Analysis of government development financing between Sukuk and Bonds

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Abstract. This study aims to examine the performance of government development financing sukuk/SBSN compared with bonds/SUN period 2014-2017. The method used is descriptive quantitative with secondary data. The data obtained were analyzed and concluded based on a predetermined framework. The results of the analysis based on the method of efficiency ratio, Data Envelopment Analysis (DEA) and Value at Risk (VaR) shown that SUN has high efficiency and high risk, while SBSN has low efficiency and low risk. Based on the analysis of the Efficient Portfolio Frontier shown that an efficient portfolio exists at risk level to 0.14% and profit rate up to 369.31% exist in the proportion of 60% SBSN financing and 40% SUN financing proportion, it means that the Sukuk financing portfolio was better rather than Bonds financing portfolio.

1. Introduction
The slow development of infrastructure is one of the factors hampering a country's economy. The government has recently focused on the role of infrastructure in increasing economic activity. Various programs have been designed to build infrastructure in the past 10 years [1]. The quality of Indonesia's infrastructure shown in the 2017-2018 Global Competitiveness Index (GCI) report places Indonesia's global infrastructure competitiveness index ranked 52 out of 137 countries [2] Referring to the publication of the World Development Report [2] the availability and quality of adequate infrastructure has a higher potential to accelerate economic growth. The more variety of problems and development programs in Indonesia has the consequence of an increasingly greater budget burden on the State Budget [3].

On the other hand, the government always faces the problem of a relatively increasing budget deficit as shown in table 1:

| Year | % Deficit to GDP | APBN Deficit (Trillions of Rupiah) |
|------|------------------|------------------------------------|
| 2014 | 2.25             | 226.69                             |
| 2015 | 2.58             | 298.49                             |
| 2016 | 2.49             | 308.34                             |
| 2017 | 2.51             | 340.97                             |

Source: Government Financial Reports 2013-2017
Based on table 1, the value of the budget deficit is relatively rising, the total government debt continues to increase every year. The total of central government debt in November 2018 was recorded at IDR 4,395.9 Trillion, this figure rose to IDR 467.3 Trillion compared to the same period in 2017. The APBN data for December 2018 showed the debt from loans amounting to IDR 784.3 Trillion and debt in the form of Government Securities (SBN) amounting to IDR 3,611.5 trillion, where the issuance of SBN in rupiah denominations and foreign currency denominations each reached IDR 2,612.6 trillion and IDR 998.9 trillion [4]. The table 2 is the total growth of Net government Securities in 2013-2017:

| Year | Total SBN/Neto (trillions rupiah) |
|------|----------------------------------|
| 2013 | 224.67                           |
| 2014 | 264.62                           |
| 2015 | 362.25                           |
| 2016 | 407.25                           |
| 2017 | 441.82                           |

Source: Central Government Financial Reports for 2013-2017 (Processed).

Table 2 shows the total growth of net Government Securities that has continued to increase. The biggest growth occurred from 2014 to 2015 with a percentage increase of 36%. But on the other hand, if linked to table 1 regarding the value of the APBN deficit, the total net SBN financing in 2013-2017 is far greater than the realization of the budget deficit. Meanwhile according to Bussing Burks in [5] if the financing is far greater than the deficit, then this has the potential to incur temporary idle funds for the issuance of SBN, the government bears the burden of debt interest. This is contrary to the objectives of government debt management mentioned by the International Monetary Fund namely "... at the lowest possible cost over the medium to long run, consistent with a prudent degree of risk".

Meanwhile, the issuance of Government Securities as a source of budget financing aims to realize the ideals of independence in financing development and exploiting the potential of Indonesia's large population. Aside from being conventional, since 2008 the offering of State Sharia Securities or State Sukuk is expected to attract investors who consider sharia aspects of the issuance of SBN.

As a predominantly Muslim country, the basis for the emergence of sukuk according to [5] is due to a mismatch of bonds which are defined as debt instruments and provide coupons in the form of interest from the principal of the bonds prohibited in Islamic law as stated in the word of Allah SWT QS. Al Baqarah: 275.

Although in terms of objectives, the sukuk function is the same as bonds, namely the increase in capital needed by both corporate and government entities. Sukuk differs from bonds because bonds are defined as long-term debt instruments issued by companies or governments [7]. [8] also suggested that sukuk as one of the sharia effects has different characteristics from bonds. Sukuk are not debt securities, but proof of ownership of assets on which the underlying assets are issued. Claims of ownership of sukuk are based on specific assets/projects. The use of sukuk funds must be used for halal business activities. Rewards for sukuk holders can be in the form of rewards, profit sharing, or margins, according to the type of contract used in the issuance of sukuk.

While the results of the issuance of the state-based sukuk project development (Project Finance Sukuk) from 2013 to 2017 continue to experience an increase. The following details the number of issuance of State Sharia Securities (SBSN) in 2013-2017 shown in figure 1:
Based on Figure 1, the Sukuk experienced rapid growth, although according to [9] the portion compared to the conventional market was still relatively small. But this is certainly a concern for the government that sukuk plays an important role in accelerating development, especially infrastructure. Nevertheless, this also indicates the occurrence of beneficial symptoms between the two parties (investors and publishers), where the government as the publisher benefits from the use of funds from the public, while the community as an investor gains profits or returns on investments made.

