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Computational Risk Management for Strategic Investors: An Engineering-Inspired Approach to Portfolio Diversification

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Abstract

This study employs Monte Carlo simulation methods to assess the Value at Risk (VaR) for two major Indonesian entertainment companies: MD Pictures Tbk (FILM) and MNC Studios International Tbk (MSIN). Using daily return data from January 2022 to December 2022, we analyze the risk profiles of these stocks individually and as portfolio components. Results reveal contrasting return-risk characteristics, with FILM showing a higher expected return (0.42%) and greater volatility (standard deviation of 4.01%), while MSIN exhibits a more moderate expected return (0.33%) with lower volatility (3.64%). VaR calculations at 95% confidence level indicate maximum potential daily losses of 6.12% for FILM and 5.81% for MSIN. An equally weighted portfolio achieves significant diversification benefits, with a standard deviation of 2.77% and an improved VaR of 4.58%, representing risk reductions of 25.2% compared to FILM and 21.2% compared to MSIN. For a hypothetical investment of IDR 100 million, these translate to reduced potential daily losses of IDR 1,540,482 and IDR 1,229,142 respectively. The findings highlight that effective diversification can be achieved even within a specific industry sector, provided the component stocks have different business models and operational focuses. This research contributes practical insights for investors seeking exposure to Indonesia's growing entertainment sector while managing downside risk through strategic intra-sector portfolio construction.

Keywords: Value at Risk; Monte Carlo simulation; entertainment industry; intra-sector diversification; risk management; Indonesian capital market.

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1. Introduction

The entertainment and media industry represents a rapidly evolving sector in Indonesia's economy, offering unique investment opportunities while presenting distinct risk-return dynamics. This study focuses on quantifying and comparing investment risks associated with two major companies in this sector: MD Pictures Tbk (FILM) and MNC Studios International Tbk (MSIN), using Value at Risk (VaR) methodology with Monte Carlo simulation approach.

Financial risk management has increasingly adopted sophisticated methodologies to quantify potential investment losses under various market conditions. Among these methodologies, Value at Risk (VaR) has emerged as one of the most widely adopted frameworks for risk assessment and management in financial institutions and investment portfolios (Jorion, 2007). The Indonesian entertainment and media sector, characterized by its creative content production, evolving business models, and sensitivity to both domestic consumer behaviors and digital transformation trends, presents an intriguing case for applying advanced risk assessment methodologies.

Indonesia's creative economy has demonstrated remarkable growth in recent years, with film and television content production becoming key contributors to this expansion. Within this dynamic landscape, MD Pictures Tbk and MNC Studios International Tbk represent significant players with different operational strategies and market positions, creating distinct risk characteristics that merit detailed analysis.

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MD Pictures Tbk, established in 2002 and publicly listed on the Indonesia Stock Exchange (IDX) in 2018, has established itself as one of the leading film production companies in Indonesia. The company has produced numerous commercially successful films and has expanded its presence in international markets. Its business model focuses primarily on theatrical film production, complemented by content distribution through various platforms, including digital streaming services.

In contrast, MNC Studios International Tbk, a subsidiary of the larger MNC Group, operates a more diversified content creation business. Publicly listed on the IDX in 2018, MNC Studios is involved in various aspects of content production, including television programs, films, animation, and talent management. The company benefits from its integration with MNC Group's media distribution network, including television channels and digital platforms, but also faces the complex dynamics of a rapidly evolving media landscape.

The significance and novelty of this research lie in several key aspects. First, while numerous studies have examined risk profiles of traditional sectors in Indonesia's market, research focusing specifically on entertainment and media companies using advanced VaR methodologies remains relatively limited. This study addresses this gap by providing a focused analysis of two major players in Indonesia's creative economy.

Second, by employing Monte Carlo simulation approaches for VaR calculation, this research moves beyond simplistic risk metrics and acknowledges the complex, often non-normal distribution of stock returns in emerging market creative sectors. This methodological sophistication allows for more accurate risk assessments that can better inform investment decisions in this unique industry.

