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Full Length Article

Developing financial disclosure quality in *sukuk* and bond market: Evidence from Indonesia, Malaysia, and Australia

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Abstract

This research investigates the relationships among financial disclosure quality (FDQ), accounting-based risks (ABRs), *sukuk,* and bond market. Using three samples of different countries (Indonesia and Malaysia for *sukuk* ratings, and Australia for bond ratings) through pooled EGLS regression, the results suggest that FDQ related to reliability affects *sukuk* ratings, but not bond ratings. Leverage is found to be the most influential on *sukuk* and bond ratings. FDQ is, to some extent, found to affect the relationship between ABRs (i.e., operating income, leverage and ROI) and *sukuk* or bond ratings. Differentiating between *sukuk* and bond issuers is not empirically proven. Additionally, ancillary evidence that relevance is more pronounced than reliability; and bond ratings are more concerned with the variability of financial measures than *sukuk,* is left to further research for confirmation. This is ample evidence for the expanded value-relevance of financial disclosure in *sukuk* and bond market.

JEL classification: G1; G2; G3; M4

Keywords: Financial disclosure quality (FDQ); Relevance and reliability; *sukuk* and bond ratings; Accounting-based risks (ABRs)

1. Introduction

Increasingly advanced information technology has brought many new challenges, especially in the field of financial information governance. We are witnessing how the digital economy, which is marked by the emergence of global digital giants such as Google, Amazon, Facebook, Apple, Uber, Airbnb, Alibaba, and many others; and a new era of industrial revolution 4.0 is currently covering our everyday life, including new modes of supply and demand, rapid change of assets, and a fleeting exchange of assets (Jeny, 2017; Schwab, 2017). In the past, most of companies' assets were real assets, such as buildings and machinery. Now 'magic assets' (i.e., intangible assets), such as brands, corporate image or goodwill, intellectual property, and human assets are increasingly dominant. Moreover, the evolution of modern companies, proliferating into conglomerates, subsidiaries, or leased assets, has also further blurred the traditional boundaries of the company (Wallman, 1995).

Thus, the accounting system is currently considered unable to capture and disclose the rapid turnover of 'modern' assets. This phenomenon may pose a serious challenge for accounting standards, either in valuation or in a disclosure, that are not only required to be relevant, but also reliable. Regardless of the fact that some attempts for updated standards are currently

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underway through AAOIFI: Sharia Standard 42 (see Bouheraoua, Mohamad, Kasri, & Abdullah, 2014) and IAS 38 (IASB, 2016), it is laborious for accounting standard setters to meet, simultaneously, relevance and reliability amid variations of the tradeoffs between relevance and reliability in reporting financial statements. Therefore, the variability of the tradeoffs of relevance and reliability raises the informational bias in financial reporting. The reported financial statement may show a high level of decision usefulness because of the high level of both relevance and reliability; or sometimes, the reported financial statement shows a low level of decision usefulness because of the low level of both relevance and reliability.

In capital markets, most empirical evidence shows that the determinants of financial disclosure quality, including its attributes coming from relevance and reliability and fundamental risks or accounting-based risks (ABRs), are empirically priced (Barth, Landsman, & Wahlen, 1995; Botosan & Plumlee, 2002, 2013; Song, Thomas, & Yi, 2010; Qizam, 2011 etc.).[2] In this regard, unfortunately, these studies mostly adopt short-term measures of financial disclosure quality (e.g., information content, accrual quality, or other measures), not yet utilizing a large potential of long-run financial information.

Meanwhile, the current global economy has been characterized by rapid growth in Islamic finance, especially *sukuk*. In addition to *sukuk*'s unique characteristics, i.e., an Islamic fund that is safe, not involved in excessive speculation, and having generally low trading turnover, makes *sukuk* less volatile than conventional bonds. Its flintstone is that the issuers no longer come from Islamic countries, but also from Western, African, and other Asian countries, which are previous issuers of conventional instruments such as, United Kingdom, South Africa, Luxembourg, and Hong Kong. The uncertainty and volatility of *sukuk*'s development in recent years that are attributable to oil-price volatility, resulting in a revenue decline of USD 300 billion, driving the deficit budget of Gulf-Cooperation-Council (GCC) countries, offer prospective opportunities and new challenges for *sukuk* growth. Due to these circumstances, most GCC countries are trying to turn to the capital and bond market, especially through issuing both bonds and *sukuk*. Optimistically, it is predicted that there will be an average *sukuk* growth of 10% annually and a positive gap between supply and demand for *sukuk* for upcoming years, i.e., USD 143 Billion (2017), USD 178.4 billion (2018), USD 221.1, billion (2019), USD 256.9, billion (2020), USD 271.3, billion (2021) (Thompson Reuters, 2017).

Along with the rapid growth and prospective opportunities of *sukuk*, however, *sukuk* ratings and bonds ratings, recently, have trended down. Presumably, this downward trend relates to the quality of financial information (Al Homsi, Sori, & Mohamad, 2017; Blume, Lim, & Mackinlay, 1998; Jorion, Shi, & Zhang, 2009; Jorion & Zhang, 2007). Jolly (2017) notes that down-trends among almost half of the 130 rated countries, and country ratings leading to a higher risk of default, have recently appeared.

Previous studies have documented the causes of observed decreases in credit ratings and the apparent tightening of standards drived by changes in accounting quality over time (see Jorion & Zhang, 2007; Jorion et al., 2009; Blume et al., 1998; Heflin, Shaw, & Wild, 2011; Bhojraj & Sengupta, 2003; Duffie & Lando, 2001; Damak, 2017). These findings underscore the critical role of accounting quality in credit rating analysis. To the best of our knowledge, previous findings, empirically, have not yet explored risk-relevance of FDQ attributes (relevance and reliability) and accounting-based risks (ABRs) from the overwhelming benefit of long-term financial information, especially in the context of Islamic debt (*sukuk*) or bond market.

Motivated by these previous studies, that mostly focus on examining the determinants of financial disclosure quality (FDQ), and on employing proxies of the short-term financial information quality in the context of capital market, and the down-trends of *sukuk* ratings and bond ratings amid the rapid growth of *sukuk* that are presumably related to the financial disclosure quality, this research is intended to re-investigate the determinants of financial disclosure quality, either through its attributes of relevance and reliability, but also through fundamental risks or accounting-based risks (ABRs), not in the context of capital market, but that of *sukuk* and bond market. The research examines whether or not FDQ that appears as relevance and reliability in *sukuk* market (through credit rating) is empirically priced thereof; whether ABRs also affect *sukuk* ratings; whether the identified FDQ as moderating variable also affects the relationship between accounting-based risks and *sukuk* rating, and whether differentiating between *sukuk*-issuing firms (using samples from Indonesia and Malaysia) versus bond-issuing firms (using sample of Australia) leads to an effect on the influence of ABRs toward credit ratings, and on the moderating effect of FDQ on the relationship between accounting-based risks and *sukuk* rating. This is in contrast to the approach commonly taken by the value relevance studies that generally base their inferences on pooled samples (Brown, Lo, & Lys, 1999; Cohen, Dey, & Lys, 2004; Rajgopal & Venkatachalam, 2005). In this research, we will demonstrate comparability from different rating groups in a multi-country setting (*sukuk*-issuing firms from Indonesia's and Malaysia's samples and bond-issuing firms from Australia's sample) to yield new insight on the inter-relationship among *sukuk* and bond ratings, FDQ, and accounting-based-variables (accounting fundamentals). The reasons why these three countries are set up, representatively, for this study are highlighted in Section 2.

Given these arguments and objectives, this research contributes to, *firstly* expanding previous empirical evidence of financial disclosure quality from the stock market to which accounting-fundamental studies are mostly devoted to a wider context of *sukuk* and bond market. In addition, understanding how two sources of financial information attributes (relevance and reliability) regarding FDQ is very important to measure

[2] Qizam (2011) specifically finds that information bias from the tradeoff between relevance and reliability affects the relationship between accounting-based risk and the cost of capital; and also between market-based risk and the cost of capital.

the information risk developed from the long-run series of financial information, which in turn can be used as comprehensive inputs in developing quality indices of firms' financial information, especially when applied in the context of debt market (*sukuk* or bond) to set their ratings. The downward trends of the *sukuk* and bond ratings, that are presumably related to FDQ, are expected to be upgraded to the appropriate level with which the sell-side and buy-side of *sukuk* and bond might utilize (see Graham, Harvey, & Rajgopal, 2005). This will also boost the increased decision usefulness of financial information for investment decision making, creditworthiness assessment, the standard setting improvement through harmonizing between Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI), and International Financial Reporting Standards (IFRS) (Rahman, 2003). Hence, this is a 'new' attempt to expand the existing issues of FDQ determinants, i.e., accounting-accrual quality, information content, and more other accounting quality ones.

Secondly, the apparently decreased value-relevance of FDQ in relation to credit ratings (Blume et al., 1998; Jorion et al., 2009; Rajgopal & Venkatachalam, 2005) should be equated with the increased attempts to explore determinants driving the long-run and comprehensive benefits of financial information and its evolving environments. Hence, this research explores the extent to which FDQ attributes, related to relevance and reliability on ABRs, are of great importance for *sukuk* and bond rating policy. We may utilize ABRs as alternative determinants of FDQ in a wider context of debt market, so as to predict potential (long-run) default risks more accurately, rather than to apply 'superficial' analysis of short-run financial information.

Third, this study will provide empirical evidence on how information risk can be built by exploring more deeply the FDQ attributes, namely relevance and reliability and ABR variables that are expected to be useful for developing risk-relevance or value-relevance theory, which was previously triggered by Beaver, Kettler, and Scholes (1970). In addition, the results of this research are expected to contribute to the development of information risk measurement standards originating from financial information risk attributes that further reveal the potential risks more comprehensively, and in the long term, to be utilized to the greatest extent in rating determination, especially *sukuk* and bond ratings.

Fourth, this research is to re-confirm whether a comparison between FDQ, occurring in *sukuk*-issuing (sharia-compliant), and bond-issuing (non-sharia-compliant) companies is worth verifying as confirmed by previous empirical results of Farooq and AbdelBari (2015) and Wan Ismail, Kamarudin, and Sarman (2015), who finds robust evidence that sharia-compliant firms have significantly higher earnings quality relative to non-sharia compliant firms.

The remainder of this paper is organized as follows: Section 2 highlights an overview of *sukuk* market in Malaysia and Indonesia, and the bond market in Australia; Section 3 reviews literature and develops the hypotheses; and Section 4 outlines research methods. The results and discussion are presented in Section 5, while the conclusion is provided in Section 6.

