

The Influence of Green Banking and ESG Practices on Financial Performance

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Financial Performance

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ABSTRACT

The purpose of this study is to examine how Indonesian state-owned banks' profitability was affected by green banking and Environmental, Social, and Governance (ESG) activities between 2021 and 2023. While ESG represents a dedication to environmental, social, and governance factors, green banking refers to ecologically friendly banking practices. This work employs panel data regression analysis on a sample using a quantitative methodology of five state-owned banks selected through purposive sampling, resulting in 30 observations from annual reports, sustainability reports, and Financial Services Authority data. The results show that green banking significantly increases bank profitability, while ESG practices separately do not have a significant impact. However, the integration of green banking and ESG simultaneously has a positive and significant effect on profitability. This finding implies that state-owned banks need to adopt a holistic sustainability strategy to optimize long-term financial performance. This integration not only supports financial stability but also strengthens the bank's contribution to sustainable development, in line with global goals for a better environment and responsible governance.

Keywords: Environmental, Social, and Governance (ESG), Green Banking, Profitability, SOE Bank.

ABSTRAK

Tujuan dari penelitian ini adalah untuk menguji bagaimana profitabilitas bank-bank BUMN Indonesia dipengaruhi oleh perbankan hijau dan kegiatan Lingkungan, Sosial, dan Tata Kelola (ESG) antara tahun 2021 dan 2023. Sementara ESG merupakan dedikasi terhadap faktor lingkungan, sosial, dan tata kelola, perbankan hijau mengacu pada praktik perbankan yang ramah lingkungan. Pekerjaan ini menggunakan analisis regresi data panel pada sampel menggunakan metodologi kuantitatif dari lima bank BUMN yang dipilih melalui purposive sampling, menghasilkan 30 observasi dari laporan tahunan, laporan keberlanjutan, dan data Otoritas Jasa Keuangan. Hasil penelitian menunjukkan bahwa perbankan hijau secara signifikan meningkatkan profitabilitas bank, sementara praktik ESG secara terpisah tidak memiliki dampak yang signifikan. Namun, integrasi perbankan hijau dan ESG secara bersamaan memiliki efek positif dan signifikan terhadap profitabilitas. Temuan ini menyiratkan bahwa bank-bank BUMN perlu mengadopsi strategi keberlanjutan holistik untuk mengoptimalkan kinerja keuangan jangka panjang. Integrasi ini tidak hanya mendukung stabilitas keuangan tetapi juga memperkuat kontribusi bank terhadap pembangunan berkelanjutan, sejalan dengan tujuan global untuk lingkungan yang lebih baik dan tata kelola yang bertanggung jawab.

Kata kunci: Lingkungan, Sosial, dan Tata Kelola, Perbankan Hijau, Profitabilitas, Bank BUMN.

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INTRODUCTION

To promote sustainable development and stimulate economic growth, the financial sector is strategically important. Banking institutions can steer the flow of money to industries that support social and environmental sustainability because they are financial intermediaries. Financial institutions have been encouraged to embrace green banking practices and incorporate Environmental, Social, and Governance (ESG) principles into their operations and strategies as a result of the substantial increase in attention given to sustainability and Corporate Social Responsibility (CSR) issues in recent years (Cantero-Saiz et al., 2025). A paradigm shift in the banking industry is reflected in this trend, which moved away from an exclusive emphasis on financial gain and toward a balance between profitability and social and environmental effect.

In Indonesia, State-owned banks with a highly strategic role include Bank Mandiri, Bank Rakyat Indonesia (BRI), Bank Negara Indonesia (BNI), Bank Tabungan Negara (BTN), and Bank Syariah Indonesia (BSI). According to the Financial Services Authority (OJK, 2023), these five banks control more than 50% of the total assets of the national banking industry. This shows that they have great capacity and responsibility in supporting the sustainable finance (sustainable finance). With extensive operational networks and large assets, these banks can be the main drivers of the transformation of a more environmentally friendly and inclusive financial system (Szidarovszky & Yakowitz, 2013).