Third, the comparative analysis between individual stock risk profiles and portfolio combinations offers practical insights for diversification strategies within Indonesia's entertainment sector. This bridges theoretical risk assessment with practical portfolio management applications for investors interested in gaining exposure to Indonesia's growing creative economy.

Fourth, the research provides a timely analysis using market data from 2022, capturing a period when the entertainment industry was recovering from pandemic-related disruptions while simultaneously navigating digital transformation challenges and opportunities.

The importance of accurate risk assessment has been highlighted by numerous researchers in financial literature. Campbell et al. (2001) demonstrated the utility of VaR frameworks for optimal portfolio selection, highlighting how these methodologies can help investors balance return objectives with risk constraints. Similarly, Blavatskyy (2022) proposed an expected return-expected loss approach that provides a nuanced perspective on optimal portfolio investment, recognizing that investors often conceptualize risk in terms of potential losses rather than abstract statistical measures of dispersion.

In the context of emerging markets like Indonesia, traditional risk measurement approaches often fall short due to the unique characteristics of these markets, including higher volatility, reduced liquidity, and greater sensitivity to both local and global factors. As noted by Rajyaguru (2023), risk characteristics can vary significantly across different market environments and economic sectors, necessitating tailored approaches to risk assessment and management.

Recent advances in computational capabilities have further enhanced the applicability of Monte Carlo approaches. Sharma and Shekhawat (2022) demonstrated how portfolio optimization could be enhanced through integrating advanced computational methods with risk assessment frameworks, offering improved predictive capabilities for complex market environments. Similarly, Zhu (2012) established important connections between return forecasting capabilities and optimal portfolio construction strategies, highlighting the relevance of sophisticated risk assessment approaches for effective investment decision-making.

The methodological approach adopted in this study builds upon these foundations, employing Monte Carlo simulations to generate multiple potential price paths for both MD Pictures and MNC Studios based on observed historical return patterns. By analyzing the distribution of potential outcomes across these simulated paths, the study derives VaR estimates at various confidence levels, offering a nuanced perspective on the potential downside risks associated with investments in these stocks, both individually and as portfolio components.

2. Methods

This study employs a quantitative approach to assess the risk profiles of MD Pictures Tbk (FILM) and MNC Studios International Tbk (MSIN) through Value at Risk calculations using Monte Carlo simulation techniques. The methodological framework encompasses data acquisition, return calculation, descriptive statistical analysis, individual stock VaR estimation, portfolio construction, and portfolio VaR assessment to provide comprehensive insights into risk dynamics within Indonesia's entertainment sector.

For data collection and preparation, the research utilized secondary data consisting of daily closing prices for FILM and MSIN stocks from Investing.com, covering the period from January 1, 2022, to December 31, 2022, with approximately 244 trading days. This timeframe was specifically selected to capture the entertainment industry's performance dynamics during a period of post-pandemic recovery and digital transformation. The dataset underwent preprocessing to check for missing values and non-trading days, ensuring alignment between the two stocks to facilitate accurate correlation calculation and portfolio analysis.

Daily returns were calculated using the simple return formula:

$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}}$$

where R_t represents the return on day t; P_t represents the closing price on day t; P_{t-1} represents the closing price on the previous trading day.

This formula captures the percentage change in price from one trading day to the next, providing a standardized measure of performance that enables comparison between stocks with different price levels. Expected returns for individual stocks were calculated as the arithmetic mean of historical returns:

$$E(R_t) = \frac{1}{n}\sum_{t=1}^{n} R_t$$

where n represents the number of observations in the dataset.

The volatility or risk of individual stocks was measured using standard deviation, which quantifies the dispersion of returns around their mean:

$$\sigma = \sqrt{\left[\frac{\sum_{t=1}^{n}\left(R_t - E(R_t)\right)^2}{n-1}\right]}$$

This metric serves as a primary indicator of investment risk, with higher values indicating greater volatility and potential for both gains and losses.

