Performance of Indonesian green sukuk (islamic bond): a sovereign bond comparison analysis, climate change concerns?

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Abstract. Commonly, green sukuk is highly demanded by investors as it promotes green activities which give a good image for investors. This would support climate change issues. This paper’s objective is to analyze the performance of green sukuk’s price after the issuance date. During the offering period, most green sukuk was oversubscribed, which may implicate after the issuance. The method applied for this research was the descriptive method by comparing the prices’ movement of green sukuk with another green bond after issuance and similar bond for benchmarking and correlation analysis. The result showed that since the condition during the offering period was oversubscribed, it does not necessarily correlate to the performance after issuance period of green sukuk. The decrease of Indonesian green sukuk prices are caused by macroeconomic factors hence the good image of green activities does not always attract investors directly. Climate change issues may not be the first consideration since investors may only seek for profit motive.

1. Introduction
The growth of green bond has been accepted well by investors since June 2007. The first green bond was issued by European Investment Bank (EIB) without independent review. The second green bond was issued in November 2008 by World Bank-International Bank for Reconstruction and Development (IBRD) with CICERO as an independent review. In fact, no research on the performance of this green bond or sukuk price has been conducted since the issuance. Green bond or sukuk should have a good image for investors as it supports green activities which preserved the environment and maintain the balance of the ecosystem. Thus, green sukuk or bond has intrinsic value which can imply investors’ support for green activities.

Demand for the green bond is quite big as investors seek not only profit but also due to the good image of this bond. This can be a credit to the company to show that they also concern with the environmental issues. Climate change issues have a direct correlation to the green bond demand as it gives credit to the investor, hence investors should keep it to maintain the good image.

The objective of this paper is to analyze the performance of green sukuk in the secondary market. The characteristic of a green sukuk investor may be different with Islamic investors, which may dominate the market share. However, in the secondary market, many factors can affect investors to either buy or sell the green bonds. In turn, this would affect the performance of green bonds.
2. Literature review

No paper has discussed the performance of sovereign green bond price. So far, the discussion on green bond has been focused on the characteristics and classification of the bond. While the report on green bond price data was issued by the Climate Bond Initiative (CBI).

Reboredo [1] stated that green bond, in general, has a stronger correlation to fixed income market. This would not give diversification for investors to green bond with other similar investments. Meanwhile, Schmitt [2] argued that green bond was traded in lower yield compared to others in 2016 and 2017, but it tended to decrease without significant difference. Febi et al. [3] studied that there is a liquidity risk on a green bond. The bigger bid-ask measure would lead to a bigger yield of the green bond.

![Figure 1. Comparative of the yield of French Green Bond](Source: CBI, 2018[4])

Most second opinions used Sustainalytics (Poland, Belgium, Fiji), while Indonesia used CICERO and the only country which uses US dollar for the green bond [6]. French has a lower yield at the issuance date (Figure 1). This can be a cheap cost for the green bond. Meanwhile, the demand for a sovereign bond is lower compared to others, whereas US green bond has a bigger demand than Euro (Figure 2) [4].

![Figure 2. Oversubscription of EUR green bond](Source: CBI, 2018[4])
CBI has no report on sovereign bond in Q2 of 2017. In Q1 of 2018, Indonesia issued USD1.25 billion of the green bond and becoming the first sukuk (Islamic bond) green bond in the world, while Belgium issued USD5.5 billion as the second biggest green bond after French. They used almost 85% for rail transport network investments. The first sovereign green bond was issued by Poland in 2016 [5]. In general, the most allocation is on energy 36% and transport (Figure 3).

3. Research method
The research method is based on quantitative data of the green bond price in each country. The data is taken from the Bloomberg server, with period extends from the date of bond issuance to a specific date. The sample comprises some green bonds from Indonesia, France, Nigeria, Poland, Belgium in Euro and US dollar, also Indonesian conventional bond of with the same maturity for comparison. Fiji green bond was eliminated since the data is not available.

The analysis is based on the index-based comparison, i.e.: (a) based on the first date of green bond issuance in each country; (b) based on the same period as Indonesian green bond issuance to see the comparative bond price and similar conventional bond is also added; and (c) based on the first date of green bond issuance in each country. These analysis would see the consistent pattern of the green bond in each country. In addition, Pearson correlation analysis was used to see the correlation between green bonds and related exchange rate.

4. Analysis
Indonesian green bond price performance gradually decreased from the first date of issuance to the 73rd. This may be caused by a less conducive market such as reflected by Rupiah (IDR) currency decrease. However, since the bond is in the US dollar, the decrease in IDR should not be the main cause of the decrease in price performance. Another possibility is the flight to safety of funds from emerging markets instruments, due to the increase in the Fed Funds Rate, concerns on the impact of a trade war on growth, also the oil price increase since Indonesia is a net oil importer.