Despite various policies and encouragement from regulators, the implementation of green banking and ESG in the Indonesian banking sector still faces various challenges, especially in measuring its effectiveness on financial performance. Profitability remains the main indicator in determining the fate of banking operations, especially for state-owned banks that are expected to continue to make significant contributions to state revenues (Davydenko et al., 2023). Prior research has demonstrated that the use of green banking can enhance profitability indicators including Return on Equity (ROE), Return on Assets (ROA), and Net Interest Margin (NIM) (Siahaan et al., 2021; Atichasari et al., 2023; Lalon et al., 2025). There is currently little empirical data on this topic in the Indonesian setting, though (Yuen et al., 2022; Jain & Sharma, 2023).

The relationship between bank benefit and green keeping money is affected by different components, counting computerized innovation and operational productivity that drive supportability and increment income (Bataineh, 2024; Fahmie et al., 2025). Directions such as PBI Number 14/15/PBI/2012tod POJK No. 51/POJK.03/2017 to energize the integration of natural and social perspectives in commerce choice making (Chen et al., 2023; Silalahi et al., 2023; Nirwansyah, 2025). Green Managing an account Divulgence is a vital pointer in evaluating a bank's commitment to supportability, as well as fortifying open believe, corporate notoriety, and worldwide competitiveness (Umar et al., 2023; Horobet et al., 2025).

Even while research on ESG and sustainable banking is growing, there aren't many empirical studies that precisely assess how Indonesia's state-owned banks' profitability is affected by green banking practices. Numerous earlier studies have ignored the distinctive features of state-owned banks in favor of concentrating on the private sector or financial institutions generally (Islam et al., 2024; Manurung et al., 2024). State-owned banks are actually a pertinent and significant subject of study in the framework of the national economy because they have the dual task of fostering development and preserving profitability (Tia et al., 2023; Sharma et al., 2025).

This study aims to investigate how Indonesian national banks' profitability is impacted by green banking and ESG criteria between 2021 and 2023. It is thought that this study would shed more light on the connection between bank performance and sustainability through quantitative analysis based on financial data and GBD savings rates. It is anticipated that the results of this study would provide a clear contribution to the discussion of sustainable finance policy in Indonesia. The findings of this study can serve as a guide for the government and regulators in strengthening ESG regulations, as well as for bank management in implementing business strategies that are not only profit-driven

but also support long-term development goals. Additionally, this study has social implications in promoting financial literacy and utilizing financial technology (fintech) to enhance effective and inclusive financial literacy, particularly in the context of payments, payments, and community engagement.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

Green Banking and Profitability

Green banking denotes a banking strategy that incorporates environmental sustainability into every facet of its operations. As noted by Zhang et al. (2022), green banking aims to promote environmentally friendly and sustainable financial practices through strategies such as reducing carbon emissions, optimizing resource use, and financing eco-friendly projects (Wang & Luo, 2022; Lona et al., 2024; Indana & Pangestuti, 2024). The fundamental idea is to improve the management of environmental risks while broadening green finance options. This encompasses fields like Energy efficiency, organic farming, ecotourism, renewable energy, and environmentally friendly modes of transportation. By implementing sustainability-oriented principles, green banking seeks to mitigate environmental damage while offering innovative green financial products. It also emphasizes stakeholder engagement and raises awareness of environmental impacts and the importance of sustainable business practices. According to Husnah and Ichwan, (2023) and Dewi et al. (2024), green banking aligns with the trio of foundations of sustainable development: profit, people, and planet. According to earlier research, green banking initiatives such using digital banking services and green financing can boost financial performance measures like Return on Equity (ROE) and Return on Assets (ROA) and increase operational efficiency (Putri et al., 2022; Yafie et al., 2024).

Consequently, there is a growing correlation between green banking and financial success, and as banks' dedication to sustainability grows, so does the potential for long-term gains. Profitability indicates a bank's ability to generate profits through efficient management of assets and capital (Al Amosh et al., 2023). High profitability not only reflects good financial health but also indicates long-term sustainability and competitiveness in a dynamic market (Cerciello et al., 2023; Rany et al., 2024). An important factor for sustainable profitability is the quality of the bank's loan portfolio. Banks that maintain a low number of non-performing loans usually reduce credit risk and maintain financial stability in the long term. (Atichasari et al. 2023; Evoney, & Margaretha, 2024).

