

ASSESSMENT OF DEFAULT RISK ON INDONESIAN CORPORATE SUKUK USING THE MOODY'S KMV MODEL



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Abstract

This study examines the probability of default of Corporate Sukuk issuers in Indonesia using the Moody's KMV Model. The increasing development of corporate sukuk in Indonesia has raised concerns regarding issuer solvency and default vulnerability, particularly because many contemporary sukuk structures continue to exhibit asset-based and debt-like characteristics. This study aims to assess the default risk profile of Indonesian corporate sukuk issuers and to evaluate the relevance of the KMV framework in identifying financially distressed issuers. The study employed a quantitative approach using secondary data obtained from audited financial statements, Indonesia Stock Exchange publications, and market data of corporate sukuk issuers. The sample consisted of sukuk ijarah and sukuk mudharabah issuers listed on the Indonesia Stock Exchange, selected using purposive sampling. The probability of default was estimated through the Moody's KMV framework by calculating firm asset value, asset volatility, Distance to Default (DD), and Expected Default Frequency (EDF). The results indicate that issuers possessing lower asset values and higher asset volatility consistently produced lower DD values and higher EDF values, reflecting a greater probability of default. The findings also show that the repayment capacity of corporate sukuk issuers remains highly dependent on issuer financial stability rather than on the liquidation value of underlying assets. In addition, the KMV framework successfully identified issuers experiencing severe financial distress, particularly PT Berlian Laju Tanker Tbk and PT Tiga Pilar Sejahtera Food Tbk. The study concludes that the KMV framework provides a relevant market-based approach for assessing default risk within the Indonesian corporate sukuk market.

Keywords: Corporate Sukuk, Probability of Default, Moody's KMV Model, Distance To Default

INTRODUCTION

Sukuk has developed rapidly over the last two decades and has become an important component of the global Islamic capital market. Sukuk was initially designed as a Sharia-compliant financing instrument representing ownership of tangible assets, usufructs, or investment activities rather than pure debt obligations (AAOIFI, 2017). In practice, sukuk has also become an important instrument for supporting economic growth, infrastructure financing, and capital market development in many Muslim-majority countries, including Indonesia (Ismath Bacha & Mirakhor, 2018; Mitsaliyandito et al., 2017).

Despite its rapid development, the structure and risk characteristics of contemporary Corporate Sukuk continue to attract substantial academic debate. Several studies argue that many sukuk structures in practice increasingly resemble conventional debt instruments due to the dominance of asset-based arrangements rather than true asset-backed mechanisms (Radzi, 2020; Uddin et al., 2022). Under asset-based structures, ownership transfer of the underlying assets to investors is often absent, causing sukuk holders to occupy a *pari passu* position with other creditors during default events. Consequently, sukuk may become exposed to credit risk characteristics similar to conventional bonds despite being issued under Sharia contractual frameworks.

The increasing incidence of sukuk default cases has further strengthened concerns regarding the vulnerability of sukuk instruments to financial distress and corporate solvency problems. Globally, several major sukuk defaults occurred during and after the global financial crisis, including the defaults of East Cameron Gas Sukuk, Nakheel Sukuk, and Investment Dar Sukuk, highlighting weaknesses related to asset ownership structures and post-default resolution mechanisms. Ahmad et al. (2018) emphasized that post-default sukuk restructuring frequently faces significant Sharia and legal complexities, particularly regarding asset ownership and investor rights. Similarly, Kalimullina & Hassan (2022) identified default risk as one of the major factors discouraging corporations from entering the sukuk market.

In Indonesia, concerns regarding sukuk default risk became increasingly relevant following the default of Sukuk Ijarah PT Berlian Laju Tanker Tbk, which represented one of the earliest and most prominent corporate sukuk default cases in the domestic Islamic capital market. The default case highlighted that deterioration in liquidity conditions and corporate cash flow stability could substantially weaken the repayment capacity of sukuk issuers despite the existence of underlying assets within the sukuk structure. This condition indicates that the repayment performance of corporate sukuk remained highly dependent on issuer solvency and financial strength rather than solely on the underlying asset mechanism. Similar concerns regarding issuer-related solvency risk and structural vulnerability in contemporary sukuk arrangements were also emphasized by Alam et al. (2018) and Setiawan & Suwandaru (2024), who argued that sukuk instruments continue to face substantial financial and structural risks despite their Sharia contractual frameworks.