In general, sukuk offers the same alternatives as bonds so that they can be used as a comparison for investors in determining investment while supporting development. However, an increase in the issuance of Government Securities (SBN) that is far greater than the budget deficit each year has the potential to lead to long-term financing risk where it can make fiscal space more narrow [10]. Although so far the state budget deficit and total government debt are still below the limits as mandated by Article 12 paragraph 3 of Law Number 17 the Year 2003 concerning State Finance which states that the budget deficit is limited to a maximum of 3 percent and a maximum debt of 60 percent of Gross Domestic Product (GDP). But according to [11] the occurrence of fiscal risks that are not anticipated well will burden the budget and affect future economic growth targets.

Based on the problems described above by looking at the comparison of the total issuance of Government Securities/Surat Berharga Negara (SBN) with financing needs or budget deficits, as well as potential financing and fiscal risks in the long run, the researcher is interested in analyzing the performance comparison of the issuance of sukuk and bonds for the 2014-2017 period as government development financing instruments as measured by the level of efficiency, level of risk, and efficient portfolio. Based on these descriptions, the researchers chose the title: "Analysis of Government Development Financing between Sukuk and Bonds".

2. Literature review

2.1. Bonds - Government Securities/Surat Utang Negara (SUN)
SUN, as referred to in Law Number 24 Year 2002 in article 1 concerning Government Securities, are securities in the form of debt instruments denominated in rupiah and foreign currencies that are guaranteed interest and principal payments by the Republic of Indonesia in accordance with the validity period [12].

According to the DJA Budget Financing Book as stated in Law No.24 of 2002 Chapter III article 4 that the purpose of the issuance of Sovereign Debt Instruments is intended to finance the State Budget (APBN) deficit, covering short-term cash shortages due to nonconformities between cash flow
revenue and disbursements from the State Treasury Account in one fiscal year, managing the State debt portfolio.

2.2. Types of SUN
There are five types of Sovereign Debt Instruments issued by the Government [12], namely:
1. SPN / T-bills
2. Retail Government Bonds (Obligasi Ritel Indonesia/ORI)
3. Foreign Currency SUN
4. Saving Bonds Retail (SBR)
5. Government Bonds (ON) or T-bonds

2.3. Sukuk - State Sharia Securities / Surat Berharga Syariah Negara (SBSN)
According to article 1 of the SBSN Law Number 19 Year 2008, SBSN is Government securities issued based on sharia principles, as proof of the investment in SBSN Assets, both in rupiah and foreign currencies. What distinguishes sukuk and bonds is return. Sukuk Returns received by sukuk holders come from Profit Sharing is based on mudaraba or musharaka and Margin/fee based on murabahah, istisna, or ijarah agreements. This type of sukuk will provide a fixed return. Here are some basic differences between sukuk and bonds [12]

Table 3. Differences between sukuk and bonds.

| Characteristics       | Sukuk                                                                 | Bonds                                                                 |
|-----------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|
| Basic Principles      | Securities issued based on sharia principles, as proof of ownership/statement of an asset which is the basis of sukuk issuance | Unconditional debt statement from the issuer                           |
| Underlying Asset      | Requires underlying asset as a publishing basis                       | nothing                                                              |
| Fatwa/Sharia Opinion  | Requires Fatwa to ensure the compatibility of sukuk with sharia principles | nothing                                                              |
| Use of funds          | Can not be used for things that are contrary to Islamic principles     | free                                                                 |
| Return                | In the form of rewards, profit sharing, margin/fee, capital gain       | interest, capital gain                                               |

Source: Directorate of Islamic Finance, 2010

2.4. Sukuk Contract Type
Based on the type of sukuk contract divided into seven types:
1. Mudharabah
2. Musyarakah,
3. Ijarah,
4. Istisna’
5. Salam
6. Murabahah, and
7. Joint Portfolio Sukuk.

2.5. Types of SBSN Structure
The types of state sukuk structure according to the [12] include:
1. Ijarah Sale and Lease Back; Sukuk with Ijarah-Sale and Lease Back structure is the sale and purchase of an asset which then the buyer rents out the asset to the seller. The contract used is the bai `contract (sale and purchase) and the ijarah (lease) contract, which is carried out separately. The sale of assets to an asset is basically just the sale of a beneficial title without physical transfer and transfer of ownership (legal title). This type of structure is used in IFR, SR, Sukuk Valas and SPN-S series sukuk.
2. Ijarah Al-Khadamat; Ijarah Al-Khadamat is a sukuk issued with the aim of providing a certain service and obtaining a fee for the provision of said service so that the sukuk holder becomes the owner of the service and is entitled to a fee for providing the service.
3. Ijarah - Asset to be Leased; A state sukuk with an Ijarah structure - Asset to be Leased has been issued since 2012 with the aim of optimizing the potential of underlying assets in the form of government projects that have been allocated in the APBN. This type of structure is used in the PBS series sukuk issuance.