2. Overview of *sukuk* market in Malaysia and Indonesia and bond market in Australia

In this research, we include three countries: Malaysia and Indonesia, representing *sukuk* market, and Australia, representing bond market as a comparative peer with the explanation as follows. It was reported that the global *sukuk* issuances during 2017 had reached USD 116.7 billion, being an incremental jump of approximately 33% over the previous year (2016) issuances of USD 87.9 billion. From the global *sukuk* issuances, Asia-Pacific and the Far East, has dominated the global *sukuk* market. This shows that Asia contributes 72.1% of the total global *sukuk* issuance, while GCC, Africa, Europe, and others contribute the rest, i.e., 23.3%, 2.2%, and 2.36% respectively. In general, the countries significantly contributing to the *sukuk* market include Malaysia, with a market share of 62.5%, UAE (7.3%), Saudi Arabia (9.7%), Indonesia (6.4%), Bahrain (2.8%), Qatar (2.6%) and Turkey (2%) (IIFM Sukuk Report, 2018).

From an increase of around 33% over the 2016 issuances of USD 87.9 billion, within 2017, 87% of the USD 434 billion outstanding, *sukuk* comes from four key markets; Malaysia, Saudi Arabia, Indonesia and the UAE. Cumulatively, from 2001 to 2017, Malaysia shows its dominance as the biggest *sukuk* issuer (a combination of domestic and international), reaching USD 612 Billion—the only country labelled as 'matured' in the stage of *sukuk* market development (COMCEC, 2018), successively followed by Saudi Arabia with USD 95 billion, UAE with USD 68 Billion, and Indonesia with USD 63 Billion. In total, 68.9% (almost 70%) out of the total global *sukuk* issuance belongs to Malaysia and Indonesia (62.5% from Malaysia plus 6.4% from Indonesia) (IIFM Sukuk Report, 2018).

Henceforth, we tap Indonesia for the next *sukuk* market of interest. In addition to its leading in sovereign *sukuk* issuance, (around USD 69.2 billion or 19.01% of the total global *sukuk* issuance), Indonesia has shown its specific uniqueness, due to its largest Muslim population in the world (approximately more than 229 millions of Muslims or 87,2% and 12,7% out of all the world's Muslims, i.e., 1.8 billion Muslims). Indonesia is the country with immensely high potential for *sukuk* growth. Moreover, Malaysia and Indonesia have comparable sharia-governance models (i.e. both applying two-tier centralized model), and are derived from a homogenous race of *Melayu,* where the people are similar and related to each other in either multi socio-cultures or religions. This condition may give the two countries high potential for fast growth of *sukuk* issuance with comparable risk exposure. Thus, the two countries, Malaysia and Indonesia, are considered economically and prospectively eligible to represent the majority of the world's *sukuk* issuance.

To be able to scrutinize comparability between *sukuk* and bond issuers, we adopt a peer developed country as a benchmark to which conventional bond market fully applies, but which, geographically, belongs to the same region of Asia-Pacific countries, and has an economically comparable value of outstanding bonds with Malaysia's and Indonesia's *sukuk*

value. That is Australia. From literature, there are only three Asia-Pacific countries that are considered developed countries: Japan, Australia, and New Zealand, accounting for USD 12,978.1 billion, USD 1944.7 billion, USD 80 billion (USD 56 billion for government bonds and USD 24 billion for international debt securities). The value of Australia's debt (USD 1944.7 billion) stands appropriately in the mid-point between Japan (amounting to USD 12,978,1 billion) and New Zealand, concentrating more on government bonds (see Bank for International Settlement, 2018). When compared to the value of Malaysia's *Sukuk* (USD 612 billion) and of Indonesia's *sukuk,* amounting to USD 63 billion, Australia is the right choice for the peer country of conventional bonds to compare *sukuk* from Malaysia and Indonesia.

3. Literature review and hypotheses development

The credit rating industry was established approximately 158 years ago, but currently, three major rating agencies, Standard & Poor's, Moody's and Fitch Ratings have dominated 90 percent of the global market (Deshun, 2018). Many various types of market participants have also utilized these credit ratings. Issuers use them to improve the marketability and price of their debt and other securities (e.g., Dichev & Piotroski, 2001). *Sukuk*/credit ratings are also used for either buy-side or sell-side investors, for private contracts, and for regulators (Covitz & Harrison, 2004) to assess credit risks, to comply with the guidelines or rules of investment and to determine the amount of collateral to withstand credit derivatives' exposure. Many criticisms, however, come upon the rating agencies due to their methodology and other issues. In addition, the informational effects of rating changes have become more pronounced following the enactment of regulation FD (Jorion, Liu, & Shi, 2005), suggesting the growing importance of credit ratings to capital and bond market participants.

3.1. Inter-relationship across financial disclosure quality (FDQ), financial data, default risks and sukuk/bond ratings

Addressing the relationship between financial disclosure quality (FDQ) and credit ratings, we point to three strands of research (Blume et al., 1998). The first two strands are related to testing the information content of credit ratings in various ways (Jorion & Zhang, 2007; Zhou, 2001). The second strand addresses the investigation of information content toward rating changes in the capital market (González et al., 2004). The third strand examines the determinants of credit ratings encompassing a variety of determinants, e.g., regarding financial ratios and financial data (i.e., leverage, liquidity, and firm size) (Blume et al., 1998; Kamstra, Kennedy, & Suan, 2001); corporate governance mechanisms (measurement of ownership structure and board independence) (Ashbaugh-Skaife, Collins, & LaFond, 2006; Bhojraj & Sengupta, 2003); and macroeconomic factors effect on credit ratings (GDP growth measures (Amato & Furfine, 2004).

In corporate governance, Bhojraj and Sengupta (2003) assert that a firm's likelihood of default relies on the availability of credible information to evaluate the default risk and agency costs, both of which are determined by governance mechanisms, being the focus of much research (Shleifer & Vishny, 1997). Under the agency theory framework of Jensen and Meckling (1976), they distinguish two mechanisms through which the governance mechanism affects credit ratings. The first is agency risk. This is the risk that management, acting in its self-interest, will take actions that deviate from firm value maximization, as well as the risk of the manager being incompetent. The second is information risk. This is the risk that managers have private information that would adversely affect the default risk of a loan. Governance mechanisms can reduce both these risks. Specifically, with regard to agency risk, firms with strong governance should receive a higher rating. Similarly, mechanisms that induce firms to disclose information in a timely and transparent manner should reduce information risks and, therefore, improve a firm's rating.

Jorion et al. (2009) investigates empirical evidence pointing to the downward drift in the intercept documented by Blume et al. (1998). They argue that information quality is the main factor contributing to the downward drift. Explicitly, ratings agencies state that in setting credit ratings, agencies take into account accounting quality (S&P's, 2003, p. 22). As a result of recent accounting scandals, such as Enron and WorldCom, agencies have started to publish the methodologies they use to filter corporate earnings. However, some evidence shows a decrease in the value-relevance of accounting information (see Blume et al., 1998; Duffie & Lando, 2001). If this decrease continues, increased default risk and higher credit spread will be most likely to come.

Meanwhile, credit ratings are often found to be empirically related to financial-data-and-ratio measures, and default risks. These ratios are traditionally applied in default prediction studies (Altman, 1968), which are similar to ratings prediction and estimation studies. These ratios represent factors such as leverage, liquidity, interest coverage, and profitability that determine a firm's creditworthiness. Similarly, the firm's size also contributes to its default probability and creditworthiness. Therefore, these ratios should be related to credit ratings, i.e. the higher the ratio is, ceteris paribus, the better the firm's rating will be (see also Kamstra et al., 2001; Kaplan & Urwitz, 1979). Supported by the other evidence, we can conclude that accounting variables contain information relevant to default prediction, and *sukuk*/credit rating (Amato & Furfine, 2004; Blume et al., 1998; Mählmann, 2011).

Notwithstanding, in terms of *sukuk* ratings, when related to FDQ and financial ratios, we find very limited studies. Beyond the studies mapped by Zulkhibri (2015), who has depicted various areas of *sukuk* studies from three theoretical and empirical points of views: the underlying theory and nature (e.g., Ariff & Safari, 2015; Rohim & Saniff, 2013), the operational issues and structures involved in *sukuk* (e.g., Ahroum, Fatima-Zahra, & Achchab, 2018; Alam, Hassan, & Haque, 2013; Fathurahman & Fitriati, 2013); and the role of *sukuk*

in economic development (e.g., Ahmad, Mohd Daud, & Kefeli, 2012; Said & Grassa, 2013), we can go to quite a number of studies that investigate *sukuk* ratings in various ways (e.g., Kamarudin, Kamaluddin, Ab. Manan, & Mat Ghani, 2014; Kartiwi, Gunawan, Arundina, & Omar, 2018; Zakaria, Md Isa, & Abidin, 2012). However, we find very few studies which empirically address the relationship between *sukuk* ratings and FDQ, or accounting fundamentals (Ab Hamid, Zakaria, & Ab Aziz, 2014; Al Homsi et al., 2017; Arundina, Omar, & Kartiwi, 2015; Elhaj, Muhamed, & Ramli, 2015).

In conclusion, the aforementioned literature review addresses the important role of financial disclosure quality for credit risk, as well as *sukuk*-and-bond ratings bursting out at the same time, when a declining quality of accounting information is presumably attributable to the non-credible standard settings in bond and *sukuk* ratings, and the empirically vibrant relationship between financial ratios, or accounting based risks (ABRs), and credit, or *sukuk* ratings, illuminates the great significance of re-investigating the determinants of financial disclosure quality in a wider context of *sukuk* and debt market, rather than that of the stock market. To the best of our knowledge, previous studies have not yet empirically explored a variety of FDQ attributes (relevance and reliability) through a variety of empirically measurable proxies. In addition, in setting credit ratings, benefits of ABRs have not been explored yet, from the long-term potential of financial information, so as to identify risk exposure that may come upon firms as accurately and early as possible. This is the missing gap addressed in our research.

3.2. Hypothesis development

Duffie and Lando (2001) posit that a key finding of their model is, imprecision in reported total assets leads to higher credit spreads and greater default probabilities than otherwise. In their view, the noise in accounting reports could result from deficiency in accounting standards (e.g. a major limitation of current U.S. GAAP is their inability to accurately measure intangible assets on the balance sheet), poor disclosure quality, and opportunistic earnings management (Al Homsi et al., 2017; Arundina et al., 2015; Cohen et al., 2004).

Following Kirschenheiter (1997) and Qizam (2011), we adopt alternative ways to measure financial information (disclosure) quality, i.e., FDQ, which is split into two: FDQ that reflects relevance, and that relates to reliability of financial statements, the two of which are a problem in making a decision on information (decision usefulness problem). Decision usefulness becomes an important concept in reporting financial statements, and as a form of reaction to the impossibility to prepare theoretically 'correct' financial statements (Scott, 2006). Overall, this explanation demonstrates that financial disclosure quality (FDQ)—FDQ adhering to relevance is referred to as CMH; whereas, FDQ relating to reliability is referred to as VMH—is supposed to determine credit ratings. Hence, the hypothesis is formulated as follows:

H1a. CMH is positively influent on Islamic-credit (*sukuk*) rating

H1b. VMH is positively influent on Islamic-credit (*sukuk*) rating

Qizam (2011), then, proves that these empirical results are consistent with the research literature, particularly research spearheaded by Botosan and Plumlee (2002, 2013), Komalasari and Baridwan (2001), and Mardiyah (2002). All of these studies support the theory that increased disclosure reduces the cost of equity. Consistent with Barth et al. (1995), and also Song et al. (2010), Qizam's findings also mean that value relevance for accounting-based risks (ABRs) will increase if the quality of financial statement information is enhanced.