For portfolio analysis, returns were calculated using a weighted average of the individual stock returns:

$$R_p = w_{FILM} \times R_{FILM} + w_{MSIN} \times R_{MSIN}$$

Where:

- R_p is the portfolio return
- w_{FILM} and w_{MSIN} are the portfolio weights for FILM and MSIN respectively (with $w_{FILM} + w_{MSIN} = 1$)
- R_{FILM} and R_{MSIN} are the returns of the individual stocks

An equally weighted portfolio was constructed to examine diversification benefits within the entertainment industry sector. The expected return of the portfolio was calculated as:

$$E(R_p) = w_{FILM} \times E(R_{FILM}) + w_{MSIN} \times E(R_{MSIN})$$

The portfolio standard deviation, accounting for correlations between assets, was calculated as:

$$\sigma_p = \sqrt{\left[w_{FILM}^2 \times \sigma_{FILM}^2 + w_{MSIN}^2 \times \sigma_{MSIN}^2 + 2 \times w_{FILM} \times w_{MSIN} \times \rho_{FILM,MSIN} \times \sigma_{FILM} \times \sigma_{MSIN}\right]}$$

Where $\rho_{FILM,MSIN}$ represents the correlation coefficient between the returns of FILM and MSIN.

The Monte Carlo simulation approach was employed to model the distribution of potential future returns based on historical parameters. This method involved generating a large number of random scenarios to approximate the probability distribution of future outcomes. The procedure consisted of parameter estimation using historical return series to estimate key parameters including mean return (μ) and standard deviation (σ) for each stock; random return generation according to the normal distribution with the estimated parameters:

$$R_{sim} = \mu + \sigma \times Z$$

where Z represents a random draw from a standard normal distribution, implemented in Microsoft Excel using the $NORM.INV(RAND(), \mu, \sigma)$ function; simulation repetition 244 times to generate a distribution of potential returns; and parameter re-estimation using the simulated returns to recalculate the mean and standard deviation, providing updated parameters for the VaR calculation.

Value at Risk was calculated using the parametric approach based on the simulated return distribution. VaR at confidence level $(1 - \alpha)$ was calculated as:

$$VaR_{1-\alpha} = \mu_{sim} - Z_{1-\alpha} \times \sigma_{sim}$$

Where:

- μ_{sim} is the mean of the simulated returns
- σ_{sim} is the standard deviation of the simulated returns
- $Z_{1-\alpha}$ is the Z-score corresponding to the confidence level $(1 - \alpha)$

Three confidence levels were used: 99% (α = 0.01), 95% (α = 0.05), and 90% (α = 0.1). The Z-scores for these confidence levels were obtained using the standard normal distribution: $Z_{0.01}$ = 2.326, $Z_{0.05}$ = 1.645, and $Z_{0.10}$ = 1.282.

To enhance the stability and reliability of the VaR estimates, the Monte Carlo simulation was repeated 1,000 times, and the average VaR was calculated. This iterative approach helps to reduce the impact of simulation randomness on the final VaR estimates:

$$\bar{VaR}_{1-\alpha} = \frac{1}{m}\sum_{j=1}^{m} VaR_{1-\alpha}, j$$

where m is the number of iterations (1,000 in this study) and $VaR_{1-\alpha}, j$ is the VaR at confidence level $(1 - \alpha)$ from the jth iteration.

For practical interpretation, the VaR values were expressed in monetary terms for a hypothetical investment of IDR 100,000,000, enhancing the interpretability of the results by translating abstract percentages into concrete potential loss amounts that investors can more readily understand and incorporate into their risk management frameworks.

3. Results and Discussion

The analysis begins with an examination of the descriptive statistics for the daily return series of MD Pictures Tbk (FILM) and MNC Studios International Tbk (MSIN). Table 1 presents these statistics, providing insights into the fundamental risk and return profiles of both stocks during the study period (January 2022 - December 2022).