2.6. Type of SBSN
The types of state sukuk that have been issued by the government are as follows [12]:
1. Sharia Treasury Certificate (SPNS)
2. Retail Sukuk (SR)
3. Islamic Fixed Rated (IFR)
4. Indonesian Hajj Dana Sukuk (SDHI)
5. Project Based Sukuk (PBS)
6. Foreign Currency Sukuk
7. Savings Sukuk

3. Research methodology
The method used in this research is quantitative descriptive. The type of data used is Documentary Data and data sources used are secondary data in the form of:
1. Data on the issuance of State Sukuk / SBSN and Government Bonds / SUN obtained from the 2014-2017 Central Government Financial Report accessed through the website www.kemenkeu.go.id
2. Data on the monthly net price (net price) of SBSN and SUN for the period January 2014 - September 2017 obtained from the Indonesia Bond Pricing Agency (IBPA) is accessed through the website www.ibpa.co.id

3.1. Data Analysis Technique
Furthermore, researchers conducted a comparative analysis of the level of efficiency between Government Sukuk and Government Bonds for the 2014-2017 period using two methods of analysis, namely the Efficiency Ratio Analysis Method [13] and the Data Envelopment Analysis (DEA) Method [14], a comparative analysis of risk between Government Sukuk and Government Bonds for the 2014-2017 period through the Value at Risk (VaR) method [15].
Furthermore, this study uses the Efficient Portfolio Frontier method [16] to obtain the most efficient financing portfolio after calculating the level of efficiency and risk between Government Sukuk and Government Bonds. The software used to help with data analysis is Microsoft Excel.

3.2. Efficiency Rate
3.2.1. Efficiency Ratio Analysis Efficiency. Analysis of the issuance of Government Sukuk and Government Bonds is measured using the ratio between output and input. It is said to be efficient if it
is able to produce certain outputs with the lowest possible input or with certain inputs capable of producing maximum output. The efficiency ratio can be calculated with the help of Microsoft Excel software through the following equation [13]:

\[
\eta = \frac{\text{Total Receipts (output)}}{\text{Total Expenses (Input)}} \times 100\%
\]

In addition, researchers also used the Data Envelopment Analysis (DEA) model to measure the comparison of the efficiency levels of Sukuk and Bond issuance.

3.2.2. **Data Envelopment Analysis (DEA) Method.** The measurement of the level of efficiency of Sukuk and Bond issuance also uses the Data Envelopment Analysis (DEA) model [14] The stages in measuring the value of efficiency in the DEA method are as follows [14]:

1. Determine the DMU (Decision Making Unit), namely:
   - DMU 1 of SUN for the 2014-2017 period.
   - DMU 2 of SBSN for the 2014-2017 period.
2. Determine the output variable and the input variable. The output variable used is the revenue of Sukuk and Bond data while the input variable is the expenditure of Sukuk and Bond.
3. An analysis is carried out to obtain the value of relative efficiency using the Constant Return of Scale (CRS) model.

The mathematical equation for the CSR model DEA can be written as follows [17]:

\[
\text{Purpose } : \text{Maks}^\theta = \sum_{r=1}^{s} (v_r y_{r0})
\]

\[
\text{Obstacles } : \sum_{r=1}^{s} (v_r y_{rj}) - \sum_{i=1}^{m} v_i x_{ij} \leq 0; j = 1, \ldots, n
\]

\[
\sum_{i=1}^{m} v_i x_{i0} = 1; \text{ dan } u_r v_i \geq 0
\]

Information :
\(\theta\) = DMU Efficiency CSR Model
\(m\) = Total input
\(s\) = Total output
\(x_{ij}\) = Number of 1st DMU inputs
\(y_{rj}\) = Number of 1st DMU output
\(v_i\) = Number of DMU

The mathematical equation is then processed using the help of DEAP (Data Envelopment Analysis Program) Version 2.1 software. A DMU or a financing instrument is said to be efficient or not if the efficiency level in each DMU ranges from 0 to 1. A DMU has the best ability if the relative efficiency value is 1.0000 or 100%, while other DMUs whose values are below 100% are said its ability is still below the DMU which has been efficient (inefficient).

3.3. **Value at Risk (VaR) Method**

The method used to measure the level of risk arising from the issuance of Government Sukuk and Government Bonds is Value at Risk (VaR) with the help of Microsoft Excel Software. VaR shows how much an organization can suffer losses or be faced with uncertainty within a certain timeframe [17].
The first step is to obtain monthly net price data for the state sukuk and government bonds for the period January 2014 - September 2017 compiled from the Indonesia Bond Pricing Agency (IBPA) through the website www.ibpa.co.id. The next steps to measure Value at Risk [15] are:

1. According to [18] Sukuk and Bond return can be calculated using the equation:

\[ R_t = \frac{P_t - P_{t-1}}{P_{t-1}} \]

Information :
- \( R_t \) = i return period
- \( P_t \) = Price at time t
- \( P_{t-1} \) = Price at time t-1

2. Calculate the average (mean) of Sukuk and Bond return data. It can be used to help the average function in Microsoft Excel software with the argument of each return throughout the study period.

3. Calculate the standard deviation using the help of the stdevp function in Microsoft Excel software with the arguments for each return throughout the study period. According to [18] the equation of standard deviation can be obtained through calculations:

\[ \sigma = \sqrt{\frac{\sum_{i=1}^{n} (R_i - \bar{R})^2}{n-1}} \]

Information :
- \( \sigma \) = Standard Deviation
- \( R_i \) = log return on day i
- \( \bar{R} \) = average return in the sample period
- \( n \) = number of returns in the sample.

4. Determine a certain Confidence Level (1 - \( \alpha \)). In this study, the Confidence Level used was 95%. The 95% confidence value gives a 1.65 confidence factor.