Referring to Qizam (2011), the risk of information from tradeoff variability between relevance and reliability has a moderating effect on the relationship between accounting-based risks and cost of equity. It is supposed to represent the moderating effect on the relationship between accounting-based risks and credit ratings (see Al Homsi et al., 2017; Arundina et al., 2015; Elhaj et al., 2015). As a result, this leads to hypothesis 2:

H2a. The AVERAGE group of accounting-based risks takes positively the effect on sharia-credit (*sukuk*) rating.

H2b. The BETA group of accounting-based risks takes negatively the effect on sharia-credit (*sukuk*) rating.

H2c. The VARIANCE group of accounting-based risks takes negatively the effect on sharia-credit (*sukuk*) rating.

H2d. All the groups of accounting-based risks are more frequently evidenced to take significantly effect on *sukuk* rating than on conventional bond rating.

Several previous studies show that lower disclosure quality is associated with higher credit spreads (Yu, 2005). Similarly, Francis, LaFond, Olsson, and Schipper (2005) find that greater information risk, as proxied by lower accruals quality, is associated with higher debt costs. Several recent studies suggest that the quality of accounting data may have declined over time. Brown et al. (1999) document a systematic decrease in the value relevance of accounting information from 1958 to 1996, which includes the years 1978–1995, as in the Blume et al. (1998) sample.

In summary, to the extent that the informativeness of accounting variables has decreased over time, the declining quality of accounting information may explain the apparent tightening of credit standards and its key role in *sukuk* and bond ratings (see also Al Homsi et al., 2017; Arundina et al., 2015; Elhaj et al., 2015). As a result, the hypothesis is formulated as follows:

H3a. The FDQ, as reflected in relevance-reliability level, will take a positive moderating effect on the relationship between the AVERAGE group of accounting-based risks (ABRs) and Islamic credit (*sukuk*) ratings

H3b. The FDQ, as reflected in relevance-reliability level, will take a negative moderating effect on the relationship between the BETA group of accounting-based risks (ABRs) and Islamic credit (*sukuk*) ratings

H3c. The FDQ, as reflected in relevance-reliability level. will take a negative moderating effect on the relationship between the VARIANCE group of accounting-based risks (ABRs) and Islamic credit (*sukuk*) ratings

Additionally, Farooq and AbdelBari (2015) test whether or not shariah-compliant firms differ from other firms in the quality of information disclosure; and whether or not investors can consider information disclosed by Shariah-compliant firms more truthful than information disclosed by other firms. Using the data from the MENA region (Morocco, Egypt, Saudi Arabia, United Arab Emirates, Jordan, Kuwait and Bahrain), Farooq and AbdelBari (2015) examine the relationship between earnings management and Shariah compliance during the years 2005 and 2009. Their results show that Shariah-compliant firms engage in lower earnings management than non-Shariah-compliant firms, except for in the common law countries, and during crisis periods. Meanwhile, Wan Ismail et al. (2015) also finds robust evidence that shariah-compliant companies have significantly higher earnings quality, compared to other firms.

Given the above results, the next hypothesis to test is as follows:

H3d. The moderating effect of FDQ, as reflected in relevance and reliability, are more frequently evidenced to occur significantly in the relationships among all the groups of accounting-based risks and *sukuk* ratings than in the relationships among all the groups of accounting-based risks and the conventional bond rating.

4. Research method

4.1. Sample selection and data

The samples originate from a combination of financial and non-financial firms listed at Indonesia Stock Exchange (IDX), Kuala Lumpur Stock Exchange (KLSE), and the Australian Securities Exchange (ASE), consisting of the consumer goods industry, miscellaneous industry, basic chemical industry; trading, services and investment companies; agriculture; infrastructure, utilities, and transportation; and property and real estate, and are based on a purposive sampling. On one hand, the variables of ABRs and FDQ (as independent or moderating variables) are measured using a fourteen-year financial data series ranging from 2003 to 2016 to obtain three groups of a twelve-year range for each, i.e., 2003–2014, 2004–2015, and 2005–2016 to be averaged out and transformed through many ways into the final measures of ABRs (proxied in three forms of AVERAGE, BETA, and VARIANCE) and FDQ (proxied in two attributes of relevance and reliability) for three-year observations of 2014, 2015, and 2016. On the other hand, the dependent variable of *sukuk* and bond ratings (RAT) encompasses three-year *sukuk* and bond ratings from 2015 to 2017 (taking a lead *t+1*). Specifically, there are three categories of panel data: the first category covers the three groups (i.e., AVERAGE, BETA, VARIANCE) of accounting-based risks variables (ABRs); the second comprises financial disclosure quality (FDQ) proxied by CMH (relevance level) and VMH (reliability level), and the third contains *sukuk*/bonds ratings (RAT) as dependent variables.

The first category of data required to measure accounting-based risks variables (ABRs) covers three years of observations (2014, 2015, and 2016), but the data series of observation required must be traced back to twelve years for each, i.e., observation of accounting-based risks variables (ABRs) for 2014 needs twelve-year serial data from 2003 to 2014; 2015 and 2016 observations require twelve-year serial data from 2004 to 2015 and from 2005 to 2016 respectively. Therefore, accounting based-risk (ABRs) variables for the three year observations (2014, 2015, and 2016) are run using a twelve-year data series of financial data, in total, ranging from 2003 to 2016. For example, accounting-based-risk variables (ABRs) of income growth (IG) is generated from: first, calculating the value of growth built up from a five year data series; secondly, once the income growth is identified, its average, its beta, and its variance[3] are calculated to arrive at AVERAGE IG, BETA IG and VARIANCE IG for three consecutive years, 2014, 2015, and 2016. When identifying IG for 2014, data series of income ranging from 2003 to 2014 are needed; IG for 2015 needs data series ranging from 2004 to 2015, and IG for 2016 requires data series from 2005 to 2016. Thus, measuring these three groups of AVERAGE, BETA, and VARIANCE for each accounting-based risk variable, need a fourteen-year series of financial data ranging from 2003 to 2016.

The second category of data required to measure financial disclosure quality (FDQ) (CMH and VMH) involves three years of observations (2014, 2015, and 2016). A long process, however, is needed to find the relevant inputs of the two variables of CMH and VMH. This process has an impact on the use of long-data series to result in these two variables (CMH and VMH). CMH refers to relevance level, scored by a ratio pointing to the covariance of the intrinsic value, and the market value divided by the covariance of the intrinsic value, and the book (historical) value. Intrinsic (real) value (V*) is measured by applying Graham's updated formula (Lin & Sung,

[3] Average is formulized as $1/n \times \sum IG_{it}$; beta as $Cov(IG_{it}, IG_{mt})/\sigma^2_{mt}$, where $Cov(IG_{it}, IG_{mt})$ is $\sum (IG_{it}-\overline{IG}_{it}) \times (IG_{mt}-\overline{IG}_{mt})$, and variance $(\sigma^2{}_{mt})$ as $\sum(IG_{mt}-\overline{IG}_{mt})^2/n$). Subscript *m* refers to an average value of all observations of interest in the sample.

2014) as follows: V*=(EPSx [8.5+2g]x4,4)/Y where V* = the value expected from the growth formulas over the next seven years; EPS = the company's last earnings per share; 8.5 = P/E base for a no-growth company; g = the reasonably expected seven-year growth rate; 4.4 = the average yield of AAA 20-year-corporate bonds in 1962 (USA) (instead of 4.4, central-bank rates of each country as risk free rates are applied for the three samples); Y = the current yield on AAA corporate bonds. CMH, then, is measured for three years, i.e, CMH_{2014}, CMH_{2015}, dan CMH_{2016}.

For example, to calculate the CMH variable of a company *i* in 2014 ($CMH_{i,2014}$), two inputs are needed, i.e., the covariance of intrinsic value and market value (Cov [$V^*_{i,2014}$, $M_{i,2014}$]) and 2) the covariance of intrinsic value and book value (Cov [$V^*_{i,2014}$, $H_{i,2014}$]). Likewise, this applies to calculate CMH for a company *i* in 2015 and 2016. However, in order to obtain the covariance of intrinsic value and market value in 2014 (Cov [$V^*_{i,2014}$,$M_{i,2014}$]), the first five year data series of intrinsic value and market value are needed, namely intrinsic value and market value ranging from 2010 to 2014; likewise, a series of intrinsic values and market values for the next second and third five year observations are also needed, namely two data series of 2011–2015 and 2012–2016 of intrinsic value and market value to arrive at a covariance of intrinsic value and market value for the next two year observations for 2015 and 2016 respectively.

Meanwhile, the calculation of the intrinsic value (V*) of a company *i* in year *t* requires serial inputs of lagged earnings per share (EPS) to obtain the expected growth of EPS. In total, this applies to calculate the intrinsic value (V*) of companies for seven years, from 2010 to 2016 ($V^*_{i,2010\text{-}2016}$). To calculate the intrinsic value (V*) of a company *i* in 2010 ($V^*_{i,2010}$), for example, we estimate the expected value of EPS growth for 2010 ($g_{i,2010}$) from the average EPS growth covering a seven year data series, 2004–2010, or raw data of EPS for 2003–2010. In the same way, average EPS growth is calculated using the next seven year EPS growth series, EPS growth for 2011 ($g_{i,2011}$) from the average EPS growth in 2005–2011; EPS growth for 2012 ($g_{i,2012}$) from the average EPS growth in 2006–2012; EPS growth in 2013 ($g_{2013,i}$) from the average EPS growth in 2007–2013; EPS growth in 2014 ($g_{i,2014}$) from the average EPS growth in 2008–2014; EPS growth in 2015 ($g_{i,2015}$) from the average EPS growth in 2009–2015; EPS growth in 2016 ($g_{i,2016}$) from the average EPS growth in 2010–2016.

Likewise, the calculation of reliability variables (VMH) is carried out for a period of three years, VMH_{2014}, VMH_{2015}, and VMH_{2016}. The yearly VMH value of a company is calculated by a ratio of the market value variance, divided by the book value variance for company *i* in year *t*. Additionally, the calculation process is also based on the market value and book value series starting from 2003. For example, the 2014 market value, and 2014 book value variance are calculated from 12 annual series of market values for a period of 2003–2014; market value variance and book value variance for company *i* in 2015 are calculated from the next 12 annual data series ranging from 2004 to 2015; and market value variance and book value variance for company *i* in 2016 are calculated from the next twelve annual series of market values for 2006–2016. Thus, it can be concluded that the overall financial data series needed to measure financial disclosure quality related to relevance (CMH) and reliability (VMH), is a series of financial data from 2003 to 2016.