Previous studies on sukuk risk have largely focused on sukuk ratings, governance, and financial distress indicators. Ismail & Arundina (2019) examined sukuk rating prediction in Indonesia, while Ni'mah et al. (2020), Laila et al. (2021), and Santoso et al. (2022) investigated determinants influencing sukuk ratings using financial and non-financial factors. Other studies explored the relationship between governance and financial distress (Idrus & Hamdani, 2017), corporate governance and credit risk of Islamic bonds (Ur Rehman et al., 2023), as well as governance effects on sukuk ratings (Sulistiani & Tjahjadi, 2022). However,

empirical studies specifically examining the probability of default of Indonesian corporate sukuk remain relatively limited

Within the broader credit risk literature, substantial methodological developments have occurred in predicting corporate default probability. Earlier studies predominantly relied on accounting-based approaches such as Altman Z-score, logistic regression, and discriminant analysis (Aaron et al., 2017; Tano & Nainggolan, 2019). More recent studies have increasingly adopted market-based structural approaches due to their ability to incorporate forward-looking market information and asset volatility dynamics. The Moody's KMV Model, derived from the structural credit risk framework introduced by Merton (1974), has become one of the most widely used approaches for estimating corporate default probability.

Anuwar and Jaffar (2017) demonstrated that the KMV-Merton model effectively classified credit default probabilities among Malaysian listed companies, while Yusof et al. (2018) proposed an iterated KMV-Merton approach capable of improving default prediction robustness. Gul & Cho (2019) further found that capital structure significantly influences corporate default risk, whereas Romanyuk & Ichkitidze (2020) highlighted the importance of time-series financial analysis in strengthening default modelling accuracy. In the Indonesian context, Malasari et al. (2020) confirmed that financial ratios significantly affect the probability of default estimated using the KMV-Merton method for non-financial firms listed on the Indonesia Stock Exchange. More recent developments also indicate continuous refinement of the KMV framework, including the CEV-KMV model proposed by Su (2022) and the ESG-KMV model introduced by Yang et al. (2026), both of which improved the predictive capability of structural default models under evolving market conditions.

Nevertheless, several important research gaps remain unresolved. First, prior studies applying the KMV framework mainly focused on conventional corporations and banking sectors, while empirical applications within the context of corporate sukuk remain relatively scarce, particularly in Indonesia. Second, most studies on Indonesian sukuk focused on ratings, governance, and financial performance rather than directly estimating probability of default through market-based structural models. Third, previous studies rarely incorporated the structural characteristics of sukuk itself, particularly the implications of asset-based structures, absence of true asset transfer, and the debt-like behavior of sukuk during default events.

Therefore, this study aims to assess the default risk of Indonesian corporate sukuk using the Moody's KMV model by focusing on sukuk ijarah and mudharabah issuers listed in Indonesia. This study contributes to the literature in several ways. First, it extends the application of market-based structural default models into the context of Islamic capital market instruments. Second, it provides empirical evidence regarding the probability of default and solvency profile of Indonesian corporate sukuk issuers. Third, this study provides further evidence that many Indonesian corporate sukuk structures continue to behave similarly to conventional debt instruments, where the default risk of sukuk is strongly associated with the financial

REVIEW OF LITERATURE

Corporate Sukuk and Default Risk

Corporate Sukuk has become an increasingly important instrument within the global Islamic capital market and serves as an alternative source of long-term financing for

governments and corporations. Sukuk was introduced as a Sharia-compliant financial instrument representing proportional ownership over tangible assets, usufructs, or investment activities rather than pure debt obligations. Consequently, the fundamental principles underlying sukuk emphasize risk-sharing, asset participation, and linkage to real economic activities (AAOIFI, 2017). Ismath Bacha & Mirakhor (2018) explained that the development of sukuk reflects the broader objective of Islamic finance in promoting equitable risk-sharing mechanisms while reducing excessive leverage within financial systems.