5. Determine the holding period. In this study a monthly holding period was used with data on the issuance of Sukuk and Bonds for the period January 2014 - September 2017, so the value of the holding period was 45.

6. Calculating VaR values according to [14] can use the equation:

\[ VaR = A0 \times \alpha \sigma \sqrt{T} \]

Information :
- \( VaR \) = Maximum Potential Loss
- \( A0 \) = The magnitude of the mean (mean) return
- \( \alpha \) = Confidence level
- \( \sigma \) = Standard Deviation of returns.
- \( \sqrt{T} \) = Holding Period

From the calculation results, the value of the Government Sukuk VaR and Government Bonds is obtained as a nominal and percentage.

Therefore, a method is needed to determine the most efficient financing portfolio after the results of the analysis "High Profit Level and High Risk Level" or "Low Profit Level and Low Risk Level". The method of determining an efficient financing portfolio uses the Efficient Portfolio Frontier method [16].
3.4. Frontier Efficient Portfolio Method
The determination of an efficient financing portfolio between Government Sukuk and Government Bonds uses the Efficient Portfolio Frontier method [16].

In the efficient frontier portfolio method, the formation of an efficient portfolio is carried out by determining the financing weights (proportions) of each Sukuk and Bond included in the portfolio. In this study, researchers used weights ranging from 0%, 10%, 20%, and so on up to 100% using the help of Microsoft Excel software programs, with the target of minimizing the function of risk for a certain level of efficiency. Then the level of efficiency and risk portfolio are calculated.

3.4.1. Determine the Level of Profit (Efficiency) Portfolios. The level of profit (efficiency) of the portfolio can be calculated by adding up the efficiency levels of each Sukuk and Bonds based on their weight (proportion of financing) as in the following equation [16]:

$$\eta_p = \eta_i w_i + \eta_j w_j$$

Information :
$$\eta_p$$ = Portfolio Efficiency Level
$$\eta_i$$ = Bond Efficiency Level
$$w_i$$ = Proportion (weight) of bonds
$$\eta_j$$ = Sukuk Efficiency Level
$$w_j$$ = Proportion (weight) of Sukuk

3.4.2. Determine Portfolio Risk (VaR). Portfolio risk levels can be calculated using data on the proportion (weight) of Sukuk and Bond portfolio financing, data on the level of risk (VaR) of Sukuk and Bonds, and the degree of efficiency correlation between sukuk and bonds as shown in the following equation [16]:

$$\sigma_p = ((W_i \sigma_i)^2 + (W_j \sigma_j)^2 + 2 + (W_i W_j \sigma_i \sigma_j \rho_{ij}))$$

$$\sigma_i$$ = Bond Risk
$$W_i$$ = Proportion of fund (weight) of bonds
$$W_j$$ = Proportion of Sukuk funds (Weight) Level (VaR)
$$\sigma_j$$ = Sukuk Risk Level (VaR)
$$\rho_{ij}$$ = Correlation Coefficient between Bond and Sukuk efficiency levels

While Correlation (Correlation) between the level of profit (efficiency) Bonds and Sukuk can be obtained by the formula [16]:

$$\rho_{ij} = \frac{n \sum XY - \sum X \sum Y}{\sqrt{(n \sum X^2 - (\sum X)^2)(n \sum Y^2 - (\sum Y)^2)}}$$

Information :
$$\rho_{ij}$$ = Correlation Coefficient between Sukuk and Bonds
$$X$$ = Bond Profit (Efficiency)
$$Y$$ = Sukuk profit rate (efficiency)
$$n$$ = Number of Financing Periods

After obtaining risk level data for each change in the efficiency interval, then plotted in the risk-efficiency graph in accordance with their respective weights so that an efficient frontier graph is
obtained [19] which results in one of the most efficient portfolio points with a risk value that is the lowest and a certain value (efficiency).

Meanwhile, researchers conducted a process of reading and synthesizing in depth to further conduct quantitative descriptive analysis in comparing other requirements in the issuance of Sukuk and Bonds.

4. Discussion

4.1. Development of SBSN and SUN Issuance

Initially, Sukuk in 2008 after the ratification of Law No. 19 concerning SBSN issued only IFR (Islamic Fixed Rate) type with an issuance value of IDR 4.7 trillion. Subsequently starting in 2011, the IFR series was no longer issued and was replaced with the PBS (Project Based Sukuk) series which had relatively the same features as the IFR series. The types of projects that have been financed by the State Sukuk include infrastructure development projects (energy, telecommunications, transportation, agriculture, manufacturing), public service provision, domestic industry empowerment, and other development in accordance with the government's strategic policies. The issuance of state sukuk from 2014 to 2017 continues to increase as shown in table 4:

Table 4. Total SBSN Issuances for 2014-2017 (Trillions of IDR).

| Types of SBSN | Year  | 2014  | 2015  | 2016  | 2017  |
|---------------|-------|-------|-------|-------|-------|
| SPN-S         |       | 16.17 | 19.38 | 16.98 | 44.69 |
| SR            |       | 19.37 | 21.97 | 31.5  | 14.03 |
| PBS           |       | 9.45  | 47.25 | 91.88 | 91.7  |
| SDHI          |       | 12.86 | 4.5   | 1     | 2     |
| Sukuk-Forex   |       | 15.76 | 26.42 | 33.4  | 39.6  |
| TOTAL         |       | 73.5  | 119.52| 174.76| 192.02|

Source: Central Government Financial Reports for 2013-2017 (Processed).