The third category of data required to measure *sukuk*/bond rating (RAT) covers one year ahead (with a lead *t+1*) of the three yearly observations, RAT in 2015, 2016, and 2017, instead of 2014, 2015, and 2016, belonging to ABRs and FDQ variables. This step is conducted since the rating action committed has been published after considering previously various information, especially the financial statements reflecting the events and business transactions that have already occurred. Often the rating action is delivered not once a year, but sometimes at the beginning, in the middle, and also at the end of the year. To avoid misleading analysis covering a rating action delivered, after taking the issuance of financial information into account, the *sukuk*/bond rating variable is one year ahead (a lead *t+1*) of the independent/moderating variables.

Hence, the sample data sources include two parts: 1) the annual financial (accounting) data for a fourteen year period from 2003 to 2016 from Indonesia, Malaysia, and Australia provided by Thomson Reuters' Datastream, and 2) the data of *sukuk* and bond ratings obtained from the different rating agencies, with *sukuk* ratings from PT. PEFINDO (Indonesia) and from RAM Rating Services Berhad (Malaysia), and bond ratings from Moody's (Australia) ranging from 2015 to 2017. The identification and measurement of the variables in more detail are also depicted in Table 1 as follows:

4.2. Empirical models

To test hypothesis 1a and 1b, the following model (model 1) was applied as follows:

$$\text{Model 1: } RAT_{i,t+1} = \alpha_{10} + \alpha_{11} CMH_{i,t} + \alpha_{12} VMH_{i,t} + \xi_{i,t};$$

where $RAT_{i,t+1}$, $CMH_{i,t}$, and $VMH_{i,t}$ have been defined as in Table 1; and $\xi_{i,t}$ is error term for firm *i*, in period *t*. Meanwhile, testing hypothesis 2a, 2b and 2c, then, was conducted through the following models:

$$\text{Model 2a: } RAT_{i,t+1} = \alpha_{20} + \sum \alpha_{21,j} ABRs(A)_{i,t} + \omega(a)_{i,t};$$

$$\text{Model 2b: } RAT_{i,t+1} = \alpha_{30} + \sum \alpha_{31,k} ABRs(B)_{i,t} + \omega(b)_{i,t};$$

$$\text{Model 2c: } RAT_{i,t+1} = \alpha_{40} + \sum \alpha_{41,l} ABRs(V)_{i,t} + \omega(c)_{i,t};$$

where $RAT_{i,t+1}$ has been previously defined as in Table 1; $ABRs_{i,t}$ are Accounting-Based Risk Variables transformed into three group of seven accounting-based risks: AVERAGE, BETA, and VARIANCE (as defined in more detail in Table 1); and $\omega(a.b,c)_{i,t}$ is error term firm *i* in period t for three different groups of ABRs; j,k,l = sub-script referring to coefficients of

Table 1
Identified variables, specification and measurement.

Abbreviated Names	Full Names	Variable Description/ Measures	Ingredients/inputs	Selected Sample	Data Source
***Sukuk* or bond ratings as Dependent Variable**					
RAT_{t+1}	*Sukuk* or bond ratings in lead *t+1*	measured by index score of *sukuk*/bond ratings for a period *t+1*	*sukuk* and bond ratings	three years of observations: 2015, 2016, and 2017	PT. PEFINDO FOR INDONESIA, RAM RATING FOR MALAYSIA, AND MOODY'S FOR AUSTRALIA
Financial Disclosure Quality (FDQ) as Moderating Variables/Independent Variables measured by referring to Kirschenheiter (1997):					
CMH_{it}	Relevance level of financial disclosure quality (FDQ)	measured by a ratio reflecting covariance of intrinsic value and market value divided by covariance of intrinsic value and book value in a company *i* period *t*	Three forms: intrinsic value, book value and market value		Thompson Reuters Datastream
			1) Intrinsic value (V*), measured by using earning per share (EPS) following Graham's updated formula (Lin &Sung, 2014)	Seven groups of ranges: 2003–2010; 2004–2011; 2005–2012; 2006–2013; 2007–2014; 2008–2015; 2009–2016	
			2) book value	Three groups of ranges: 2003–2014; 2004–2015; 2005–2016	
			3) market value	Three groups of ranges: 2003–2014; 2004–2015; 2005–2016	
VMH_{it}	Reliability level of financial disclosure quality (FDQ)	measured by a ratio reflecting variance of market value divided by variance of book value in a company *i* period *t*	Two forms: book value and market value		Thompson Reuters Datastream
			1) book value	Three groups of ranges: 2003–2014; 2004–2015; 2005–2016	
			2) market value	Three groups of ranges: 2003–2014; 2004–2015; 2005–2016	
Accounting-based risks (ABRs) as Independent Variables:					
AG_{it}	Accounting-based risks (ABRs) from asset growth (Three forms: AVERAGE, BETA, and VARIANCE)			Three groups of ranges: 2003–2014; 2004–2015; 2005–2016	Thompson Reuters Datastream
	1) Average of Asset Growth	measured by averaging asset growth for a company *i* period *t*	total asset	2003–2014	
	2) Beta of Asset Growth	measured by Covariance of Asset Growth for a company *i* period *t* and average asset growth in the sample period t divided by variance of average asset growth in the sample period t	total asset	2004–2015	
	3) Variance of Asset Growth	measured by variance of asset growth for company *i* period *t*	total asset	2005–2016	
DG_{it}	Accounting-based risks (ABRs) from depreciation growth (Three forms: AVERAGE, BETA, and VARIANCE)			Three groups of ranges: 2003–2014; 2004–2015; 2005–2016	Thompson Reuters Datastream

(*continued on next page*)

Table 1 (*continued*)

Abbreviated Names	Full Names	Variable Description/ Measures	Ingredients/inputs	Selected Sample	Data Source
	1) Average of depreciation growth	measured by averaging asset growth for a company *i* period *t*	total depreciation	2003−2014	
	2) Beta of depreciation growth	measured by covariance of depreciation growth for a company *i* period *t* and average depreciation growth in the sample period t divided by variance of average depreciation growth in the sample period t	total depreciation	2004−2015	
	3) Variance of depreciation growth	measured by variance of asset growth for a company *i* period *t*	total depreciation	2005−2016	
IG_{it}	Accounting-based risks (ABRs) from income growth (Three forms: AVERAGE, BETA, and VARIANCE)			Three groups of ranges: 2003−2014; 2004−2015; 2005−2016	Thompson Reuters Datastream
	1) Average of income growth	measured by averaging income growth for a company *i* period *t*	net income	2003−2014	
	2) Beta of income growth	measured by covariance of income growth for a company *i* period *t* and average income growth in the sample period *t* divided by variance of average income growth in the sample period *t*	net income	2004−2015	
	3) Variance of income growth	measured by variance of income growth for a company *i* period *t*	net income	2005−2016	
LV_{it}	Accounting-based risks (ABRs) from leverage (Three forms: AVERAGE, BETA, and VARIANCE)			Three groups of ranges: 2003−2014; 2004−2015; 2005−2016	Thompson Reuters Datastream
	1) Average of leverage	measured by averaging leverage for a company *i* period *t*	total debt and total equity	2003−2014	
	2) Beta of leverage	measured by covariance of leverage for a company *i* period *t* and average leverage in the sample period *t* divided by variance of average leverage in the sample period *t*	total debt and total equity	2004−2015	
	3) Variance of leverage	measured by variance of leverage for a company *i* period *t*	total debt and total equity	2005−2016	
OI_{it}	Accounting-based risks (ABRs) from operating income (Three forms: AVERAGE, BETA, and VARIANCE)			Three groups of ranges: 2003−2014; 2004−2015; 2005−2016	Thompson Reuters Datastream
	1) Average of operating income	measured by averaging operating income for a company *i* period *t*	operating income	2003−2014	

Table 1 (*continued*)

Abbreviated Names	Full Names	Variable Description/ Measures	Ingredients/inputs	Selected Sample	Data Source
	2) Beta of operating income	measured by covariance of operating income for a company *i* period *t* and average operating income in the sample period *t* divided by variance of average operating income in the sample period *t*	operating income	2004–2015	
	3) Variance of operating income or log natural of operating income variance (LNVOI)	measured by variance of operating income for a company *i* period *t*	operating income	2005–2016	
RI_{it}	Accounting-based risks (ABRs) from return on investment (ROI) (Three forms: AVERAGE, BETA, and VARIANCE)			Three groups of ranges: 2003–2014; 2004–2015; 2005–2016	Thompson Reuters Datastream
	1) Average of return on investment (ROI)	measured by averaging return on investment (ROI) for a company *i* period *t*	net income and total asset	2003–2014	
	2) Beta of return on investment (ROI)	measured by covariance of return on investment (ROI) for company *i* period *t* and average return on investment (ROI) in the sample period *t* divided by variance of average return on investment (ROI) in the sample period *t*	net income and total asset	2004–2015	
	3) Variance of return on investment (ROI)	measured by variance of return on investment (ROI) for a company *i* period *t*	net income and total asset	2005–2016	
SA_{it}	Accounting-based risks (ABRs) from sale to asset ratio (Three forms: AVERAGE, BETA, and VARIANCE):			Three groups of ranges: 2003–2014; 2004–2015; 2005–2016	Thompson Reuters Datastream
	1) Average of sale to asset ratio	measured by averaging sale to asset ratio for a company *i* period *t*	total sale and total asset	2003–2014	
	2) Beta of sale to asset ratio	measured by covariance of sale to asset ratio for a company *i* period *t* and average sale to asset ratio in the sample period *t* divided by variance of average sale to asset ratio in the sample period *t*	total sale and total asset	2004–2015	
	3) Variance of sale to asset ratio	measured by variance of sale to asset ratio for a company *i* period *t*	total sale and total asset	2005–2016	

seven accounting-based risks j for each group of AVERAGE; k for BETA; and l for VARIANCE.

Model ANOVA (Model 2d), is used to test whether frequency distributions for all coefficients of seven accounting-based risk variables from three forms of attributes (AVERAGE, BETA, and VARIANCE) emanating from the three different samples of Indonesia, Malaysia, and Australia, already tested with model 2a, 2b, and 2c, are the same (H_{3d}: $\mu_1 \neq \mu_2 \neq \mu_3$). In this model, μ_1 denotes coefficients of all variables for the Indonesia sample; μ_2 denotes coefficients of all variables for the Malaysia sample; μ_2 denotes coefficients of all variables for the Australia sample.

Table 2
Rating-scale specification, *Sukuk* and bond rating scale/index, and its frequencies.

