Indonesian Green Sukuk (Islamic Bond) of climate change: A revisited analysis

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Abstract. Significant demand for Indonesian green sukuk did not automatically relate to the performance after issuance. The performance was not good as expected due to macroeconomic factor. Thus, this paper aims to analyze the performance of second green sukuk performance issuance as well as other green bonds in Indonesia. The research employs the descriptive method based on the price movement of green sukuk with others for benchmarking and correlation analysis. The result is different from the previous research such as Euro currency that does not affect Indonesian USD-based green sukuk. In addition, second Indonesian green sukuk is better than the previous one, and local green bond has a better performance than Indonesia green sukuk.

1. Introduction
The first issuance of Indonesian green sukuk has recorded a history of green project development in Indonesia. Projects must be verified by an independent agent for a green compliance issue. Demands from investors were so big as the result of oversubscribed bid for the issuance. The first green sukuk issuance in 2018 showed that many investors were aware of the green issue especially related to climate change. However, the price performance after the issuance was not so good as the price decreased due to Euro strengthening compared to US Dollar.

The first issuance of green sukuk was successful, so the government issued the second bond in 2019. The second issuance was equally successful as many investors were waiting for this. However, the issuance of the first sukuk amounted only USD 2bn, which was smaller than the first one, (USD 3bn). The coupon rate increased from 3.9% to 3.75%. This can be a significant factor of the high demand for this kind of bond.

This paper expects to overcome the gap by discussing the performance of second Indonesian green sukuk (Islamic bond) concerning the climate change which was absent in previous papers. The paper would be the first to discuss the performance of second Indonesian green sukuk (Islamic bond). The paper also analyzes trend analysis and Yield to Maturity (YTM).

This paper aims to evaluate Indonesia green sukuk performance after the second issuance. The paper expects to identify if the green sukuk issuance has a consistent pattern. Other factors may affect the performance of the green sukuk until maturity date. The factors and their relationship with the performance may be used to support investment decisions, hence investors would benefit from this paper. Siswantoro initiated a research on Indonesian sovereign green sukuk in 2018 [1]. He found that Indonesia sovereign green sukuk did not show better performance than such other sovereign green bonds as France, Poland, Belgium, and Nigeria bonds. This may be caused by the fact that other green bonds are based on Euro which was strengthened at that period. In 2019, compared to vanilla bond,
sovereign green bond of Hongkong was more oversubscribed than Chile. Chile, Poland and Netherland green bonds are more tightened than vanilla bonds [2].

As discussed by Siswantoro, French green bond has a lower yield than others while the demand for this bond is also high. Besides, the unique characteristics of green bond is similar to climate bonds [1]. In addition, green bond market is similar to the general bond [3]. So, it has a similar opportunity for investors but green bond is less liquid than others [4]. Investors demand for competitive price for green bonds [5]. They also have a specific preference as sovereign green bonds are not demanding. In other cases, municipal green bonds have a better performance than general municipal bonds. The issue of sustainability also contributes to this factor [6].

Siswantoro & Syakhroza have analyzed that climate bond has been mostly based on Euro rather than USD denomination [7]. The size of climate bond does not relate to the period of climate bonds. Furthermore, Siswantoro also stated that green bond should be standardized in order to be understood by investors [8]. This included the objective determination of Sustainable Development Goals (SDGs) as each green bond had different standards for SDGs objectives [9].

2. Method

The research uses data from secondary market, from various publicly available data sources. The bond price is taken from Bloomberg server. The samples are green bonds from Indonesia, France, Nigeria, Poland, Belgium and local green bonds in Indonesia. Most green bonds are Euro-based, except Indonesia which are USD-based and Rupiah-based for local green bond.

The research applies index-based analysis of, (a) the period of issuance of green sukuk with other green bonds to see the comparability of the first and second green sukuk to others and (b) Yield To Maturity (YTM) analysis which analyses the yield of each bond in a specific period. The comparison would be beneficial for investors to decide the investment.

3. Results and discussion

Siswantoro & Syakhroza analyzed that Indonesian green sukuk (Idn) has a high correlation to Euro which strengthened at that period [7]. However, the observation period is still below two months which may not be valid. The extended period would give a comprehensive analysis of buying or selling green sukuk in the secondary market.

In Figure 1, we can see that Indonesian green sukuk (Idn) declined until November 2018. It started to increase above the normal price in the early of February 2019. On the other hand, conventional bond (Nidn) decreased sharply until September 2018. Although it started to increase, the performance was still under Indonesian green sukuk. Green bond of France (Fr) and Belgium (Belg) has a similar pattern. However, France was performing better, while Poland (Pol) bond remained stable along the period. EUR/USD pattern does not have correlation to the price movement of Euro- or USD-based green bond. This is different from the previous paper as the observation period is too short. But each type of the same denomination currency basis (Euro (Belg and Fr), USD (Idn and Nidn) has similar pattern (see Figure 1).
Figure 1. Green bond performance at the first date issuance.

The result is consistent with Partridge & Medda who compared a research on green bond and general bond in USA [6]. In Indonesia, green sukuk has a larger market than general bonds which can be bought by conventional market. So the result may be different from Reboredo and Febi et al. [3][4]. They are different and green sukuk is more liquid than general bonds in Indonesia.