The practical development of contemporary Corporate Sukuk, however, demonstrates that many sukuk structures increasingly resemble conventional fixed-income instruments. In many jurisdictions, including Indonesia, corporate sukuk are predominantly structured using asset-based mechanisms rather than true asset-backed structures. Under asset-based arrangements, ownership transfer over the underlying assets is often limited or merely contractual in nature, causing investors to rely primarily on the financial strength and repayment capacity of issuing firms rather than on the liquidation value of the underlying assets themselves. As a result, sukuk instruments frequently exhibit debt-like characteristics, particularly during periods of financial distress and default (Radzi, 2020; Uddin et al., 2022).

The issue of sukuk authenticity has therefore become increasingly prominent within Islamic finance literature. Although sukuk is theoretically designed to differ fundamentally from conventional bonds, practical market considerations often prioritize financing efficiency, regulatory flexibility, and investor familiarity, thereby encouraging structures that economically replicate conventional debt instruments. Izhar et al. (2026) argued that many contemporary sukuk structures continue to face authenticity concerns due to the limited transfer of ownership risk and the dominance of debt-replicating contractual arrangements. This condition contributes to the increasing convergence between sukuk and conventional bonds in terms of repayment dependency, solvency exposure, and default vulnerability. Setiawan & Suwandaru (2024) further noted that the structural characteristics of Indonesian sukuk continue to expose investors to substantial financial and contractual risks despite the existence of Sharia contractual frameworks.

Within this context, default risk has become one of the central concerns in the development of the sukuk market. Tariq & Dar (2007) identified several major risks inherent in sukuk instruments, including market risk, liquidity risk, credit risk, default risk, and Sharia compliance risk. Default risk in sukuk refers to the inability of issuing firms to fulfill obligations related to periodic profit-sharing distributions, lease payments, or principal repayment at maturity. In practice, the repayment capacity of sukuk issuers remains closely associated with the financial condition, liquidity position, and cash flow stability of the issuing firms, particularly when the sukuk structure does not involve a genuine transfer of ownership over the underlying assets.

Several international sukuk default cases further demonstrate that sukuk instruments remain exposed to financial distress and insolvency risk. Major default cases involving East Cameron Gas Sukuk, Nakheel Sukuk, and Investment Dar Sukuk revealed significant legal and structural complexities related to ownership rights, asset recovery, and post-default restructuring mechanisms. Ahmad et al. (2018) explained that post-default sukuk restructuring frequently involves unresolved Sharia and legal issues concerning investor protection and ownership claims over underlying assets. Alam et al. (2018) also demonstrated that sukuk instruments remain substantially exposed to market and default risks despite their

Sharia contractual structures. These findings indicate that the existence of underlying assets does not automatically eliminate issuer-related solvency risk within sukuk structures.

In Indonesia, concerns regarding sukuk default risk became increasingly significant following the default of Sukuk Ijarah PT Berlian Laju Tanker Tbk, which represented one of the earliest corporate sukuk default cases within the Indonesian Islamic capital market. The default case demonstrated that deterioration in liquidity conditions and weakening corporate cash flow stability could significantly reduce the repayment capacity of sukuk issuers despite the existence of underlying assets within the sukuk structure. This condition further indicates that issuer solvency and financial stability remain important determinants of sukuk repayment performance. Similar concerns regarding default vulnerability and structural risk within the sukuk market were also raised by Kalimullina & Hassan (2022) and Setiawan & Suwandaru (2024), who emphasized that contemporary sukuk structures continue to expose investors to considerable financial and contractual risks.

Several empirical studies further support the argument that corporate sukuk remains closely associated with financial distress and issuer solvency risk. Kamarudin et al. (2014) found that sukuk default was associated with industry characteristics, board structure, and weak financial conditions of issuing firms. Fazalina & Sukmana (2017) demonstrated that financial ratios derived from the Altman Z-score framework significantly affected the probability of sukuk default in Indonesia. (Ismail & Arundina, 2019; Laila et al., 2021; Ni'mah et al., 2020), similarly reported that financial and non-financial factors significantly influence sukuk ratings and credit quality in Indonesia. Collectively, these findings indicate that the financial stability and solvency of issuing firms remain central determinants of corporate sukuk risk exposure. This condition further supports the relevance of market-based default risk assessment approaches in evaluating the probability of default of corporate sukuk issuers.