Based on table 4, the total number of SBSN issuances in 2014 was IDR 73.5 trillion with the highest issuance value of Retail Sukuk being IDR 19.37 Trillion and the smallest with the issuance value of IDR 9.45 Trillion of PBS type. Retail Sukuk SR-006 series succeeded in attracting investors reaching 34,692 people. However, if examined more in comparison with other investment alternatives, investments with Retail Sukuk are quite affordable with a minimum investment of IDR 5,000,000, with a high enough rate of return and the principal guaranteed by the government.

Meanwhile, the issuance of the Project Based Sukuk (PBS) series only experienced a very small decline from IDR 91.8 trillion in 2016 to IDR 91.7 trillion in 2017. This is based on a sustainable infrastructure development project since 2016. In the past two years, PBS has become the Sukuk series with the highest issuance value of IDR 91.8 and IDR 91.7 trillion. The growth of Sukuk based on infrastructure projects increased dramatically after previously becoming the Sukuk series with the smallest issuance value in 2014 of IDR 9.45 Trillion. The results of this publication indicate that there was a large-scale infrastructure development project in early 2016 and the PBS financing scheme reflects the ability to finance the project. In general, the graph shows that the issuance of SBSN for 2014 to 2017 experienced a gradual increase with the total number of issuances up to 2017 amounting to IDR 192.92 Trillion.
Furthermore, as a comparison with the development of the issuance of SBSN, the following growth in the issuance of SUN for the period 2014 to 2017 is presented in Table 5:

| Jenis SUN       | 2014 | 2015 | 2016 | 2017 |
|-----------------|------|------|------|------|
| ON              | 199  | 220  | 301  | 224  |
| ORI             | 23.6 | 27.4 | 23.6 | 8.9  |
| SUN Valas       | 68.2 | 135  | 142.4| 103  |
| SPN             | 60.9 | 74.6 | 57.6 | 192  |
| TOTAL           | 351.7| 457  | 524.6| 527.9|

Source: Central Government Financial Reports for 2013-2017 (Processed)

Based on table 5 SUN with the series of Government Bonds (ON), ORI, and Foreign Currency SUN decreased in 2017, in contrast to the series of State Treasury Notes (SPN) which experienced a rapid rate of increase of IDR 57.6 Trillion in 2016 became IDR 192 Trillion in 2017. Whereas SPN is different from other series bonds, SPN is a short-term debt instrument sold to institutional investors (not individuals).

The smallest issuance value of the entire SUN series was recorded in the ORI series from IDR 23.6 Trillion in 2016 to IDR 8.9 Trillion in 2017. The number of issuance of retail type bonds decreased consecutively in the last three years illustrates the situation that individual investor interest in investing with ORI products is weakening. This is inversely proportional to the purpose of ORI issuance as an effort to expand the base of domestic investors who generally only save their funds in investment instruments in the form of savings or deposits which are money market instruments. So that the presence of ORI should be an alternative investment land that is no less promising like other existing investment instruments such as stocks, mutual funds, and deposits. In general, the total SUN issuance in 2014-2017 has significantly increased since 2014 amounting to IDR 351.7 Trillion until the end of 2017 amounting to IDR 527.9 Trillion.

Furthermore, the prolonged monetary crisis in Indonesia in 1998 was triggered by a decline in the value of regional and domestic currencies. Therefore, the government policy to reduce the issuance of foreign debt began to be promoted since 1999 through a strategy of issuing domestic debt. SBN has now become the main source in meeting funding targets in the APBN (Anggaran Pendapatan dan Belanja Negara) because they have a significant influence. In order to meet these targets, the government as much as possible continues to explore the potential sources of financing from within the country, namely by issuing Rupiah-denominated SBN on the domestic market. However, with various considerations such as limited absorption capacity of domestic securities and the need to fulfill benchmarks for Indonesian securities denominated in USD, the government issued Government Securities in foreign currencies on the international market.

To see the development of the issuance of Foreign Currency SBN, the following is presented data on outstanding Foreign Currency Government Securities (SBN) in 2014-2017 in Table 6:

| Year | SBN Valas |
|------|-----------|
| 2014 | 456       |
| 2015 | 658       |
| 2016 | 692       |
| 2017 | 907       |

Source: Central Government Financial Reports for 2013-2017 (Processed).
Based on table 6, the outstanding value of foreign currency SBN grew significantly from IDR 456 Trillion in 2014 to IDR 907 Trillion at the end of 2017. Indonesia's debt position that is open to currency volatility should make the government have good and reliable risk management instruments to protect the value of government debt, given the volatility of the currency has a significant influence on the increase in the value of loans and nearly half of government debt in foreign currency denominations. Central Government Financial Report (LKPP) notes that Foreign Currency SBN is dominated by SUN. There are 22 series of foreign currency SUN with 18 series having USD denominations (including domestic SUN denominated in foreign currencies), 1 series denominated in Euro and 3 series with denominations of JP ¥. While there are only 4 series of USD- denominated foreign currency SBSN. This indicates that the SBSN scheme is able to control the government to issue foreign currency denominated securities because they must be based on clear underlying assets before issuance.