H1: Green banking has a significant impact on profitability.

ESG and Profitability

Environmental, social, and governance, or ESG, is a framework for evaluating a company's governance practices and social and environmental effect (Davydenko et al., 2023). The Environmental Aspect (E) looks at a business's environmental protection efforts, while the social aspect (S) evaluates its effect on society, and the Governance aspect (G) emphasizes the management's control and supervision. ESG plays a vital role in sustainable investing, as companies are assessed based not only on their financial outcomes but also on their impact on environmental sustainability and social wellbeing (Weston & Nnadi, 2023; Chen et al. 2023). Studies show that firms with robust ESG practices generally achieve more consistent and profitable long-term financial results, since they are more effective at handling risks (Friede et al., 2015). Furthermore, Zhang et al. (2022) stress that effective ESG implementation helps companies reduce legal and operational risks related to violations of social and environmental regulations. This has a direct impact on the operational efficiency and reputation of the company. Businesses with high ESG scores also tend to have greater access to capital since they are more receptive and capable of managing risk (Lee & Suh, 2022). In the banking industry, ESG practices are not only important for fostering social responsibility but also serve as a crucial strategy for maintaining financial stability and reputation (Chiaromonte et al.,

2022; Cantero-Saiz et al., 2025). According to a study by Al Amosh et al. (2023), ESG has a positive impact on bank profitability, particularly through increased ROA and ROE. Accordingly, banks that implement ESG are better able to reduce risk, increase operational efficiency, and foster public trust, all of which eventually improve their financial performance.

H2: ESG has a significant effect on profitability.

Green Banking, ESG and Profitability

Eco-friendly banking practices enhance the profitability of banks (Graficka et al., 2024). Jatana and Jain (2020) discovered that the quantity of ATMs and mobile banking transactions, as components of green banking, greatly enhance profitability. These eco-friendly and digital initiatives improve operational efficiency and convenience for customers. Nevertheless, the execution of green banking encounters numerous obstacles. Bukhari et al. (2020) and Rozaki et al. (2025) observed that a lack of public awareness and insufficient resources impede the broad acceptance of green banking. Tackling these challenges is crucial for fully achieving the financial and ecological advantages of sustainable banking practices in the long run.

Cantero-Saiz et al. (2025) found that, in general, the three ESG proxies did not significantly affect bank profitability. However, they commented that bank size positively affected profitability. In comparison, Lee & Suh (2022) and Al Amosh et al. (2023) found that financial performance was positively affected by environmental, social, and governance (ESG) aspects. Both the banking and non-financial sectors have experienced positive impacts from ESG. These differences in results imply that how ESG is measured, the size of the organization, and the sector background can all influence how ESG affects financial performance (Jatana & Jain, 2020; Julia & Kassim, 2020). Green banking and ESG practices have shown positive impacts on profitability. Aslam and Jawaid (2023) found that green banking policies significantly increase Return on Assets (ROA) through increased operational efficiency and environmentally friendly asset management. Supporting this, Putri et al. (2022), identified that mobile banking transactions and the number of ATMs, as components of green banking, also contribute positively to ROA.

H3: Green Banking and ESG have a significant impact on profitability

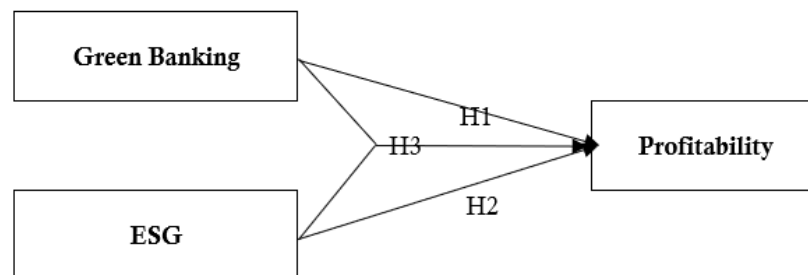


Figure 1. Research Framework

The research framework in Figure 1 illustrates the relationship between green banking practices, Environmental, Social, and Governance (ESG) performance, and bank profitability. This study aims to empirically test three main hypotheses. First (H1), that green banking, which includes environmentally friendly policies, green financing, and operational energy efficiency, has a significant impact on bank profitability. Second (H2), that the implementation of ESG principles has a positive impact on financial performance, with a focus on environmental sustainability, social responsibility, and good governance. Third (H3), there is a simultaneous influence of green banking and ESG on profitability, reflecting the synergy between environmentally friendly practices and sustainability governance in improving financial performance. This framework forms the

basis of analysis for understanding the strategic role of sustainability in the modern banking sector.