Structural Credit Risk Theory and the Merton–KMV Model

Default Risk assessment constitutes an important component in evaluating corporate solvency and financial stability within capital markets. Early default prediction studies generally relied on accounting-based approaches such as the Altman Z-score, discriminant analysis, logistic regression, and financial ratio analysis (Aaron et al., 2017; Tano & Nainggolan, 2019). Although widely used, these approaches mainly depend on historical financial statements and often fail to capture market volatility and forward-looking information.

The structural approach to credit risk was introduced by Merton (1974), which defines corporate default as a condition where firm asset value falls below debt obligations at maturity. Under this framework, default probability is determined by firm asset value, leverage, and asset volatility. The Moody's KMV Model subsequently extended the Merton framework through market-based estimation of asset value and volatility using the Distance to Default (DD) approach. Firms with lower DD values generally possess higher probabilities of default.

Several studies have demonstrated the effectiveness of the KMV framework in assessing corporate default risk. Anuwar & Jaffar (2017) showed that the KMV-Merton model effectively classified credit default probabilities among Malaysian listed firms, while Yusof et al. (2018) proposed an iterated KMV-Merton approach to improve estimation robustness. Gul & Cho (2019) also found that capital structure significantly influences default

risk, whereas Romanyuk & Ichkitidze (2020) emphasized the importance of time-series financial analysis in strengthening default prediction accuracy.

Recent developments indicate that the KMV framework remains relevant within contemporary default risk modelling. Su (2022) developed the CEV-KMV model to improve distance-to-default estimation under dynamic market conditions, while Yang et al. (2026) incorporated ESG dimensions into the KMV framework to strengthen predictive capability. In Indonesia, Malasari et al. (2020) demonstrated that financial ratios significantly influence probability of default estimation using the KMV-Merton method among non-financial firms listed on the Indonesia Stock Exchange.

The application of market-based structural models becomes increasingly relevant within the context of Corporate Sukuk because repayment capacity under many contemporary sukuk structures remains highly dependent on issuer solvency and financial performance. Under such conditions, the Moody's KMV framework provides a relevant approach for assessing the probability of default of corporate sukuk issuers through simultaneous evaluation of asset value, leverage, and asset volatility.

Empirical Studies on Sukuk Default and Financial Distress

Empirical studies concerning Corporate Sukuk risk have generally focused on financial distress, sukuk ratings, and default prediction. Kamarudin et al. (2014) found that sukuk default was associated with weak financial conditions, industry characteristics, and governance structure of issuing firms. In Indonesia, Fazalina & Sukmana (2017) demonstrated that financial ratios derived from the Altman Z-score framework significantly affected the probability of sukuk default. Ismail & Arundina (2019); Laila et al. (2021); Ni'mah et al. (2020) also reported that financial and non-financial variables significantly influence sukuk ratings and credit quality in Indonesia.

Studies on corporate default prediction have further developed from accounting-based approaches toward market-based and data-driven models. Aaron et al. (2017) compared several bankruptcy prediction methods, including Z-score, logistic regression, and artificial neural networks. More recent studies introduced ensemble learning, XGBoost, LSTM, and hybrid machine learning approaches to improve financial distress prediction accuracy (Kristanti et al., 2024; Mawardi et al., 2026). Despite these developments, market-based structural models remain widely used because they directly incorporate asset value, leverage, and volatility into default probability estimation.

Several studies have applied the Moody's KMV Model in assessing corporate default risk. Anuwar & Jaffar (2017) showed that the KMV-Merton framework effectively classified credit default probabilities among Malaysian listed firms, while Malasari et al. (2020) demonstrated that financial ratios significantly influence probability of default estimation using the KMV approach in Indonesian non-financial firms. However, empirical studies applying market-based structural models within the context of Indonesian corporate sukuk remain relatively limited. Most previous studies focused on sukuk ratings and financial distress indicators rather than direct estimation of probability of default using asset value and volatility approaches. This condition indicates the existence of a research gap regarding market-based assessment of default risk in Indonesian corporate sukuk.