Panel A: Indonesia (Sources: PT. PEFINDO)

No	*Sukuk* Rating-scale	*Sukuk* Index	Fequency in 2015	Frequency in 2016	Frequency in 2017	Total Freq.
1	idAAA	1000	13	12	12	37
2	idAA+	0,944	1	1	2	4
3	idAA	0,889	5	5	5	15
4	idAA-	0,833	8	8	6	22
5	idA+	0,778	10	10	8	28
6	idA	0,722	12	6	7	25
7	idA-	0,667	6	10	8	24
8	idBBB+	0,611	3	6	6	15
9	idBBB	0,556	2	2	2	6
10	idBBB-	0,5	1	0	0	1
11	idBB+	0,444	0	1	0	1
12	idBB	0,389	0	0	1	1
13	idBB-	0,333	0	0	0	0
14	idB+	0,278	0	0	0	0
15	idB	0,222	0	0	0	0
16	idB-	0,167	0	0	0	0
17	idCCC	0,111	0	0	0	0
18	idD	0,056	0	0	0	0
19	idAA-;idA	0,806	0	0	1	1
20	idAA-;idAA	0,861	0	0	2	2
21	idA; idBBB	0,639	0	0	1	1
TOTAL OBSERVATIONS			61	61	61	183

Panel B: Malaysia (Sources: RAM Rating Services)

No	*Sukuk* Rating-scale	*Sukuk*-rating Index	Fequency in 2015	Frequency in 2016	Frequency in 2017	Total Freq.
1	AAA	1000	9	7	10	26
2	AA1	0,950	5	6	5	16
3	AA2	0,900	7	8	7	22
4	AA3	0,850	6	5	4	15
5	A1	0,800	1	1	1	3
6	A2	0,750	0	1	1	2
7	A3	0,700	0	1	1	2
8	BBB1	0,650	0	0	1	1
9	BBB2	0,600	0	0	0	0
10	BBB3	0,550	0	0	0	0
11	BB1	0,500	0	0	0	0
12	BB2	0,450	0	0	0	0
13	BB3	0,400	0	1	1	2
14	B1	0,350	0	0	0	0
15	B2	0,300	0	0	0	0
16	B3	0,250	0	0	0	0
17	C1	0,200	0	0	0	0
18	C2	0,150	0	0	0	0
19	C3	0,100	0	0	0	0
20	D	0,050	1	0	0	1
21	AAA; AA1	0,975	0	1	0	1
22	AA2; AAA	0,950	1	0	0	1
23	AAA; AA2	0,950	0	0	1	1
24	AA3; AAA	0,925	1	0	0	1
25	AA1; A3; AA1	0,867	1	0	0	1
26	A1; AA2	0,850	0	1	0	1
TOTAL OBSERVATIONS			32	32	32	**96**

Panel C: Australia (Sources: Moody's)

No	Bond-ratings Scale	Bond-ratings Index	Frequency in 2015	Frequency in 2016	Frequency in 2017	Total Freq.
1	Aaa	1.000	0	0	0	0
2	Aa1	0,952	0	0	0	0
3	Aa2	0,905	0	0	0	0
4	Aa3	0,857	3	3	3	9
5	A1	0,810	1	1	2	4

(*continued on next page*)

Table 2 (*continued*)

Panel C: Australia (Sources: Moody's)						
No	Bond-ratings Scale	Bond-ratings Index	Frequency in 2015	Frequency in 2016	Frequency in 2017	Total Freq.
6	A2	0,762	2	2	2	6
7	A3	0,714	5	3	3	11
8	Baa1	0,667	5	6	7	18
9	Baa2	0,619	7	8	9	24
10	Baa3	0,571	3	4	3	10
11	Ba1	0,524	1	1	2	4
12	Ba2	0,476	1	1	1	3
13	Ba3	0,429	5	4	4	13
14	B1	0,381	2	2	1	5
15	B2	0,333	0	1	0	1
16	B3	0,286	2	0	1	3
17	Caa1	0,238	1	1	1	3
18	Caa2	0,190	0	0	0	0
19	Caa3	0,143	0	1	0	1
20	Ca	0,095	0	0	0	0
21	C	0,048	0	0	0	0
22	A2, A3, A2	0,746	1	1	1	3
23	A3, Baa1	0,690	1	1	0	2
24	Baa2, Baa3	0,595	1	1	0	2
25	Ba1, Ba2, Baa3	0,524	1	0	0	1
26	Ba1, Ba2	0,5	0	1	1	2
27	Ba3, Ba2, Ba1-PD, (P)Ba1, Ba2, (P)Ba1, Ba1	0,497	0	1	0	1
28	Ba1, Ba2, Ba2	0,492	1	0	0	1
29	Ba3, Ba3, Ba3, Ba2, Ba3	0,438	0	0	1	1
30	B1, B1-PD, B3 (LGD5), B3 (LGD5)	0,333	2	2	2	6
31	B2-PD, B2, B3	0,317	2	2	2	6
32	B3, B3-PD, Ba3 (LGD-1), Caa1 (LGD4)	0,309	1	1	1	3
33	B3, B2	0,309	0	1	1	2
34	B3, B3-PD, B3 (LGD3)	0,286	2	2	2	6
35	B2, B3, Caa1, Ca, Caa1	0,238	0	0	1	1
36	Ca, Caa3, Caa3, Caa1	0,155	1	0	0	1
TOTAL OBSERVATIONS			**51**	**51**	**51**	**153**

Notes: For Panel A, official rating starts from no. 1 to no. 18; while rating no. 19 to 21 is a mixture of some ratings because companies are rated several times in a year, or there are different types of *sukuk*/bonds that get different ratings; for Panel B, official rating starts from no. 1 to no. 20; while rating no. 21 to 26 is a mixture of some ratings because companies are rated several times in a year or there are different types of *sukuk*/bonds that get different ratings; for Panel C, Official rating starts from no. 1 to no. 21; while rating no. 22 to 36 is a mixture of some ratings because companies are rated several times in a year or there are different types of bonds that get different ratings. To measure this credit/*sukuk* rating variable, the specification of Ayturk, Asutay, and Aksak (2017) is applied for modeling *sukuk* and credit ratings' index in our study. A credit rating index score, as a continuous variable, is constructed by using the availability of data from PT. PEFINDO for the Indonesia sample, RAM Rating Services Berhad for the Malaysia sample, and Moody's for Australia. Credit rating scales and the credit rating index are comprehensively portrayed in Table 2. If there is more than one rating score for a *sukuk*/bond issuance, all the score indices are totaled to calculate the mean value of all scores.

Furthermore, to test hypothesis 3a, 3b, and 3c, these models were adopted as follows:

$$\text{Model 3a:}\quad \mathrm{RAT}_{i,t+1} = \alpha_{50} + \alpha_{51}\mathrm{CMH}_{i,t} + \alpha_{52}\mathrm{VMH}_{i,t} + \sum \alpha_{53,j}\mathrm{ABRs(A)}_{i,t} + \sum \alpha_{54,j}\mathrm{ABRs(A)}_{i,t} + \sum \alpha_{55,j}\mathrm{ABRs(A)}_{i,t}{*}\mathrm{CMH}_{i,t} + \sum \alpha_{56,j}\mathrm{ABRs(A)}_{i,t}{*}\mathrm{VMH}_{i,t} + \varepsilon(a)_{i,t};$$

$$\text{Model 3b:}\quad \mathrm{RAT}_{i,t+1} = \alpha_{60} + \alpha_{61}\mathrm{CMH}_{i,t} + \alpha_{62}\mathrm{VMH}_{i,t} + \sum \alpha_{63,k}\mathrm{ABRs(B)}_{i,t} + \sum \alpha_{64,k}\mathrm{ABRs(B)}_{i,t} + \sum \alpha_{65,k}\mathrm{ABRs(B)}_{i,t}{*}\mathrm{CMH}_{i,t} + \sum \alpha_{66,k}\mathrm{ABRs(B)}_{i,t}{*}\mathrm{VMH}_{i,t} + \varepsilon(b)_{i,t};$$

$$\text{Model 3c:}\quad \mathrm{RAT}_{i,t+1} = \alpha_{70} + \alpha_{71}\mathrm{CMH}_{i,t} + \alpha_{72}\mathrm{VMH}_{i,t} + \sum \alpha_{73,l}\mathrm{ABRs(V)}_{i,t} + \sum \alpha_{74,l}\mathrm{ABRs(V)}_{i,t} + \sum \alpha_{75,l}\mathrm{ABRs(V)}_{i,t}{*}\mathrm{CMH}_{i,t} + \sum \alpha_{76,l}\mathrm{ABRs(V)}_{i,t}{*}\mathrm{VMH}_{i,t} + \varepsilon(c)_{i,t};$$

where $\mathrm{RAT}_{i,t+1}$, CMH, VMH, $\mathrm{ABRs}_{i,t}$ have been previously defined as in Table 1; and $\varepsilon(a.b,c)_{i,\ t}$ = error term firm i in

period t for three different groups of ABRs; j,k,l = sub-script referring to coefficients of seven accounting-based risks j for each group of AVERAGE; k for BETA; and l for VARIANCE.

Model ANOVA (Model 3d), then, is used to test hypothesis h3d, i.e., whether frequency distributions for all coefficients of seven accounting-based-risk variables from three forms of attributes (AVERAGE, BETA, and VARIANCE) emanating from the three different samples of Indonesia, Malaysia, and Australia already tested with model 3a, 3b, and 3c are the same (H_{3d}: $\mu_1 \neq \mu_2 \neq \mu_3$). In this model, μ_1 denotes coefficients of all variables for the Indonesia sample; μ_2 denotes coefficients of all variables for the Malaysia sample; μ_2 denotes coefficients of all variables for the Australia sample.

In addition, the observed data from a three-country sample indicates that the sample data include panel data with the number of N (number of corporate cross sections) larger than T (observation time, i.e., 3 years). Henceforth, data specifications include panel/pooled data requiring a specific regression model. As a result, the main analysis for hypothesis testing follows the panel data processing procedures (pooled EGLS) to minimize cross section heteroscedasticity problems, while the additional robustness test is conducted to include year-effect to control for time change to the selected variables.

5. Results and discussion

5.1. Descriptive statistics

Panel A and B of Table 1 lists the *sukuk* rating scales from Indonesia and Malaysia, while Pabel C of Table 2 illustrates bond-rating scales from Australia (including its index and frequency distribution) for a period of 2015–2017 as follows:

There are three different rating scales sourced from different rating agencies in three different countries, all of which have their own standards. That is the reason why each sample in each country is analyzed separately. The rating index score indicates, the greater the value of the rating index is, the higher the credibility of the *sukuk*/bond issuer will be; and vice versa. This rating index score is used as a dependent variable denoted by RAT.

Upon the long process of producing the final variables of interest, involving 14 years of financial data series (2003–2016) to arrive at ABRs and FDQ variables for a period of 2014–2016, as dependent and moderating variables, and the assignment of the corresponding observations of *sukuk* and bond ratings for a period of 2015–2017 (taking a lead *t+1*) as dependent variables, we find the final number of 61 companies from Indonesia; 96 companies from Malaysia; and 51 companies from Australia. In detail, the description of sample distribution and variables (grouped into three groups: AVERAGE, BETA, and VARIANCE) for the three countries can be seen in the following table.