RESEARCH METHOD

Green managing an account and Natural, Social, and Administration hones in 2021–2023 are inspected in this ponder employing a quantitative technique. This ponder points to evaluate how much the arranged policy's usage in specific, green managing an account and ESG can move forward banks' monetary execution. The information utilized is auxiliary information assembled from yearly reports, bookkeeping articulations, and the official location of the Money related Administrations Specialist, with the information collection time allotment starting in December 2024 until the investigate concludes. Five government-owned banks Bank Mandiri, Bank Rakyat Indonesia (BRI), Bank Negara Indonesia (BNI), Bank Tabungan Negara (BTN), and Bank Syariah Indonesia (BSI) were chosen utilizing the purposive inspecting strategy since they have all appeared a commitment to ESG and green keeping money hones by routinely discharging budgetary reports and connection with partners amid the perception period. Over the course of three a long time, information were collected each six months, coming about in thirty perceptions. Bank benefit is surveyed through three essential measurements: Return on Resources (ROA), Return on Value (ROE), and Net Intrigued Edge (NIM). At the same time, green keeping money exercises are surveyed utilizing the Green Managing an account Divulgence File made by Sarma and Roy (2022), while the ESG score is decided agreeing to each bank's engagement with natural, social, and administration variables. For looking at the relationship among factors, board information relapse investigation is connected along side the Chow and Hausman tests to distinguish the foremost reasonable estimation demonstrate, particularly between Pooled Slightest Squares (PLS), Settled Impacts Show (FEM), or Arbitrary Impacts Demonstrate (REM). This strategy empowers a more exact examination of the relationship elements between factors over a particular time outline and among bank units. This ponder points to offer unmistakable experiences for policymakers and keeping money division partners to advance maintainable monetary hones that prioritize not fair benefit but too more extensive social and natural commitments.

RESULTS

The findings of the linear regression analysis, which was done to look into how independent factors affect the dependent variable, are displayed in Table 1. The purpose of this analysis is to determine how each variable affects the model that is being created. The regression coefficient, standard error, t-statistic, and p-value (probability) are displayed for each variable. Each independent variable's unique significance is assessed using the t-test. If the variable significantly affects the model being evaluated, more investigation will be required.

Table 1. Linear Regression Estimation Results and T-test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	4.304760	0.536592	8.022403	0.0000
Green Banking	0.191624	0.085765	2.234291	0.0339
ESG	-0.142227	0.068511	-2.075976	0.0475

Table 1 the regression equation, the following interpretations can be made in academic sequence. First, the constant value is 4.304760, indicating that if the independent variables green banking and ESG are equal to zero, the predicted value of Return on Assets (ROA) would be 4.304760. Second, the coefficient for green banking is 0.191624 and is positive, suggesting that a 1% increase in the green banking score is associated with an increase in ROA by approximately 0.191624%. Third, the ESG coefficient is -0.142227 and negative, indicating that a 1% increase in ESG disclosure corresponds to a roughly 0.142227% decrease in ROA. Lastly, the Adjusted R-squared value of 0.287511 shows that the green

banking and ESG factors account for 28.75% of the variation in ROA, with other factors not included in the model influencing the remaining 71.2%.

A parametric measurable strategy for evaluating if there's a crucial dissimilarity between two unmistakable datasets is the autonomous test t-test. The specified t-table esteem for a centrality level of 0.05 is 2.05183, concurring to an investigation of the fractional test comes about in Table 1, but the computed t-value is 2.234291. The green managing account revelation measures appear that green keeping money incorporates a critical effect on the budgetary execution of state-owned banks (SOE Bank) from 2021 to 2023, with a t-value surpassing the t-table esteem ($2.234291 > 2.05183$) and a p-value of 0.0339, which is less than 0.05. As appeared in Table 4.6, the calculated t-value is -2.075976, and the t-table esteem at a importance level of 0.05 is 2.05183. Given that the t-value is less than the t-table esteem ($-2.075976 < 2.05183$) and the likelihood esteem is $0.0475 < 0.05$, the negative coefficient recommends a negative relationship: the subordinate variable likely decreases as ESG rises. Hence, it can be gathered that ESG, as demonstrated by ESG revelation measurements, does not altogether affect the productivity of Bank BUMN amid the 2021–2023 time period.