French green bond dropped significantly after the first date of issuance, but it had an increasing trend with high volatile. Such was also the case for Belgium green bond, but the increasing trend was not as high as French (Figure 4). The most stable green bond was Poland, which was stale price from 0 to 1.01. Nigerian green bond was unique since it increased sharply after the first issuance date and then started to decrease. A common trader would prefer European green bond with the increasing price trend rather than Indonesian green bond.
The next analysis was based on the same period with Indonesian green bond issuance until 6 June 2018. French and Belgium green bonds have a similar pattern, but French has higher price index (Figure 5). Meanwhile, Poland green bond was the most stable with the lowest coefficient of variation (0.1%). Indonesian green bond decreased after the first date issuance, for similar comparison bond with the same maturity was added (Indonesian conventional bond). However, it was worse than the
green bond, since it decreased more sharply. This may be due to the Indonesian conventional bond was in Rupiah, not in US dollar.

The ratio of Euro to US dollar was added to see the comparative analysis. During the period where Euro weakened, the Euro-based green bonds (French and Belgium) increased except Poland. Using Pearson correlation analysis, we can see that Indonesian green bond has a significant correlation (0.869) to EUR/USD and the conventional bond gave higher correlation (0.912). However, Euro green bonds do not have opposite significant correlation, except Poland, but it is small (Table 1).

Table 1. Correlation analysis of green bond performance

| Variable | Pearson Correlation | Sig. (2-tailed) | N |
|----------|---------------------|-----------------|---|
| Indonesia | 1                   |                 | 73|
| France   | .110                | .354            | 73|
| Belgium  | .121 .987**         | .308 .000       | 73|
| Poland   | -.519** .321** .310** | .000 .006 .008 | 73|
| Indonesia1 | .956** .153 .152 -.446** | .000 .195 .200 .000 | 73|
| EURUSD   | .869** .006 -.021 -.426** .912** | .000 .960 .860 .000 .000 | 73|

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2. Descriptive Analysis of green bond performance

| Variable | N | Minimum | Maximum | Mean | Std. Deviation | Variance | Skewness Std. Error | Kurtosis Std. Error |
|----------|---|---------|---------|------|----------------|----------|---------------------|---------------------|
| Indonesia | 73 | .97     | 1.00    | .9881| .00812         | .000     | -.446 .281          | -1.295 .555         |
| France   | 73 | 1.00    | 1.03    | 1.0190| .01017         | .000     | -.323 .281          | -1.971 .555         |
| Belgium  | 73 | 1.00    | 1.02    | 1.0114| .00746         | .000     | -.276 .281          | -1.180 .555         |
| Poland   | 73 | 1.00    | 1.00    | 1.0016| .00105         | .000     | -.250 .281          | -1.183 .555         |
| Indonesia1 | 73 | .95     | 1.00    | .9791| .01618         | .000     | -.364 .281          | -1.501 .555         |
| EURUSD   | 73 | .94     | 1.01    | .9841| .02143         | .000     | -.634 .281          | -1.136 .555         |

All Euro green bonds have a significant correlation with each other, but Poland has a small correlation even though it is significant (Table 1). Then, the most volatile green bond is French (1%
for the coefficient of variation), followed by Indonesia (0.82%), Belgium (0.74%) and Poland (0.1%). By this, we can predict the characteristics of an investor of the green bond.

From Table 2, all green bonds have similar characteristics for skewness and kurtosis, which were negative. This means the tail tends to be at the left of the normal curve and thinner, hence it is not normally distributed.

5. Conclusion
Indonesian green bond has distinctive characteristics compared to other sovereign green bonds such as French and Belgian. Only Indonesia uses the US dollar, while others use Euro and local currency such as Nigeria and Fiji. Indonesian green bond highly correlated with Euro and US dollar, while the conventional bond has a worse indicator than the green bond.

For a trader, they would prefer a green bond with high volatility and increase price trend such as French and Belgian green bonds. US dollar green bond may have a significant correlation to the movement of the Euro to US dollar index. Climate change issues may be ignored by investors as they exclusively based on profit motive. Further issues of green quality to investors would be an interesting topic to be discussed further.

References
[1] Reboredo J C 2018 Green bond and financial markets: Co-movement, diversification and price spillover effects Energy Economics 74 38-50
[2] Schmitt H J 2017 A parametric approach to estimate the green bond premium Work project master finance (London: NOVA – School of Business and Economics)
[3] Febi W, Schäfer, D, Stephan A and Sun C 2018 The impact of liquidity risk on the yield spread of green bonds Finance Research Letters
[4] Climate Bonds Initiative 2018 Green bonds market summary Q1 2018 URL: www.climatebonds.net/files/reports/q1_2018_highlights_final.pdf
[5] Climate Bonds Initiative 2018 The green bond market in Europe 2018 URL: www.climatebonds.net/files/reports/the_green_bond_market_in_europe.pdf
[6] Climate Bonds Initiative 2018 Sovereign green bond briefing URL: www.climatebonds.net/files/reports/sovereign_briefing2017.pdf