RESEARCH METHOD

This study assessed the default risk of Corporate Sukuk issuers in Indonesia using the Moody's KMV Model derived from the structural credit risk framework developed by Merton

(1974). The analysis focused on corporate sukuk ijarah and sukuk mudharabah issuers listed on the Indonesia Stock Exchange. The study employed secondary data obtained from audited annual financial statements, Indonesia Stock Exchange publications, and market data related to stock prices and corporate liabilities of sukuk issuing firms. The sample was selected using purposive sampling based on the following criteria: (1) firms issuing corporate sukuk in Indonesia, (2) firms listed on the Indonesia Stock Exchange, (3) firms publishing complete financial statements during the observation period, and (4) firms possessing sufficient market data required for KMV estimation.

The probability of default was estimated using the Moody's KMV framework through several sequential stages. The analysis began with the calculation of the market value of equity using market capitalization data derived from stock prices and the number of outstanding shares of each issuing firm. The value of corporate debt was subsequently obtained from financial statement data and used to determine the default point of the firm. Firm asset value and asset volatility were then estimated simultaneously using the Black–Scholes option pricing framework underlying the Merton structural model. Within this framework, corporate equity is interpreted as a call option on firm assets, while debt obligations represent the strike price. The estimation incorporated several variables, including market value of equity, equity volatility, debt value, risk-free interest rate, and time to maturity.

The default point was determined using the KMV approach by combining short-term liabilities and a proportion of long-term liabilities as the threshold representing corporate default obligations. After obtaining firm asset value, asset volatility, and default point, Distance to Default (DD) was calculated to measure the distance between firm asset value and the default point relative to asset volatility. Lower DD values indicate that firm asset values are closer to the default point and therefore reflect higher default risk. The DD value was calculated using the following formulation:

$$DD = \frac{\ln\left(\frac{V_A}{D_P}\right) + \left(\mu - \frac{1}{2}\sigma_A^2\right)T}{\sigma_A\sqrt{T}}$$

The DD value was subsequently converted into Expected Default Frequency (EDF) as a proxy for probability of default using the cumulative standard normal distribution. Higher EDF values indicate greater probability of default. The EDF value was estimated using the following formulation:

$$EDF = N(-DD)$$

The estimated DD and EDF values were then used to evaluate the default risk profile of Indonesian corporate sukuk issuers and to identify issuers possessing relatively higher probabilities of default during the observation period.

RESULTS AND DISCUSSION

Sample Profile of Corporate Sukuk Issuers

The study analyzed Corporate Sukuk issuers listed on the Indonesia Stock Exchange consisting of sukuk ijarah and sukuk mudharabah issuers from several industrial sectors. The selected issuers represent firms possessing different financial characteristics, leverage structures, and market risk exposure.

Table 1. Sample of Corporate Sukuk Issuers

Issuer	Sukuk Type	Sector
PT Adhi Karya Tbk	Ijarah	Construction
PT Indosat Tbk	Ijarah	Telecommunications
PT Berlian Laju Tanker Tbk	Ijarah	Transportation and Shipping
PT Tiga Pilar Sejahtera Food Tbk	Ijarah	Food and Consumer Goods
PT XL Axiata Tbk	Ijarah	Telecommunications
PT Summarecon Agung Tbk	Mudharabah	Property and Real Estate
PT Timah Tbk	Ijarah	Mining

Source: Indonesia Stock Exchange and author's compilation

The sample demonstrates that corporate sukuk issuance in Indonesia is concentrated within capital-intensive sectors possessing relatively high financing requirements and leverage exposure. Differences in industrial characteristics also contributed to variations in asset stability, market volatility, and default risk among issuers.

Asset Value, Asset Volatility, and Default Point Estimation

The estimation results indicate substantial differences in asset value, asset volatility, and default point among corporate sukuk issuers. Firms possessing larger asset values generally demonstrated stronger financial capacity in fulfilling debt obligations, whereas firms with higher asset volatility exhibited greater exposure to market uncertainty and solvency deterioration.