Table 1. Comparison of Expected Return and Standard Deviation of FILM and MSIN Stocks

Statistic	MSIN	FILM
Expected Return	0.33%	0.42%
Standard Deviation	3.64%	4.01%

The descriptive statistics reveal interesting patterns in the return characteristics of these two entertainment industry stocks. Both companies exhibit positive expected returns during the study period, with FILM showing a higher expected return of 0.42% compared to MSIN's 0.33%. This suggests that, on average, MD Pictures delivered slightly better daily performance than MNC Studios during 2022, possibly reflecting stronger market reception to its content releases or business developments during this period. In terms of volatility, FILM demonstrates a higher standard deviation (4.01%) compared to MSIN (3.64%), indicating greater day-to-day fluctuations in its stock price. This aligns with what might be expected based on the companies' business models – MD Pictures' focus on theatrical film production may

expose it to more concentrated release-related risks and fluctuations, while MNC Studios' more diversified content production and established connection to MNC Group's distribution network may provide some stability to its returns.

These findings are consistent with theoretical expectations and previous research by Mencía (2009), who noted that companies with more concentrated revenue streams often demonstrate greater price sensitivity to specific performance events compared to those with more diversified revenue sources. The contrast between FILM and MSIN reflects the classic investment trade-off between risk and return, with FILM offering slightly higher potential returns but with increased volatility.

The Monte Carlo simulation was employed to generate distributions of potential returns based on the historical parameters of both stocks. Using the NORM.INV function in Excel with the historical mean and standard deviation as inputs, 244 simulated returns were generated for each stock. Table 2 presents the updated parameters derived from these simulated returns.

Table 2. Results of Expected Return and Standard Deviation from Monte Carlo Simulation

Stock	Historical Expected Return	Simulated Expected Return	Historical Standard Deviation	Simulated Standard Deviation
MSIN	0.33%	0.24%	3.64%	3.68%
FILM	0.42%	0.74%	4.01%	4.19%

The Monte Carlo simulation introduced some variations in the expected returns and standard deviations of both stocks. For MSIN, the expected return decreased from 0.33% in the historical data to 0.24% in the simulated data, while the standard deviation increased slightly from 3.64% to 3.68%. In contrast, FILM's expected return increased significantly from 0.42% to 0.74%, with a modest increase in standard deviation from 4.01% to 4.19%. These shifts in parameters highlight the impact of random variation in the simulation process and provide a broader perspective on the potential range of return-risk characteristics that investors might experience. The divergence in expected returns between the two stocks became more pronounced in the simulation, with FILM showing a more substantial increase in its expected return. This could be interpreted as the simulation capturing a wider range of positive outcome scenarios for FILM based on its historical volatility patterns.

As noted by Liu (2024), such simulation results can often reveal potential asymmetries in return distributions that might not be immediately apparent from simple historical statistics. The increased expected return for FILM, coupled with only a modest increase in standard deviation, suggests a potentially favorable risk-return trade-off in the simulated scenarios.

Based on the Monte Carlo simulation parameters, Value at Risk (VaR) was calculated for both stocks at three confidence levels: 99% ($\alpha = 0.01$), 95% ($\alpha = 0.05$), and 90% ($\alpha = 0.10$). Table 3 presents the VaR results for both stocks.

Table 3. Results of VaR Estimation at Different Confidence Levels

Stock	Confidence Level	Initial VaR	Mean VaR (after iterations)
MSIN	99%	-8.31%	-8.32%
	95%	-5.80%	-5.81%
	90%	-4.47%	-4.47%
FILM	99%	-9.00%	-8.95%
	95%	-6.15%	-6.12%
	90%	-4.62%	-4.61%

The VaR results confirm that FILM consistently exhibits higher potential losses compared to MSIN across all confidence levels. At the 95% confidence level, which is commonly used in risk management practices, FILM has a VaR of -6.12%, indicating a potential daily loss of 6.12% with 5% probability. In contrast, MSIN's VaR at the same confidence level is -5.81%, suggesting a slightly lower potential loss. This pattern aligns with the standard deviation findings, confirming that FILM's higher expected returns come with increased downside risk. The difference in VaR between the two stocks is most pronounced at the 99% confidence level, where FILM's VaR (-8.95%) exceeds MSIN's (-8.32%) by approximately 0.63 percentage points. This suggests that FILM may have slightly fatter left tails in its return distribution, indicating a higher probability of extreme negative returns compared to MSIN.