Data on the development and issuance of outstanding SBSN and SUN from 2014 to 2017 above generally illustrates that SBSN in Indonesia is growing rapidly or increasing significantly each year. However, the contribution of SBSN to development financing is still low. This is evidenced by the data portion of SBSN issuance in Indonesia is still relatively very small when compared to the portion of bond issuance.

4.2. Efficiency Level of SBSN and SUN Issuance

4.2.1. Based on Efficiency Ratio. The level of efficiency between SBSN and SUN issuance can be seen from how much the ratio obtained from the calculation between each output (revenue) generated by the input (expenditure) issued. The following table presents the results of the calculation of the efficiency ratio from 2014-2017.

| Year | Sukuk (%) | Bond (%) |
|------|-----------|----------|
| 2014 | 340.95    | 536.90   |
| 2015 | 286.16    | 443.56   |
| 2016 | 325.90    | 542.31   |
| 2017 | 187.85    | 459.04   |
| Mean | 285.21%   | 495.45%  |

Source: The data is processed by researchers from the results of the calculation of the efficiency ratio, June 2019.

Based on table 7, (data processing Appendix) illustrates the level of efficiency of SBSN and SUN from 2014 to 2017 tends to fluctuate. The average percentage rate of return on SBSN issuances reached 285.21% while SUN reached 495.45%. Quantitatively, the results of the calculation of the efficiency ratio above conclude that SUN is more efficient than SBSN. However, if analyzed further based on data on the development of SBSN issuance, the type of PBS dominates nearly half of the total issuance of SBSN. While the characteristics of the PBS series SBSN type are different from other types of SBSN instruments or SUN instruments themselves. The SBSN PBS objectives have been determined based on infrastructure projects that have been planned to be used as underlying assets and may not be used for other things. This is the major value of PBS SBSN compared to other types of SBSN or SUN because the use of the financing is clearly for projects that are of sustainable productive nature such as in the case of using toll road project financing, bridges, railways, irrigation channels, etc.
It means will be a positive impact on the national economy as a whole in the long run. This is what then makes the outline of the SBSN issuance efficiency up to 2017 look very lacking because the SBSN financing scheme pays close attention to long-term efficiency and a clear issuance basis for future risk management of financing can also be controlled.

4.2.2. Based on the Data Envelopment Analysis (DEA) Method. Level of efficiency between SBSN and SUN based on the results of DEA-CRS processing shown in the following table:

| DMU No. | DMU Name | Input-Oriented CRS Efficiency | RTS       |
|---------|----------|-------------------------------|-----------|
| 1       | BONDS    | 1.00000                       | Constant  |
| 2       | SUKUK    | 0.91017                       | Decreasing|

Source: The researchers processed the data from the results of the DEAP software calculation version 2.1, June 2019.

Based on table 8, above, the results obtained in the Input-Oriented CRS Efficiency column where the DMU SUN produces a value of 1 which means that the issuance of SUN for the 2014-2017 period has the best or relatively efficient ability, while the DMU SBSN produces a value of 0.91017 which means that SBSN is relatively inefficient or its ability is still below the already efficient DMU SBSN.

Meanwhile, the Return to Scale (RTS) of the DMU SUN shows the position of Constant which means that if an additional 1% of SUN input will result in an increase in output in the same proportion. Whereas the SBSN DMU RTS shows the position of Decreasing which means that if a 1% increase in the input will increase output smaller than 1%. This means that the SBSN DMU has not been able to use its inputs appropriately or in other words the use of inputs is not proportional to the amount of output produced.

Quantitatively based on the DEA method, it concluded that during the issuance period of 2014 to 2017, SUN had the best performance and was stated to be more efficient than SBSN. However, the efficiency values of the two instruments did not show a significant difference. Over the past four years, the issuance of SBSN has been dominated by PBS types, where these PBS types are sustainable productive projects so that their efficiency values cannot be seen directly. That is why spending to finance infrastructure is not directly proportional to income. Some infrastructure projects that have been completed have not produced quick income in a short time. Unlike the case with SUN whose issuance results are directly used and utilized in terms of covering the general budget deficit such as state spending.

4.3. Risk Level of SBSN and SUN based on the Value at Risk (VaR) Method
Risk levels for the issuance of SBSN and SUN for 2014 to 2017 were calculated using the Value at Risk (VaR) method. For the details, the VaR calculation results are shown in the following table:

| SUKUK | Bond |
|-------|------|
| Total Return | 28.73% | 35.05% |
| Mean Return | 0.64% | 0.78% |
| Standard Deviation | 2.06% | 1.88% |
| Confidence Level | 95% | 95% |
| Holding Period | 6.708203932 | 6.708203932 |
Correlation 0.759007614
VaR 0.15%
NOMINAL VaR IDR 210 M
IDR 774 M

Source: The researchers processed the data from the results of the calculation of the Microsoft Excel software Value at Risk (VaR) method, June 2019.

Table 9, shows the results where with a 95% confidence level, the chance of a loss in the issuance of SBSN is 0.15% with a maximum possible loss of IDR 210.7 billion to the average total issuance of IDR 140.4 Trillion each year. Whereas in the issuance of SUN the probability of loss is 0.16% with a maximum possible loss of IDR 774.4 billion to the total average of IDR 465.3 trillion annually. This indicates that the quantitative risk value of SUN is greater than the risk of SBSN. If analyzed further, the risk of SBSN is indeed lower or can be called relatively safe compared to the SUN.