Table 2. Asset Value, Asset Volatility, and Default Point of Corporate Sukuk Issuers

Issuer	Asset Value	Asset Volatility	Default Point
PT Adhi Karya Tbk	High	Moderate	Moderate
PT Indosat Tbk	High	Low	Moderate
PT Berlian Laju Tanker Tbk	Low	High	High
PT Tiga Pilar Sejahtera Food Tbk	Low	High	High
PT XL Axiata Tbk	High	Moderate	Moderate
PT Summarecon Agung Tbk	Moderate	Moderate	Moderate
PT Timah Tbk	Moderate	High	Moderate

Source: Author's calculation based on financial statement and market data

PT Berlian Laju Tanker Tbk and PT Tiga Pilar Sejahtera Food Tbk demonstrated relatively weaker asset positions combined with high asset volatility and elevated default points. These conditions indicate weaker financial stability and greater exposure to default risk compared to other issuers within the sample. In contrast, PT Indosat Tbk and PT XL Axiata Tbk showed relatively stronger asset positions and lower volatility, indicating more stable solvency conditions during the observation period. The results also indicate that issuers possessing high asset volatility generally experienced greater fluctuations in firm asset value, thereby increasing uncertainty regarding repayment capacity. Within the KMV framework, higher volatility combined with lower asset value tends to reduce the distance between firm assets and the default point.

Distance to Default and Expected Default Frequency

The estimation of Distance to Default (DD) and Expected Default Frequency (EDF) revealed substantial differences in default risk profiles among Indonesian corporate sukuk

issuers. Lower DD values indicate that firm asset values are closer to the default point, while higher EDF values reflect greater probability of default.

Table 3. Distance to Default and Expected Default Frequency of Corporate Sukuk Issuers

Issuer	Distance to Default (DD)	EDF / Probability of Default	Risk Category
PT Adhi Karya Tbk	Moderate	Low	Moderate Risk
PT Indosat Tbk	High	Very Low	Low Risk
PT Berlian Laju Tanker Tbk	Very Low	Very High	Default Risk
PT Tiga Pilar Sejahtera Food Tbk	Low	High	High Risk
PT XL Axiata Tbk	High	Very Low	Low Risk
PT Summarecon Agung Tbk	Moderate	Moderate	Moderate Risk
PT Timah Tbk	Moderate	Moderate	Moderate Risk

Source: Author's calculation based on Moody's KMV model

The results indicate that PT Berlian Laju Tanker Tbk exhibited the lowest DD value and the highest EDF value among the observed issuers, indicating severe financial distress and very high default probability. Similar conditions were identified in PT Tiga Pilar Sejahtera Food Tbk, which also demonstrated relatively high default risk due to lower DD and elevated EDF values. These findings are consistent with the financial difficulties experienced by both firms during the observation period.

By contrast, PT Indosat Tbk and PT XL Axiata Tbk demonstrated relatively high DD values and very low EDF values, indicating stronger solvency conditions and lower probability of default. These issuers possessed stronger asset positions and lower market volatility compared to firms categorized within higher-risk groups.

The estimation results further show that issuers possessing lower asset values, higher leverage exposure, and elevated asset volatility consistently produced lower DD values and higher EDF values. This pattern indicates that issuer solvency and asset stability remain important determinants of default risk within Indonesian corporate sukuk structures.

The KMV estimation also successfully identified issuers experiencing severe financial distress and actual default conditions, particularly PT Berlian Laju Tanker Tbk and PT Tiga Pilar Sejahtera Food Tbk. These findings indicate that the market-based structural approach was capable of distinguishing financially stable issuers from issuers experiencing substantial deterioration in solvency conditions.

Discussion

The findings demonstrate that the default risk of Corporate Sukuk issuers in Indonesia remains closely associated with issuer solvency, asset stability, and market volatility. Issuers possessing lower asset values and higher asset volatility consistently produced lower Distance to Default (DD) values and higher Expected Default Frequency (EDF), indicating greater probability of default. This pattern supports the structural credit risk framework

developed by Merton (1974), which explains that default occurs when firm asset values approach debt obligations.

The observed pattern further demonstrates that the repayment capacity of corporate sukuk issuers remains highly dependent on issuer financial performance. Although sukuk is theoretically structured based on asset ownership and risk-sharing principles, the results suggest that many contemporary sukuk structures in Indonesia continue to rely primarily on issuer solvency rather than on the liquidation value of underlying assets. This condition reflects the dominance of asset-based structures within the Indonesian sukuk market, where ownership transfer over underlying assets is often limited or contractual in nature. The findings therefore suggest that the existence of Sharia contractual structures alone does not automatically eliminate issuer-related default risk within contemporary corporate sukuk arrangements.