Given Table 3, the interesting points worth noting are: *first*, in the AVERAGE group, the average value of asset growth (AG) and depreciation growth (DG) for Indonesia is bigger than Malaysia, and Malaysia is bigger than Australia. Income growth (IG), sales to asset ratio (SA), and ROI (RI) for Malaysia is bigger than Indonesia, and Indonesia is bigger than Australia. Leverage (LV) for Australia is bigger than Indonesia, and Indonesia is bigger than Malaysia. *Second*, in the VARIANCE group, the average variance value of asset growth (AG) for Australia is bigger than Indonesia, and Indonesia is bigger than Malaysia. Depreciation growth (DG) for Indonesia is bigger than Malaysia, and Malaysia is bigger than Australia. Income growth (IG) for Australia is bigger than Malaysia, and Malaysia is bigger than Indonesia. Sales to asset ratio (SA) for Australia is bigger than Malaysia, and Malaysia is bigger than Indonesia. ROI (RI) for Australia is bigger than Indonesia, and Indonesia is almost equal to Malaysia. Leverage (LV) for Indonesia is bigger than Australia, and Australia is bigger than Malaysia. Thus, we may conclude that profitability growth looks better, and more stable, for Malaysia and Indonesia (*sukuk* sample) than Australia (bond sample), but otherwise, the variability of profitability measures appears riskier for Australia (bond sample) than Malaysia and Indonesia (*sukuk* samples).

5.2. Testing hypothesis 1 and discussion

Testing hypothesis 1 is run by using Model 1. Hypothesis 1a and 1b are empirically supported if the coefficients of relevance variable (represented by CMH variable), and of the reliability variable (represented by the VMH variable) is positively significant. Thus, a high level of financial disclosure quality (as indicated by the significant coefficient of CMH or VMH) will have an impact on the increase in the rating of *sukuk*/bonds, and vice versa.

Table 4 shows that both countries, Indonesia and Malaysia, take into account the level of reliability of financial information in the long term (the coefficients of VMH for Indonesia and Malaysia are positively significant at p-value = 0,000), but the coefficient for Australia is negatively significant; while the level of relevance of financial information indicated by Indonesia, Malaysia, and Australia variables show coefficients that do not support the expected hypothesis. Thus, this result is more consistent with hypothesis 1b associated with the *sukuk* rating, rather than the bond rating.

Overall, it can be concluded that the ratings of *sukuk*/bonds take into account the reliability aspects of financial information relative to relevance. However, since the rating policy is very unique for each country and rating provider, there are still many factors taken into account in the rating policy provided to the public, especially the firm-specific circumstances surrounding the issuance of *sukuk*/bond ratings.

In spite of the fact that only one aspect (reliability or VMH) of the two attributes in financial disclosure quality supports the expected hypothesis (being found positively significant for the two sample: Indonesia and Malaysia), the result of testing hypothesis 1b (VMH—FDQ related to reliability—is positively significant on Islamic-credit [*sukuk*] rating) is consistent with Jorion and Zhang (2007), Jorion et al. (2009), Blume et al. (1998), and also S&P's Corporate ratings criteria (2003, p. 22). All of these studies acknowledge that the role of accounting quality is the key factor; and rating agencies

Table 3
Descriptive statistics for ratings, FDQ, and AVERAGE, BETA, and VARIANCE group of ABRs.

GROUPS OF ABRs		AVERAGE				BETA				VARIANCE			
Variables	Obs	Mean	Max	Min	SD	Mean	Max	Min	SD	Mean	Max	Min	SD
PANEL A: INDONESIA SAMPLE													
RAT	183	0.792	1.000	0.388	0.139	0.792	1.000	0.388	0.1395	0.792	1.000	0.388	0.139
CMH	183	2.1019	87.817	−6.213	9.639	2.102	87.817	−6.E+06	9.639	2.102	87.817	−6.E+06	9.639
VMH	183	10.102	113.758	0.124	16.277	10.102	113.758	0.124	16.277	10.102	113.758	0.124	16.277
AG	183	0.2494	0.942	0.047	0.146	0.917	9.940	−4,E+06	1.663	0.098	1.754	0.002	0.221
DG	183	0.345	3.695	0.008	0.474	0.467	24.821	−2,E+06	3.192	2.923	150.816	0.002	17.734
IG	183	0.488	11.394	−6.275	1.675	0.744	24.287	−3,E+06	2.917	31.663	1303.841	0.004	154.419
LV	183	0.282	0.775	0.038	0.183	1.104	10.637	−1,E+06	2.869	0.010	0.118	7.9E-05	0.017
OI	183	1.6E+09	2.3E+10	−4.E+07	3.6E+09	1.177	15.546	−1,E+06	2.802	3.8E+18	9.3E+19	3.3E+08	1.4E+19
RI	183	0.046	0.158	−0.018	0.037	1.037	14.200	−9,E+06	3.023	0.002	0.015	1.9E-06	0.003
SA	183	0.012	0.654	−0.156	0.100	0.656	16.788	−2,E+06	2.125	0.086	2.313	0.003	0.283
LNVOI										38.762	45.977	19.622	3.775
PANEL B: MALAYSIA SAMPLE													
RAT	96	0.896	1.000	0.050	0.137	0.896	1.000	0.050	0.137	0.896	0.900	1.000	0.050
CMH	96	3.265	322.210	−6.098	34.373	3.265	322.210	−6.E+06	34.373	3.265	0.446	322.210	−6.E+06
VMH	96	37.593	684.978	0.044	132.673	37.593	684.978	0.044	132.673	37.593	2.843	684.978	0.044
AG	96	0.124	0.541	−0.130	0.126	1.017	19.114	−3,E+06	3.619	0.046	0.009	0.715	7.1E-05
DG	96	0.261	2.332	−0.653	0.465	1.119	26.062	−2,E+06	4.373	1.100	0.043	23.840	0.0001
IG	96	0.667	52.990	−4.363	5.555	0.356	42.789	−2,E+06	5.710	158.626	0.141	14410.85	0.004
LV	96	0.274	0.717	0.016	0.195	1.404	29.065	−8,E+06	4.550	0.002	0.0007	0.025	1.16E-05
OI	96	1.3E+08	2.9E+09	−32663.00	5.4E+08	1.347	25.102	−0.085	5.275	1.2E+16	2.9E+10	4.1E+17	715074.8
RI	96	0.055	0.379	−0.075	0.072	1.061	11.169	−5,E+06	2.576	0.002	0.0003	0.016	2.40E-07
SA	96	0.045	1.949	−0.276	0.350	0.875	31.758	−3,E+06	5.532	0.632	0.018	18.435	8.97E-05
LNVOI										24.403	24.115	40.563	13.480
PANEL C: AUSTRALIA SAMPLE													
RAT	153	0.551	0.857	0.143	0.179	0.551	0.857	0.143	0.179	0.551	0.619	0.857	0.143
CMH	153	−1.272	217.699	−4.772	46.458	−1.E+06	217.699	−5.E+06	46.458	−1.272	1.096	217.699	−5.E+06
VMH	153	0.623	9.430	0.004	1.202	0.623	9.430	0.004	1.202	0.623	0.241	9.430	0.004
AG	153	0.106	0.941	−0.138	0.149	0.567	14.688	−4,E+06	2.260	0.116	0.020	3.286	0.0005
DG	153	0.154	1.456	−0.202	0.232	1.592	43.899	−1,E+06	6.251	0.200	0.028	5.292	0.0007
IG	153	−2.939	6.525	−1.145	16.123	1.113	54.654	−2,E+06	7.521	1311.546	2.124	64787.13	0.0006
LV	153	0.303	0.798	0.008	0.165	0.709	11.706	−5,E+06	1.982	0.006	0.001	0.0799	2.5E-05
OI	153	4,E+07	1.9E+09	−146987.8	2.1E+08	1.109	60.419	−2,E+06	8.176	0.018	0.001	0.625	9.8E-07
RI	153	0.015	0.198	−0.437	0.085	0.427	9.469	−2,E+06	1.305	0.062	0.017	2.206	0.0001
SA	153	0.0022	0.674	−0.203	0.109	0.495	12.688	−3,E+06	1.579	2.18E+16	6.9E+10	1.2E+18	6.E+07
LNVOI										26.036	24.967	41.662	17.864

Notes: Long-term data series of financial information are averaged out and transformed to tap the final variables of FDQ and ABRs covering only 3 years (2014–2016) to correspond a lead t+1 of *sukuk* and bond ratings (2015–2017). RAT, CMH, VMH, AG, DG, IG, LV, OI, ROI, SA, and LnVOI refer to *sukuk*/credit rating, relevance level, reliability level, asset growth, depreciation growth, net income growth, leverage, operating income, ROI (return on investment), sale to asset ratio, and log natural of operating income variance respectively, all of which have been depicted in Section 4 (Research Method).

explicitly claim that they greatly consider accounting quality in their ratings analysis (see also Al Homsi et al., 2017; Arundina et al., 2015; Duffie & Lando, 2001).

These results reaffirm that accounting practices, and also financial disclosure quality, are still cumbersome. The classical problem of FDQ, especially related to relevance, tends to be the top priority, aside from reliability. Some efforts to increase the FDQ are worth appreciating, either from accounting practitioners, from accounting academics, or, more importantly, from standard setters, i.e., Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) and the International Financial Reporting Standards (IFRS), so as to improve value relevance of financial disclosure. Additionally, the attempts to harmonize between AAOIFI and IFRS towards a better financial disclosure quality need to be enhanced.

5.3. Testing hypothesis 2 and discussion

Using model 2, hypothesis 2 testing is divided into three parts: *first*, the test of hypothesis 2a, which tests the effect of the AVERAGE group on the seven variables of accounting-based risk, on the ratings of *sukuk* and bond; *second*, the test of hypothesis 2b, which tests the influence of the BETA group of seven accounting-based risk variables on the *sukuk*/bond rating; and *third*, the test of hypothesis 2c, which examines the effect of the VARIANCE group of the seven accounting-based risk variables on the *sukuk* and bond ratings. Overall, there are 21 accounting-based risk variables to be tested for each country's variable coefficients. If the quality of the financial disclosure is taken into account in the *sukuk* rating policy, the coefficients of all accounting-based risk variables should be significant, and correspond to the expected signs of the

Table 4
The results of testing hypothesis 1a and 1b.