The results show that the green banking coefficient is 0.191624 and is statistically significant at the 5% level ($p = 0.0339 < 0.05$). The t-count of 2.234291 surpasses the t-table value of 2.05183; consequently, H_1 is accepted. This suggests that green banking significantly enhances the profitability of state-owned banks. This is consistent with findings from Zhang et al. (2022) showing that implementing sustainable practices in banking can improve operational efficiency, attract investors, and enhance public image, all contributing to an increase in ROA. The ESG variable shows a negative coefficient of -0.142227, a p-value of 0.0475 (< 0.05), and a t-count of -2.075976, which is significantly higher than the t-table value. Consequently, H_2 is recognized; nonetheless, the type of the established relationship is unfavorable. This suggests that a genuine relationship exists between reduced ROA and increased ESG disclosure. A possible reason is that, so far, the ESG measures put in place have not directly affected bank profitability and efficiency. On the other hand, the costs related to implementing ESG, such as training, reporting, and investments in social or governance structures, may have affected profitability during this observation period (Davydenko et al., 2023).

The Adjusted R-squared value of 0.287511 indicates that nearly 28.75% of the variations in ROA are explained by the model through green banking and ESG elements, while the remaining 71.25% is due to other factors not included in the model.

In general, these findings suggest that green banking has a beneficial and substantial impact. contribution to the profitability of state-owned banks, while ESG practices, although statistically significant, show a negative effect on ROA in the 2021–2023 period. This implies that a comprehensively integrated sustainability strategy, focusing on environmental efficiency without neglecting social and governance effectiveness, is essential to achieving optimal financial performance.

Table 2. Simultaneous Regression Test

Analysis	Value
R-squared	0.318027
Adjusted R-squared	0.267511
S.E. of regression	0.419941
Sum squared resid	4.761543
Log likelihood	-14.95849
F-statistic	6.295509
Prob(F-statistic)	0.005700
Root MSE	0.398391
Mean dependent var	4.588000
S.D. dependent var	0.490667
Akaike info criterion	1.197232
Schwarz criterion	1.337352
Hannan-Quinn criter	1.242058
Durbin-Watson stat	1.851427

The results of the Simultaneous Regression Test in Table 2 show that the calculated F value, according to the simultaneous test or F is 6.295509. The overall significance of the regression model is indicated by the fact that the calculated F value (6.295509) is greater than the F-table value (3.35). Furthermore, the significance of this finding is highlighted by the probability value (F-statistic) of 0.005700 which is smaller than 0.05. As a result, it can be said that the profitability of state-owned banks is positively affected by the green banking and ESG components simultaneously. This effect can be considered significant between 2021 and 2023. This finding suggests that the profitability results of state-owned banks are improved by implementing ESG rules and green banking practices.

The F-calculated value of 6.295509 is higher than the F-table value of 3.35 at a significance level of 5%, per the results of the F test displayed in Table 2. Additionally, the regression model is generally significant since the probability value of the F-statistic, 0.005700, is less than 0.05. ESG and green banking together have a major impact on state-owned banks' profitability, is approved. The results indicate that over the 2021–2023 observation period, Return on Assets (ROA) was positively and significantly impacted by the combined effect of the two independent factors. In terms of goodness of fit, the model's R-squared value of 0.318027 indicates that the green banking and ESG variables can explain for about 31.80% of the variation in ROA. Taking into account the amount of variables and samples, the Adjusted R-squared value of 0.267511 indicates that, although if the model's impact is not significant, it still has significance in the field of intricate macrofinancial research. The Durbin-Watson value of 1.851427 is near 2, indicating no autocorrelation in the residuals, allowing the model to be deemed statistically stable.