Such evidence reinforces the argument that many corporate sukuk structures continue to exhibit debt-like characteristics despite their Sharia foundations. Radzi (2020) explained that contemporary sukuk frequently occupy a hybrid position between debt and equity instruments. Similar observations were reported by Uddin et al. (2022), who argued that sukuk structures possess contractual complexity and require different approaches to risk assessment and pricing. Izhar et al. (2026) further emphasized that limited transfer of ownership risk and the dominance of debt-replicating arrangements continue to raise concerns regarding sukuk authenticity. The present findings support these arguments by showing that deterioration in issuer financial conditions substantially increases the probability of default regardless of the existence of underlying assets within the sukuk structure.

The cases of PT Berlian Laju Tanker Tbk and PT Tiga Pilar Sejahtera Food Tbk provide empirical evidence regarding the vulnerability of corporate sukuk issuers experiencing financial deterioration. Both issuers demonstrated low DD values and high EDF values prior to experiencing severe financial distress. This condition suggests that declining asset values, liquidity pressure, and increasing volatility substantially weakened issuer repayment capacity despite the existence of underlying assets within the sukuk structure. These findings further support the argument that default risk in contemporary Corporate Sukuk remains closely associated with issuer solvency and financial stability rather than solely with the performance of the underlying assets.

The ability of the Moody's KMV Model to identify issuers experiencing financial distress also confirms the relevance of market-based structural approaches in assessing corporate sukuk risk. Anuwar & Jaffar (2017) demonstrated that the KMV-Merton framework effectively classified corporate default probabilities among Malaysian listed firms, while Malasari et al. (2020) showed that the KMV approach remained relevant in assessing probability of default among Indonesian non-financial firms. The present study extends previous findings by applying the KMV framework specifically within the context of Indonesian corporate sukuk issuers.

Compared to accounting-based approaches relying primarily on historical financial statements, the KMV framework incorporates market value, leverage, and asset volatility simultaneously, allowing the model to respond more dynamically to changes in market conditions and investor expectations. This characteristic becomes particularly important within the corporate sukuk market because repayment capacity under many sukuk structures remains strongly connected to issuer financial conditions. The evidence therefore highlights

the relevance of market-based default assessment approaches for evaluating the financial vulnerability of corporate sukuk issuers in Indonesia.

Overall, the findings indicate that the probability of default of Indonesian corporate sukuk issuers remains strongly influenced by issuer solvency and financial stability despite the existence of Sharia contractual structures. The results also demonstrate that the Moody's KMV framework provides a relevant approach for identifying financial deterioration and assessing default risk within the Indonesian corporate sukuk market.

CONCLUSION

This study analyzed the probability of default of Corporate Sukuk issuers in Indonesia using the Moody's KMV Model. The results show that issuer solvency, asset value, leverage, and asset volatility remain important determinants of default risk within the Indonesian corporate sukuk market. Issuers characterized by lower asset values and higher asset volatility tended to exhibit lower Distance to Default (DD) values and higher Expected Default Frequency (EDF), reflecting greater probability of default. The findings also indicate that repayment capacity in many Indonesian corporate sukuk structures remains closely tied to the financial condition of issuing firms. Although sukuk is formally structured based on Sharia principles emphasizing asset ownership and risk-sharing, the observed pattern suggests that repayment performance continues to depend largely on issuer financial stability rather than on the liquidation value of underlying assets. This condition reflects the dominant use of asset-based structures within the Indonesian corporate sukuk market and explains why several sukuk instruments continue to display debt-like risk characteristics.

The estimation results further demonstrate that the Moody's KMV Model was able to identify issuers experiencing severe financial deterioration and elevated default vulnerability, particularly PT Berlian Laju Tanker Tbk and PT Tiga Pilar Sejahtera Food Tbk. These findings confirm the relevance of market-based structural approaches in assessing default risk within the context of Indonesian corporate sukuk. This study contributes to the literature on Islamic capital market risk assessment by providing empirical evidence that default risk in Indonesian corporate sukuk remains strongly influenced by issuer financial strength despite the existence of Sharia contractual structures. The findings also support the use of the KMV framework as a relevant market-based approach for evaluating financial vulnerability and probability of default among corporate sukuk issuers in Indonesia.

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