Dep. Variable: RAT				
Ind. Variable	IND Coef.	MLY Coef.	AUS Coef.	Pred. signs
1	2	4	6	8
C	0.776	0.900	0.579	?
CMH	3.8E-05	−0.0002***	−0.0004***	+
VMH	0.0012***	8.9E-05***	−0.028***	+
Adj. R-squared	0.491	0.088	0.099	
F-statistic	8.874***	5.586***	9.440***	
Prob (F-statistic)	0.000	0.005	0.0001	

Notes: Table 4 contains the results of testing hypothesis 1a and 1b, i.e., testing the effect of FDQ on *sukuk* rating using model 1. FDQ as an independent variable is divided into two variables, namely relevance (CMH) and reliability (VMH) which are measured by referring to Kirschenheiter's model (1997). For the relevance perspective, its measure is the degree of relevance measured, namely by looking at the value of the covariance between the real value and the signaled value (by the market value). It is said to be more relevant if the true value (V) and a signaled value (the market value [M] is higher than the covariance between the real value (V) and the historical (book) accounting value (H). For the reliability perspective, its measure is the degree of reliability to be measured by looking at the value of the variance between the market value (M) and the historical value (H). It is said to be more reliable if there is an increased ratio between the variance of the market value (M) and the variance of the historical value (H). Thus, the following contains results of testing hypothesis 1a and 1b for Indonesia (IND), Malaysia (MLY) and Australia (AUS) sample. Predicted signs are predictive signs for regression models that test hypotheses 1a and 1b for all three samples. *, **, and *** refer to significant levels at 10%, 5%, and 1% respectively.

hypothesis. In detail, the results of hypothesis testing 2a, 2b, and 2c can be seen in the following table.

Table 5 shows that the effect of the AVERAGE group of accounting-based risks on *sukuk*/bond rating varies greatly. It portrays the variables that consistently and positively influence the *sukuk*/bond rating for the three countries. Leverage (LV) in the three samples consistently, and significantly show positive coefficients (p-value = 0.000 < 0, 01).

In addition, for BETA group, the three samples show varying results, except for the consistent depreciation growth (DG) and income growth (IG), in two samples. Depreciation growth (DG) is consistent in the Malaysian and the Australian sample. Income growth (IG) is supported in the Indonesian and the Australian samples (p-value = 0.000 < 0, 01).[4] The number of supported coefficients in bonds market (the Australian sample) are most documented, i.e., asset growth (AG), depreciation growth (DG), income growth (IG), operating income (OI), and return on investment (RI).

In further analysis of testing H2c, the effect of accounting-based risk variables on the VARIANCE group on the *sukuk*/bond rating is also highly variable, except for variables of leverage (LV) that have proven to consistently support hypotheses for three different samples, Indonesia, Malaysia and Australia (p-value = 0.000 < 0, 01); and two variables, namely asset growth (AG) and sale-to-asset ratio variance (SA) both consistently negatively affect the rating of *sukuk* (supporting hypothesis 2c) in two samples, namely Indonesia and Australia (p-value = 0.000 < 0, 01), while income growth variance (IG) consistently supports hypotheses for two different samples, i.e., Indonesia and Malaysia (p-value = 0.000 < 0, 01).

Table S1 (see Supplementary Material, available online) comes to the conclusion that the number of accounting-based risk coefficients, which most support the hypothesis for the three groups of accounting-based risk variables, AVERAGE, BETA, and VARIANCE, takes place in the Australian sample (total coefficients supporting the expected hypotheses: 12 for Australia, 9 for Malaysia, 8 for Malaysia); and that ABRs covering seven accounting-based risk variables, especially for leverage (capital structure), are proven to be the basic determinants of credit rating, and consistent with previous literature, most of which contend that ABRs consistently support decision making, not only in stock markets, but also in debt markets. Leverage is a special case, which is the most influential in *sukuk*/bond rating (seven coefficients are significantly supported across the three samples), even though previous studies related to leverage show inconsistency (e.g., Al Homsi et al., 2017; Amato & Furfine, 2004; Arundina et al., 2015; Blume et al., 1998; Kamstra et al., 2001).

Further testing of H2d (using ONE WAY ANOVA) applies, to see if there are differences in the distribution pattern of findings related to the influence of the three groups (i.e., AVERAGE, BETA, VARIANCE) of seven ABRs on *sukuk*/bond rating among the three samples: Indonesia, Malaysia, and Australia. The results indicate that the distribution pattern shows no difference among the three samples of different countries (F-test value shows 0,81 and sig value = 0,459). This means that differentiating Islamic versus conventional annual-report disclosures originating from *sukuk* (samples from Indonesia and Malaysia) versus bond issuing firms (sample from Australia) does not support the expected hypotheses.

5.4. Testing hypothesis 3 and discussion

Testing hypothesis 3 seeks to answer question no. 3, whether the financial disclosure quality variable (FDQ) reflected in the relevance level (CMH) and reliability (VMH) can moderate the effects of seven accounting-based risk variables, namely asset growth (AG), depreciation growth (DG), leverage (LV), income growth (IG), operating income (OI), return on investment (ROI) (RI), sale to asset ratio (SA) on *sukuk*/bond rating.

Using model 3, the test results can be seen in Table 6.

Table 6 indicates that the relevance and reliability aspects of financial information disclosure are interpreted differently, with respect to the variables included in the bond rating policy. Thus, in all of the three samples, it can be concluded that, for the *sukuk* rating policy (Indonesian and Malaysian samples), the relevance of the leverage policy is taken strongly into

[4] Following the theory that the market beta also has a positive effect on the market (stock return), the beta fundamentals are also expected to have a positive effect on the stock market (stock return) and also in the *sukuk*/bond market.

Table 5
The Results of Testing hypothesis 2a, 2b, and 2c.

Dep. Variable: RAT										
Model (Var. Group)	2a (AVERAGE)			2b (BETA)			2c (VARIANCE)			Pred. signs
Sample Categories	IND	MLY	AUS	IND	MLY	AUS	IND	MLY	AUS	
Indep. Variable	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	
C	0.798***	0.904***	0.542***	0.771***	0.892***	0.552	0.293***	0.804***	−0.103***	?
AG	−0.06***	0.295***	−0.013***							+
DG	0.025***	−0.251***	0.003*							+
IG	−0.007***	−0.0009***	−0.0003							+
LV	6.2E-12***	0.077***	−6.E−14							+
OI	−0.223***	−6.9E-12**	0.012***							+
RI	1.282***	0.026	0.019***							+
SA	0.030	0.239***	−0.004**							+
AG				0.002***	0.0002	−0.0008***				−
DG				0.002***	−0.004***	−7.9E-05***				−
IG				−0.005***	0.002***	−0.004***				−
LV				0.0009***	−0.002***	0.0003***				−
OI				0.022***	6.8E-05	−0.0007***				−
RI				2.3E-06	0.006***	−0.0009***				−
SA				−0.004***	0.006***	0.0003***				−
AG							−0.068***	0.057***	−0.075***	−
DG							0.0005***	−0.074***	0.031***	−
IG							−0.0001***	−1.1E-05***	−1.7E-07	−
LV							−1.860***	−4.5E-19***	−1.545***	−
LNOI							0.014***	0.005***	0.026***	−
RI							4.335**	−0.944	−0.389***	−
SA							−0.038***	0.095***	−0.128***	−
Adj. R-squared	0.801	0.443	0.999	0.461	0.911	0.999	0.857	0.665	0.844	
F-statistic	11.959***	11.790***	35142.19***	2.327***	2.654***	9.521***	1.575***	27.914***	1.182***	
Prob (F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

Notes: Table 5 contains the results of testing hypothesis 2a, 2b, and 2c using model 2a, 2b, and 2c (upon following panel regression models, common effect models are applied) which examines the effects of the AVERAGE, BETA, and VARIANCE groups of the seven ABRs variables for the three sample groups, Indonesia, Malaysia, and Australia (abbreviated as IND, MLY, AUS respectively): asset growth (AG), depreciation growth (DG), income growth (IG), leverage (LV), operating income (OI), natural logarithm (ln) of operating income (LNOI), ROI (RI), and sale to asset ratio (SA) on the *sukuk* and bond ratings. Predictions are predictive signs for regression models that test hypotheses 2a, 2b, and 2c for all three samples. To measure accounting-based risks (ABRs) as the independent variables**,** this research accommodates previous studies (i.e., among others, Altman, 1968; Kaplan & Urwitz, 1979; Kamstra et al., 2001; Blume et al., 1998; Qizam, 2011; Beaver et al., 1970; Francis, LaFond, Olsson, & Schipper, 2004). *, **, and *** refer to significant levels at 10%, 5%, and 1% respectively.

account (p-value<0.01), whereas in the bond rating policy (the Australian sample), both the relevance and reliability of financial information are highly regarded when taking into account depreciation growth (p-value<0.01). Additionally, the reliability of average operating income, (AOI) which is strongly taken into account (p-value<0.01), is significantly supported for all the samples (Indonesia, Malaysia, and Australia).

For the two samples of Malaysia and Australia, the moderating effects of the financial disclosure quality variables related to relevance (CMH), have demonstrated to be consistently and significantly positive in the impact of beta sales-to-asset ratio (SA) on the *sukuk*/bond rating (all significant at p-values<0.01). This means the concern for the relevance of the financial disclosure quality associated with beta sales-to-asset ratio (SA) variables is considered largely when issuing the rating of *sukuk*/bonds. In the reliability attribute of FDQ, only the beta sales-to-asset ratio (SA) is highly considered in relation to issuing bond rating policy (significant at p-value<0.05).

Meanwhile, for VARIANCE groups of ABRs analysis, from two samples, Indonesia and Malaysia, the moderating effect of the financial disclosure quality variables related to reliability (VMH) proves to be consistently and significantly negative in the effect of operating income variance, and sale to asset ratio variance on the *sukuk* rating (all p-values<0.01). Considering the three samples, namely Indonesia, Malaysia, and Australia, it can be concluded that only the moderating effects of the financial disclosure quality variables, related to reliability (VMH), are demonstrated to be consistently and negatively significant in the effect of operating income variance on the *sukuk*/bond rating (all p-values<0.01). This means that great attention on the reliability of a financial disclosure, related to variability in operating income (or operating income variance), is paid by the three countries.

From Table S2 (see Supplementary Material, available online), we posit that rating agencies pay the greatest attention to relevance when incorporating ROI (RI) and leverage (LV) in setting *sukuk*/bond rating policy, while they are of most interest to reliability when taking into account operating

Table 6
The Results of Testing hypothesis 3a, 3b, and 3c.