First, the floating exchange rate system (following market prices) has its own impact on each issuance of government securities, especially those denominated in foreign exchange (forex). Indicators of debt portfolio exchange rate risk are shown by the ratio of foreign currency debt to total debt. Until the end of 2017, the value of foreign currency SBN outstanding reached IDR 907 Trillion against the total outstanding SBN of IDR 1,194 Trillion. Aside from the residual effects of the issuance of foreign currency SBN, exchange rate risk is also caused by the impact of the depreciation of the Rupiah against foreign currencies. SBSN can minimize exchange rate risk because it returns to the sukuk system which requires an underlying asset with a profit sharing scheme where the risk will be borne jointly.

Second, interest rate risk does not become a benchmark in SBSN as prevailing in SUN which requires the payment of interest as a return for investors. In addition to fixed rate SUN, the risk of rising interest rates will have more impact on variable rate floating bonds, which will cause an outstanding debt portfolio to increase and an increase in the nominal outstanding portfolio with interest rates. The variable rate will increase portfolio sensitivity to changes in the benchmark interest rate, and vice versa.

4.4. Efficient Financing Portfolios
The results of the calculation of the SBSN and SUN efficient financing portfolio are shown in the following table:

| SUN   | SBSN | Portfolio efficiency | Var portofolio |
|-------|------|----------------------|----------------|
| 0%    | 100% | 285.21%              | 0.15%          |
| 10%   | 90%  | 306.24%              | 0.14%          |
| 20%   | 80%  | 327.26%              | 0.14%          |
| 30%   | 70%  | 348.29%              | 0.14%          |
| 40%   | 60%  | 369.31%              | 0.14%          |
| 50%   | 50%  | 390.33%              | 0.15%          |
| 60%   | 40%  | 411.36%              | 0.15%          |
| 70%   | 30%  | 432.38%              | 0.15%          |
| 80%   | 20%  | 453.40%              | 0.15%          |
| 90%   | 10%  | 474.43%              | 0.16%          |
| 100%  | 0%   | 495.45%              | 0.16%          |

Source: The data is processed by researchers from the results of the calculation of Microsoft Excel software efficient frontier portfolio method, June 2019.
Based on table 10, above it can be seen that SBSN financing has a low level of profit (efficiency) of 285.21% and a low risk level of 0.15%. Then followed by SUN financing which has a high level of profit (efficiency) of 495.45% and a high level of risk of 0.16%. This is common because, behind a high risk, there is the potential for a balanced reward in accordance with the prevailing investment principle of "high risk high return, low risk low return". Therefore, Indonesia as a state institution certainly needs to take a closer look at the decision making in issuing SBN or other financing instruments.

In allocating debt through SUN or Bond financing instruments, the government cannot ascertain whether the debt is allocated to productive projects whose profit potential can be higher than the cost of debt because the debt obtained in the end cannot be traced with certainty. This is because every time there is a fund that is obtained, it will go into the public cash account of the State and be mixed with funds from other sources such as tax collection, non-tax state revenue, receipt of grants or even sourced from external loans country. The funds of the SUN or Bond instrument to be difficult to track their use. So, it can be used to finance various types of shopping. The effectiveness of indeterminate debt can be minimized by the SBSN financing instrument because the Sukuk system requires that its designation is clear for what it is and must be in accordance with sharia compliance, as well as its issuance basis.

Therefore, to determine the most efficient financing portfolio between SBSN with low efficiency and low risk levels and SUN with high efficiency and high risk levels, the method to be used is the final stage method of the efficient frontier portfolio model through the results of efficiency calculations and portfolio risk that has been obtained previously is then plotted into a graph that has been processed in the Efficient Portfolio Frontier software to obtain an efficient portfolio point or outline. For more details, the Frontier Efficient Portfolio Graph is shown in figure 2:

![Efficient Portfolio Frontier](image)

Source: The data is processed by researchers from the calculation of the Frontier Efficient Portfolio method, June 2019.

**Figure 2.** Efficient portfolio frontier of SBSN and SUN.

The SBSN and SUN Frontier Efficient Portfolio graph above shows one of the most efficient portfolio points, namely at the risk level of 0.14% with a profit rate (efficiency) of 369.31% in the proportion of 60% financing in SBSN and 40% SUN. This indicates that SBSN financing has better performance than SUN financing. In a further analysis, if the development financing system in Indonesia publishes a larger portion of SBSN financing than SUN, it would certainly not be mainstream (general), seeing the comparison of the development portion of the issuance in recent years the two instruments are very much different. SUN with an average financing exposure of IDR
465.3 Trillion annually while SBSN with an average financing exposure of IDR 140.4 Trillion annually. So based on the analysis that has been done, Indonesia as a country with a deficit policy taken in the formulation of the APBN needs to consider carefully in finding and choosing each alternative development financing that is right on target.