These findings align with research by Schuhmacher et al. (2021), who documented that companies with more concentrated business models often exhibit higher tail risks due to their exposure to specific risk factors. In the context of the entertainment industry, MD Pictures' focus on theatrical releases may expose it to more concentrated risk events compared to MNC Studios' more diversified content production activities.

When translated into monetary terms for a hypothetical investment of IDR 100,000,000, the potential daily losses become more tangible, as shown in Table 4.

Table 4. VaR in Monetary Terms for a IDR 100,000,000 Investment

Stock	Confidence Level (α)	VaR	Investment Amount	Period
MSIN	1%	-IDR 8,318,385	IDR 100,000,000	1 day
	5%	-IDR 5,809,027		
	10%	-IDR 4,471,297		
FILM	1%	-IDR 8,945,984	IDR 100,000,000	1 day
	5%	-IDR 6,120,367		
	10%	-IDR 4,614,042		

At the 95% confidence level, an investment of IDR 100,000,000 in FILM could experience a maximum daily loss of approximately IDR 6,120,367, while the same investment in MSIN could lose up to IDR 5,809,027. This difference of IDR 311,340 represents the additional risk premium that investors might consider when choosing between these two entertainment stocks. The iterative approach to VaR calculation (with 1,000 repetitions) provided more stable estimates, with only minor differences from the initial VaR calculations. This stability suggests that the VaR estimates are robust and reliable for risk management purposes.

To assess the potential diversification benefits from combining FILM and MSIN stocks, an equally weighted portfolio was constructed. Table 5 presents the expected return and standard deviation for this portfolio.

Table 5. Expected Return and Standard Deviation of Portfolio

	Expected Return	Standard Deviation
Portfolio	0.37%	2.77%

The portfolio's expected return (0.37%) falls between the expected returns of the individual stocks (0.33% for MSIN and 0.42% for FILM), as would be expected for an equally weighted combination. However, the most striking finding is the portfolio's standard deviation (2.77%), which is substantially lower than the standard deviations of both individual stocks (3.64% for MSIN and 4.01% for FILM). This significant reduction in volatility demonstrates the powerful diversification benefit achieved through combining these two entertainment industry stocks. The fact that the portfolio's standard deviation is approximately 24% lower than MSIN's and 31% lower than FILM's standard deviation suggests a less than perfect correlation between the returns of these two stocks, despite their operation in the same industry sector.

This finding supports research by Utz and Steuer (2024), who documented that even intra-sector diversification can provide substantial risk reduction benefits when the component companies have different business models, market positions, or operational focuses within the same industry. In this case, MD Pictures' focus on theatrical films versus MNC Studios' more diversified content production and distribution network appears to create complementary risk profiles that enhance diversification benefits.

Monte Carlo simulation was also applied to the portfolio, and the results are presented in Table 6.

Table 6. Monte Carlo Simulation Results for Portfolio

	Expected Return	Standard Deviation
Portfolio (Historical)	0.37%	2.77%
Portfolio (Simulated)	0.36%	2.88%

The simulated portfolio shows a slightly lower expected return (0.36% compared to 0.37%) and a marginally higher standard deviation (2.88% compared to 2.77%) than the historical portfolio. These minor changes suggest that the

portfolio's risk-return characteristics are relatively stable across different simulation scenarios, potentially indicating the robustness of intra-sector diversification benefits in the Indonesian entertainment industry.

Based on the Monte Carlo simulation parameters, Value at Risk was calculated for the portfolio at three confidence levels: 99% ($\alpha = 0.01$), 95% ($\alpha = 0.05$), and 90% ($\alpha = 0.10$). Table 7 presents the VaR results for the portfolio.