Table 1. Statistic descriptive of green bond 1.

| Description | Min  | Max  | Mean  | Std. Deviation | Skewness Statistic | SE  | Kurtosis Statistic | SE  |
|-------------|------|------|-------|----------------|--------------------|-----|---------------------|-----|
| Yidn        | 2.05 | 4.46 | 3.4497| .75893         | -.337 .107         | -1.434 .213 |
| Yfr         | .05  | 1.52 | .9680 | .45300         | -.511 .107         | -1.372 .213 |
| Ybelg       | -.17 | 1.31 | .7420 | .48002         | -.461 .107         | -1.446 .213 |
| Ypol        | -.43 | .13  | -.1177| .15708         | -.222 .107         | -1.223 .213 |
| Ynidn       | 5.37 | 8.49 | 6.9968| .76748         | -.025 .107         | -.936 .213  |

For investors which have a long term investment period, Yield to Maturity (YTM) can be a benchmark. In this case, Indonesian green sukuk can be the best choice for long term investment until maturity. Average of YTM of Indonesian green bond is 3.44%. This is the highest rate of other green bonds. However, conventional green bond has the highest YTM in this case (see Table 1). In this case, YTM of general bond is higher than green sukuk in Indonesia. Therefore, general bond is good for Held to Maturity type investors.

In the second analysis explains in Figure 2, we add second issuance of Indonesian green bond and other green bonds such as Star Energy (Star) and SMI (Smi). Star Energy issued green bond in USD while Star Energy issued in Rupiah. We only include Belgium (Belg) and Lithuania (Lith) green bonds as France green bond outperformed others. Second Indonesian green sukuk (Idn2) outperformed
the first issuance (Idn) while, conventional (Nidn) and SMI bonds were more volatile than the green bond. Star Energy bond was the most outperforming but decreased sharply at the end of February 2020. No such further information as the liquidity or market preference is available. The volume of Star Energy green bond is also bigger (USD580mn) than second Indonesia green bond (USD750mn). However, Star Energy bond has 15 years maturity while Indonesia green sukuk has only 5.5 years maturity (see Table 2).

### Table 2. Green sukuk/bond in Indonesia [10].

| Issuer                        | Amount issued | Issue date | Maturity (year) | External reviewer | Use of proceeds |
|-------------------------------|---------------|------------|-----------------|-------------------|-----------------|
| Republic of Indonesia         | USD 750m      | 2019       | 5.5             | CICERO            | Energy, Buildings, Transport, Waste, Land Use, Adaptation and Resilience |
|                               | USD 1.25bn    | 2018       | 5               |                   |                 |
| PT Sarana Multi Infrastruktur| IDR 500bn     | 2018       | 5               | CICERO            | Energy, Transport, Water, Waste, Land Use |
|                               | (USD 50m)     |            |                 |                   |                 |
| Star Energy                   | USD 580m      | 2018       | 15              | Carbon Trust      | Energy          |

![Figure 2. Green bond performance at the first date issuance.](image_url)

The next analysis is Yield to Maturity (YTM) issue. From Table 3, we can see that second Indonesian green sukuk has higher YTM than the first sukuk. However, SMI green bond is even higher than the conventional bond (this bond is in IDR), followed by general bond then Star Energy bond. The result of benchmarking may be contrary to the YTM result in the first analysis, but not for in this case.
Table 3. Statistic descriptive of green bond 2.

| Description | Min  | Max  | Mean  | Std. Deviation | Skewness Statistic | SE | Kurtosis Statistic | SE |
|-------------|------|------|-------|----------------|-------------------|----|--------------------|----|
| Y2idn       | 2.05 | 3.75 | 2.8171| .48925         | .483 .148         |    | -1.100 .294        |    |
| Y2belg      | -.17 | 1.02 | .3465 | .33722         | .554 .148         |    | -1.014 .294        |    |
| Y2nidn      | 5.37 | 7.64 | 6.6306| .55661         | -.287 .148        |    | -.499 .294         |    |
| Y2ind2      | 2.20 | 3.96 | 2.9634| .51896         | .415 .148         |    | -1.212 .294        |    |
| Y2smi       | 6.71 | 8.74 | 7.9171| .48413         | -.276 .148        |    | -.569 .294         |    |
| Y2star      | 5.72 | 7.03 | 6.4075| .38283         | -.128 .148        |    | -1.334 .294        |    |
| Ylith       | .1  | 1.12 | .5223 | .34477         | .541 .148         |    | -1.361 .294        |    |

4. Conclusion
First Indonesian green sukuk does not outperform others such as France and Belgium green bonds except Poland. However, the performance of YTM is the highest as it is stable and give higher coupon rate while second Indonesian green sukuk is better than the first, but is still below the Belgium green bond. Local green bond like Star Energy has better performance for the price movement than Indonesian sovereign green sukuk. the YTM has IDR basis green bond and has higher coupon rate than Indonesian sovereign green sukuk.

Coupon rates may not always determine the performance of price movement of green sukuk/bond. The denomination of currency and demand can affect the price movement of the bonds. This paper shows that second Indonesian green sukuk has better performance than the previous one in both aspects.

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