Dep. Variable: RAT										
Model (Var. Group)	3a (AVERAGE)			3b (BETA)			3c (VARIANCE)			Predicted signs
Sample Categories	IND	MLY	AUS	IND	MLY	AUS	IND	MLY	AUS	
Indep. Variable	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	
C	0.806***	0.944***	0.574***	0.753***	0.902***	0.617***	0.746***	0.915***	0.576***	?
CMH	−0.004**	−0.007***	0.002***	−0.0006	0.0012	0.0009***	−1.6E-06	0.005***	−0.0006	?
VMH	−0.0003	−0.0008***	−0.008	0.001***	−0.001	−0.056***	0.0004***	0.0001***	0.025***	?
AG	−0.050***	0.140***	−0.317***	0.005***	0.002	−0.028***	−0.003	0.235***	0.379***	?
DG	0.013***	−0.159***	−0.072***	−0.003***	−0.008***	−0.006*	0.006***	−0.089***	0.144***	?
IG	0.001	0.003***	0.002**	−0.007	−0.008**	−0.001	7.E−05***	3.7E-05**	8.5E-06	?
LV	−0.111***	0.015*	−0.017**	0.006***	−0.003*	−0.036***	2.1E-23***	−4.4E-19***	−2.199***	?
OI	3.1E-11***	−7.8E-11***	−3.4E-10**	0.018***	−0.001**	−0.016**	2.009***	4.406***	5.3E-19***	?
RI	−0.357***	−0.411***	1.646***	−0.003***	0.002	−0.024**	−1.388***	−1.351***	0.866	?
SA	−0.108***	0.135***	0.013	−0.007***	0.004***	−0.006*	−0.011***	0.082***	−1.072***	?
CMH*AG	−0.004**	0.117***	−0.004***							+
CMH*DG	0.004***	−0.034***	0.003***							+
CMH*IG	−8.3E-05	0.002***	0.0002							+
CMH*LV	0.013***	0.026***	−0.011***							+
CMH*OI	−4.1E-12***	−8.8E-12***	1.2E-11							+
CMH*RI	0.052**	0.012	0.008***							+
CMH*SA	0.005	−0.004	0.0125***							+
VMH*AG	0.011***	0.008	−0.035							+
VMH*DG	−0.002***	−0.002	0.102***							+
VMH*IG	−0.003***	−0.005***	−0.008*							+
VMH*LV	−0.006***	−0.001	−0.048							+
VMH*OI	4.9E-13***	1.6E-11***	2.7E-09***							+
VMH*RI	0.019***	0.003	−0.716*							+
VMH*SA	0.027***	0.013***	−0.114***							+
CMH*AG				0.002***	0.002***	0.0003***				−
CMH*DG				0.004***	0.0004	−1.E−05				−
CMH*IG				−0.005	0.0003	0.0002				−
CMH*LV				4.3E-06	−0.0006***	−0.0002				−
CMH*OI				−0.004	−6.8E-05	0.008***				−
CMH*RI				0.0005***	0.002***	0.004***				−
CMH*SA				0.003***	−0.003***	−0.002***				−
VMH*AG				−0.001	0.0005**	0.017				−
VMH*DG				−0.002	0.0004	0.004***				−
VMH*IG				0.003***	0.002*	0.0034				−
VMH*LV				−0.0002	0.0001	0.005*				−
VMH*OI				0.002***	0.0001**	0.028				−
VMH*RI				−6.4E-05	0.0002	0.024*				−
VMH*SA				−0.0002	0.0004*	−0.011**				−
CMH*AG							−0.009***	−0.024	0.003***	−
CMH*DG							0.002***	−0.030***	0.0003	−
CMH*IG							8.2E-05***	−0.0001***	5.6E-06**	−
CMH*LV							6.0E-24**	−1.1E-20*	0.056	−
CMH*OI							−0.030***	0.228	−1.0E-19***	−
CMH*RI							−0.135*	1.412***	−0.649***	−
CMH*SA							0.002**	0.022	0.006***	−
VMH*AG							−0.0002	−0.013***	−0.503***	−
VMH*DG							−0.0003***	0.014***	−0.095***	−
VMH*IG							−3.6E-05***	0.0001***	−5.6E-05*	−
VMH*LV							−6.7E-24***	7.0E-20***	−0.076	−
VMH*OI							−0.068***	−0.177***	−8.0E-19***	−
VMH*RI							0.157***	0.012	−1.132	−
VMH*SA							−0.001***	−0.009***	0.377***	−
Adjusted R-squared	0.851	0.946	0.897	0.542	0.783	0.574	0.999	0.779	0.988	
F-statistic	46.254***	72.911***	58.265***	10.354***	15.936***	9.914***	48049.56***	15.521***	172.932***	
Prob (F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

Notes: Table 6 contains the results of testing hypothesis 3a, 3b, and 3c using model 3a, 3b, and 3c (upon following panel regression models, common effect models are applied), which examines the moderating effect of FDQ of the influence of AVERAGE, BETA and VARIANCE groups of accounting-based risks (ABRs) on the *sukuk*/bond rating. ABRs as independent variables are divided into seven variables and grouped into three groups of proxies in the forms of AVERAGE, BETA, and VARIANCE. Table 6 also illustrates the moderating effect of FDQ proxied by CMH (reflecting relevance) and VMH (reflecting reliability) on the influence

between the AVERAGE, BETA, and VARIANCE groups of the ABRs, respectively, for the three sample groups (Indonesia, Malaysia and Australia, abbreviated as IND, MLY, AUS respectively): asset growth (AG), depreciation growth (DG), income growth (IG), leverage (LV), operating income (OI), ROI (RI), and sale to asset ratio (SA) on *sukuk*/bond rating for the three sample groups (RAT). Predictions are predictive signs for regression models that test hypothesis 3c for all three samples; *, **, and *** refer to significant levels at 10%, 5%, and 1% respectively.

income (OI) for the first priority, and, then, sales-to-asset ratio (SA) for the first one in constructing *sukuk*/bond rating policy. The rest of the significantly supported ABRs are unevenly scattered across the three groups, the three samples, and the two attributes (relevance and reliability) of FDQ. These effects are most supported in the VARIANCE groups of ABRs (twelve, eight, and one coefficient for VARIANCE, AVERAGE, BETA groups of ABRs respectively).

Concerning the findings in testing hypotheses 3a, 3b and 3c, regardless of the various frequency of evidences supporting the expected hypotheses, the moderating effect of FDQ reflected in CMH (relevance) and VMH (reliability) over the influence of ABRs for all perspectives (the different groups of variables, different ABRs, and different samples of the three countries) on *sukuk*/bond rating is clearly consistent with the expected hypotheses (Hypothesis 3a, 3b, 3c). These results confirm the previous studies (e.g., Al Homsi et al., 2017; Arundina et al., 2015; Bhojraj & Sengupta, 2003; Duffie & Lando, 2001; Francis et al., 2005; Heflin et al., 2011; Shleifer & Vishny, 1997; Yu, 2005).

Finally, the results of testing hypothesis 3d show that the number of supported coefficients regarding the moderating effect of relevance and reliability as a whole in the relationships among all the groups of accounting-based risks (ABRs) and the *sukuk* rating appear to be comparable to among those ABRs and the conventional bond rating. F-test values for financial disclosure quality related to each attribute (relevance or reliability), and to all attributes in sum of relevance and reliability, does not prove to be significant (p-value = 0.793 for relevance variables; p-value = 0.406 for reliability variables; and p-value = 0.871 for all combined variables of relevance and reliability). Thus, no difference in *sukuk* versus bonds-issuing countries appears in rating policy based on financial disclosure quality. This means that hypothesis 3d is not supported. This is also not consistent with the prior literature, demonstrating that sharia vs non-sharia compliant firms show different financial disclosure quality (see Farooq & AbdelBari, 2015; Wan Ismail et al., 2015).

5.5. Robustness test

We ran robustness test using a fixed effect model with least squares dummy variable (LSDV) regression (OLS with a set of year-dummies) to notice year effect more distinctly, during a period of three-year *sukuk* and rating observations, 2015–2017 (2017 is set as the reference point) to correspond the selected AVERAGE and VARIANCE group (excluding BETA groups, since they are found to be the least supportive of the hypotheses) of the five salient accounting risk variables, being similar in nature (asset growth, income growth, leverage, operating income, and return on investment), for a period of 2014–2016 among the three countries (see Table S3 of Supplementary Material, available online).

Except for the Australian 2015 sample, all the year-effect coefficients significantly hold. In addition, the financial disclosure quality (FDR), related to relevance and reliability, denotes its significant moderating effects on the relationship between ABR and *sukuk* or bond ratings. In its moderating effects, operating income (OI) is the most influential for both FDQ attributes, i.e., relevance (CMH) and reliability (VMH), showing consistency with the previous results (hypothesis 3), and then, followed by asset growth, income growth, and leverage respectively. However, ABRs variables are empirically more reflected in relevance than in reliability when setting *sukuk*/bond ratings (the significant twenty-five and eighteen coefficients support relevance and reliability respectively).

This also confirms that no significant effect of differentiating *sukuk* (the Indonesian and Malaysian samples) versus bond issuing firms (the Australian sample) exists when applying for the three samples of different countries. In addition, bond ratings (Australian samples) are evident to be more dominant, in taking VARIANCE groups of ABRs, i.e., AG, IG, LV and OI into account, than *sukuk* ratings m while AVERAGE groups are more apparent, especially when tested using the Indonesian sample, AG, IG, LV, OI and RI, constituting additional findings beyond our prediction.

6. Conclusion

Reliability of financial disclosure proves to have a significantly positive effect on *sukuk*/bond rating for the two samples, i.e., Indonesia and Malaysia, while for the Australian sample, no significant evidence is found, both in the effect of relevance and of reliability on bond rating. In Indonesia and Malaysia (*sukuk* ratings), reliability of financial disclosure is more pronounced than relevance, while in Australia (bond ratings), relevance and reliability are not a specific consideration in incorporating financial disclosure on its bond rating policy.

Furthermore, leverage is found to be the most influential in having a positive effect on *sukuk*/bond rating (followed respectively by sale to asset ratio, depreciation growth, income growth, ROI, asset growth, and operating income). These results are consistent with previous literature, most of which contend that ABRs consistently support decision making, not only in the stock market, but also in the debt market. Additionally, for all perspectives (the different groups of variables, different ABRs, and different samples of the three countries), the moderating effect of relevance is more pronounced in leverage and ROI than that of reliability, while the moderating effect of reliability (VMH) appears to be more evident in

operating income (OI) and sales to asset ratio (SA) than that of relevance to affect the *sukuk*/bonds rating.

Overall, through the robustness test, much attention on operating income, leverage, and ROI must be paid for through rating policy. These results confirm that the role of accounting quality and accounting fundamentals are the key factors in credit ratings, especially in *sukuk*-rating analysis (e.g., Al Homsi et al., 2017; Altman, 1968; Amato & Furfine, 2004; Arundina et al., 2015; Bhojraj & Sengupta, 2003; Duffie & Lando, 2001; Francis et al., 2005; Heflin et al., 2011; Shleifer & Vishny, 1997; Yu, 2005). No significant effect of differentiating *sukuk* versus bond issuing firms appears to be found, when applying the three samples of different countries (Indonesia, Malaysia, and Australia), which is not consistent with Farooq and AbdelBari (2015) and Wan Ismail et al. (2015).

Through the robustness test, it is noticeable, considering that FDQ attributes related to relevance are apparently more paramount than those related to reliability, when setting either *sukuk* or bond ratings. Variability measures (VARIANCE group) of ABRs look more interesting for bond ratings than *sukuk* ratings, being more adherent to aggregation measures (AVERAGE group) of ABRs. These may be additional findings beyond our prediction, which necessitates special attention for future research.

These findings, to some extent, need to be re-examined in a wider context. Additional tests for betterment are needed to overcome small data, a short period of samples, and heterogeneity in rating agencies.

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Appendix A. Supplementary data

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