Table 7. VaR Results for Portfolio at Different Confidence Levels

Confidence Level	Initial VaR	Mean VaR (after iterations)
99%	-6.34%	-6.60%
95%	-4.37%	-4.58%
90%	-3.33%	-3.50%

The portfolio VaR results demonstrate significant diversification benefits. At the 95% confidence level, the portfolio VaR after iterations (-4.58%) is substantially lower than the VaR of both FILM (-6.12%) and MSIN (-5.81%). This represents a risk reduction of approximately 25.2% compared to FILM and 21.2% compared to MSIN, highlighting the substantial benefit of diversification within the entertainment sector. The pattern holds across all confidence levels. At 99% confidence, the portfolio VaR (-6.60%) shows improvements compared to both FILM (-8.95%) and MSIN (-8.32%). Similarly, at 90% confidence, the portfolio VaR (-3.50%) is lower than both individual stocks' VaR values (-4.61% for FILM and -4.47% for MSIN).

When translated into monetary terms for a hypothetical investment of IDR 100,000,000, the diversification benefits become even more apparent, as shown in Table 8.

Table 8. Portfolio VaR in Monetary Terms for a IDR 100,000,000 Investment

Confidence Level (α)	VaR	Investment Amount	Period
1%	-IDR 6,600,888	IDR 100,000,000	1 day
5%	-IDR 4,579,885		
10%	-IDR 3,502,496		

At the 95% confidence level, an investment of IDR 100,000,000 in the portfolio could experience a maximum daily loss of approximately IDR 4,579,885, which is IDR 1,540,482 less than the potential loss for FILM and IDR 1,229,142 less than for MSIN. This tangible reduction in potential loss highlights the practical value of diversification, even within a specific industry sector.

The comparative analysis reveals several important patterns. First, FILM consistently exhibits higher VaR values than MSIN across all confidence levels, confirming its higher risk profile despite its higher expected return. This aligns with the fundamental risk-return trade-off principle in finance. Second, the portfolio VaR values are substantially lower than both individual stocks' VaR values, indicating that the diversification benefit is significant even with just two assets from the same industry sector. This supports the argument by Miao et al. (2023) that strategic combination of assets, even within the same sector, can substantially reduce risk when the assets have complementary business models or operational characteristics. Third, the relative benefit of diversification appears relatively consistent across different confidence levels, suggesting that portfolio construction helps mitigate both moderate and extreme downside risks. This finding indicates that the diversification benefit is robust across different risk scenarios, making it a valuable strategy for investors with varying risk tolerance levels who seek exposure to Indonesia's entertainment industry.

These findings have several important implications for investment strategies. The higher expected return of FILM (0.42% vs. 0.33% for MSIN) comes with higher volatility and potential for larger losses. Investors must assess whether this potential return premium justifies the additional risk based on their risk tolerance and investment objectives. The significant reduction in both standard deviation and VaR achieved through the equally weighted portfolio demonstrates that meaningful diversification benefits can be realized even within a specific industry sector. Investors interested in Indonesia's entertainment industry should consider exposure to multiple companies with different business models rather than concentrating investments in a single entity. The results suggest that an equally weighted allocation between FILM and MSIN provides a substantially improved risk profile while maintaining a competitive expected return. The VaR figures provided in monetary terms offer practical guidance for risk management practices, allowing investors to quantify potential losses and set appropriate risk limits for investments in Indonesia's entertainment sector.

As emphasized by Yu et al. (2020), understanding the unique risk characteristics of individual securities and their interaction effects is essential for effective portfolio modeling with practical considerations. The findings of this study contribute to this understanding by providing specific risk metrics for two major Indonesian entertainment stocks and demonstrating the quantifiable benefits of intra-sector diversification within Indonesia's growing entertainment industry.