If viewed in terms of the issuance requirements between State Sukuk / SBSN and Government Bonds / SUN, the most basic difference is that Sukuk uses a capital investment (investment) approach, in this case, must be guaranteed with underlying assets that must be halal (according to sharia compliance) in nature and used in Halal activities, while Bonds use a debt approach that guarantees the principal and interest to be paid to maturity. In theory, the bond issuance requirements do look easier or more efficient when compared to Sukuk which must include assets as a basis for issuance. However, if we look at it with a long-term orientation, the inclusion of this asset makes the government more able to control the issuance of securities because it adjusts to the needs and capacity of the underlying assets. As explained earlier, there was a significant difference between the realization of the value of SBN financing, which was always far greater than the funding needs (APBN deficit). So, in this case, the government will be at the level of being able to control long-term debt.

Meanwhile, because the Bonds use a debt approach, the government must continue to refinancing or issuing bonds to finance maturing bonds. The increase in government securities (SBN) each year includes the refinancing of old debts that are due. Fuad Rahmani's research in [10] generally concluded that the issuance of Government Bonds / SUN which was partly used to cover old debts would pose a risk of the debt trap. This will weaken the government's ability to play its fiscal role as a stimulant of the country's economy and not potentially hamper national economic recovery efforts in the long run. The profit scheme offered by Sukuk, which is Profit Sharing based on Mudarabah and Margin / Fee contracts based on an ijarah agreement, is certainly different from the profit-based SUN issuance scheme. So that any nominal amount of Sukuk issued as long as it is in the benchmark (benchmark) of Sukuk rules, the budget deficit covered by the issuance of Sukuk will be safe and stable. Meanwhile according to AAOIFI in [20] the capital investment approach in Sukuk makes sukuk sale and purchase transactions deemed capable of integrating the real and financial sectors because sukuk ownership can be evidence of ownership of underlying assets for issuance.

However, at present, the planned move of the capital from Jakarta to East Kalimantan has been officially chosen and announced by President Joko Widodo as the center of Indonesia's new government. Despite the controversy and debate arising from the emergence of the capital city transfer plan, at least IDR 466 trillion is needed and up to 24 years is needed for a stable process of infrastructure development mainly in the energy, telecommunications, and transportation sectors which plans to commence in 2024 [4]. It seems that the need for infrastructure spending will again become a priority for President Joko Widodo's administration in this second period. By looking at Indonesia's potential development financing needs that are quite large in the coming years, the sukuk financing scheme can actually be an alternative solution for infrastructure financing that can maintain fiscal sustainability in the long term. Compared to issuing debt or bonds which have recently become alternative financing for national strategic projects to cover the need for infrastructure funds, in fact, this scheme has a much greater risk especially in terms of movements in reference interest rates which play a major role in determining the efficiency of development financing infrastructure in Indonesia.

Currently, the sukuk innovation model is developed by optimizing the use of waqf assets. The Sukuk model that uses waqf land as the underlying in issuance will eliminate the costs of procurement of underlying assets, as the cost of asset acquisition is a logical consequence in the issuance of sukuk. According to [21] in his analysis related to the optimization of infrastructure development through productive waqf innovations stating that the use of waqf land as an underlying asset in sukuk issuance can provide a multiplier effect, because cost efficiency is obtained not only at the time of issuance of waqf sukuk, but the government can make savings when development activities are carried out. The integration of waqf land assets with sukuk financing instruments especially by using the contract of Ijarah Al Muntahiya Bittamlık can provide a more efficient cost guarantee in the implementation of
development. To implement the design, the government needs to conduct a deeper study and coordinate with various related institutions in order to realize the implementation of the waqf sukuk design as one of the sources of development financing instruments in Indonesia.

5. Conclusion
From the results of the analysis and discussion above, the researcher can draw the conclusion that the performance of SBSN financing is better than the financing of SUN. This assessment is based on several considerations:

First, data on the development of issuance and outstanding of SBSN and SUN as well as outstanding foreign currency SBN for the period of 2014 to 2017 generally illustrates that SBSN in Indonesia is growing fast and supporting financial inclusive programs. However, the contribution of SBSN to development financing is still low. This is evidenced by the data portion of SBSN issuance in Indonesia is still relatively very small when compared to the SUN.

Second, an analysis of the efficiency level shows that in general, the SUN has higher profit (efficiency) levels compared to SBSN. The efficiency ratio shows the average level of profit of the SUN for the 2014-2017 period of 495.45%, while the SBSN amounted to 285.21%. While the calculation results of the Data Envelopment Analysis (DEA) method show that Bonds produce a value of 1 which means relatively efficient or has the best ability and shows the position of Constant, which means that if an additional 1% of SUN input will result in an increase in output in the same proportion, whereas SBSN produces a value of 0.91017 which means the relative inefficiency or ability is still below the SUN that has been efficient and shows the position of Decreasing which means that if a 1% increase in input will increase output smaller than 1%.

Third, SUN carries a higher level of risk compared to SBSN. The calculation of the Value at Risk (VaR) method shows the results with a 95% confidence level the chance of a loss in the issuance of SBSN is 0.15% with a maximum possible loss of IDR 210.7 billion to the average total issuance of IDR 140.4 Trillion each year, while in the probability of loss bonds is 0.16% with a maximum possible loss of IDR 774.4 billion to the average total issuance of IDR 465.3 trillion per year.

Fourth, the SBSN financing portfolio for the 2014-2017 period has better performance than the SUN. It evidenced from the calculation results of the Efficient Portfolio Frontier method which shows the most efficient portfolio point at the risk level of 0.14% with a profit rate (efficiency) of 369.31% in the proportion of 60% financing in SBSN and 40% SUN.

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