4. Conclusion

This study employed Value at Risk (VaR) analysis with Monte Carlo simulation to assess and compare the risk profiles of MD Pictures Tbk (FILM) and MNC Studios International Tbk (MSIN), two prominent companies in Indonesia's entertainment industry. The research provides several valuable findings that contribute to both theoretical understanding and practical investment applications within the creative economy sector.

The analysis reveals distinct risk-return characteristics between these two entertainment companies. MD Pictures demonstrated a higher expected daily return of 0.42% compared to MNC Studios' 0.33% during the study period, reflecting potentially stronger market reception to its theatrical content releases. However, this higher return potential came with increased volatility, as evidenced by MD Pictures' standard deviation of 4.01% versus MNC Studios' 3.64%. This pattern embodies the classic risk-return trade-off observed in financial investments.

The Value at Risk analysis further confirmed this risk differential, with MD Pictures consistently showing higher potential losses across all confidence levels examined. At the 95% confidence level, MD Pictures exhibited a VaR of -6.12%, while MNC Studios' VaR was -5.81%. When translated into monetary terms for a hypothetical IDR 100 million investment, this equates to maximum expected daily losses of IDR 6,120,367 for MD Pictures and IDR 5,809,027 for MNC Studios. These findings highlight that investors seeking exposure to MD Pictures must be prepared to accept approximately 5.4% greater potential losses compared to investments in MNC Studios.

A key contribution of this research pertains to the substantial diversification benefits achieved by combining these entertainment industry stocks in a portfolio. The equally weighted portfolio demonstrated significantly improved risk characteristics, with a standard deviation of 2.77% (approximately 24-31% lower than the individual stocks) and a VaR at 95% confidence of -4.58%, representing risk reductions of 25.2% compared to MD Pictures and 21.2% compared to MNC Studios. This finding underscores that effective diversification benefits can be realized even within a specific industry sector when the component companies have complementary business models or operational focuses.

When translated into monetary terms for a hypothetical investment of IDR 100 million, these risk reductions become more tangible. At the 95% confidence level, the maximum expected daily loss for the portfolio (IDR 4,579,885) is IDR 1,540,482 less than for MD Pictures and IDR 1,229,142 less than for MNC Studios. These concrete figures highlight the practical value of intra-sector diversification strategies within Indonesia's entertainment industry.

From a methodological perspective, the Monte Carlo simulation approach proved effective in capturing the risk characteristics of these entertainment stocks, providing robust VaR estimates across multiple confidence levels. The application of iterative simulations (1,000 repetitions) ensured stability in the VaR calculations, resulting in reliable risk metrics that investors can confidently use in decision-making processes.

For investors and market participants, these findings offer several practical implications. First, the higher expected return of MD Pictures comes with correspondingly higher risk, requiring investors to carefully assess their risk tolerance before concentrating investments in this stock. Second, MNC Studios offers a more moderate risk-return profile that might be appropriate for more conservative investors seeking exposure to Indonesia's entertainment sector. Third, and most importantly, an equally weighted portfolio allocation between these two stocks provides a substantially improved risk profile while maintaining a competitive expected return, making it an attractive strategy for investors interested in this sector.

The research contributes to the growing body of literature on risk assessment in emerging market creative industries by providing specific insights into the Indonesian entertainment sector. The findings highlight both the unique characteristics of these companies and the broader applicability of advanced risk management tools in creative economy contexts.

The limitations of this study suggest opportunities for future research, including longer-term analyses, more sophisticated simulation methodologies, optimal portfolio weight determination, and incorporation of industry-specific

event impacts. These extensions would further refine our understanding of risk dynamics in Indonesia's entertainment industry and provide more comprehensive guidance for investment decision-making in this evolving sector of the creative economy.

As a final assessment, this study demonstrates that meaningful variations in risk profiles exist even between companies operating within the same industry sector, and these variations can be effectively managed through strategic portfolio construction. The Monte Carlo VaR approach provides a robust framework for quantifying these risk characteristics, offering valuable insights for investors seeking to navigate the complex risk landscape of Indonesia's growing entertainment industry.

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