Theoretically, these results support the view that the implementation of green banking and ESG policies can strengthen a company's financial performance by increasing efficiency, attracting environmentally and socially conscious investors, and reducing reputational and compliance risks (Zhang et al., 2022; Davydenko et al., 2023). Although partially the ESG variable shows a negative influence, when combined with green banking simultaneously, the impact becomes positive. This can be explained because the synergy between environmental policies (green banking) and good governance principles can provide greater added value if implemented comprehensively.

Thus, these results indicate that a comprehensive and integrated sustainability strategy is more effective in increasing the profitability of state-owned banks compared to a partial approach, as well as strengthening the position of financial institutions in supporting sustainable development in Indonesia.

DISCUSSION

The analysis results indicate that green banking has emerged as a significant concept in advancing sustainability, particularly within state-owned banks in Indonesia. Between 2021 and 2023, major banks implemented numerous green banking practices whose operations include Environmental, Social, and Governance (ESG) components (Lona et al., 2024). These efforts consist of funding sustainable projects, launching green bonds, and implementing internal policies to decrease the carbon footprint. This result aligns with the findings of Zhang et al. (2022), Putri et al. (2022), and Aslam and Jawaid (2023), highlighting that green banking practices can enhance financial performance by harmonizing business goals with sustainability principles. Furthermore, Umar et al. (2023) state that green banking serves not only to mitigate environmental risks but also to create new market prospects and enhance investor trust.

Nonetheless, the findings of this research indicate that while green banking practices positively influence profitability, assessed here via Return on Assets (ROA), the overall application of ESG principles is not fully effective. This is evident in the substantial negative impact of ESG on ROA in the partial regression analysis, highlighting a discrepancy between ESG reporting and financial outcomes (Jatana & Jain, 2020; Bagh et al., 2024). This finding suggests that ESG in some state-owned banks may still be symbolic (window dressing) and has not been fully integrated into the company's core

strategy and risk management system. In previous literature, ESG practices that are not implemented holistically often fail to create financial added value (Friede et al., 2015; Weston & Nnadi, 2023).

This condition suggests that in order to maximize the benefits of ESG, state-owned banks need to improve transparency, disclosure quality, and ESG integration into the strategic decision-making process. According to Cantero-Saiz et al. (2025), ESG that is systemically integrated into corporate governance can be a long-term risk mitigation tool and a catalyst for improving reputation and operational efficiency. Therefore, the simultaneous integration of green banking and ESG, as evidenced by the F-test results in this study, can produce stronger positive synergies on profitability compared to the implementation of each separately. The results of this study support a strategic sustainability approach that emphasizes that sustainability and profitability are not conflicting goals, but rather mutually reinforcing if implemented consistently and in a structured manner. The policy implications of these findings are the importance for regulators and stakeholders to encourage standardization and supervision of ESG reporting, as well as strengthening the internal capacity of state-owned banks in managing environmental and social risks in a measurable and accountable manner.

CONCLUSION

The findings of the study suggest that green banking positively influences the profitability of state-owned banks from 2021 to 2023. This implies that environmentally friendly banking practices, such as sustainable financing and the reduction of carbon footprints, contribute to increased financial performance. Conversely, the Environment, Social, and Governance (ESG) variable does not exhibit a notable individual impact on the profitability of state-owned banks during the same timeframe. This implies that although ESG practices might provide advantages in the long run, their immediate financial effects are still not significant. Nevertheless, when green banking and ESG are evaluated together, the analysis reveals a positive and substantial impact on the profitability of state-owned banks. This shows that, although ESG has not had a significant impact individually, the simultaneous integration of ESG and green banking has been shown to increase profitability, emphasizing the importance of a comprehensive and integrated sustainability approach.

The implication of this finding is the need for state-owned banks to not only adopt green banking as a technical initiative, but also to integrate ESG principles comprehensively into the risk management process, sustainability reporting, and strategic decision-making. This also provides a basis for regulators and policy makers to encourage harmonization of policies and supervision in the implementation of ESG and green banking in the national financial sector. This study has several limitations, including the limited number of samples in five state-owned banks and the relatively short observation period (three years). In addition, the assessment of ESG is still based on disclosure scores, which do not necessarily reflect the actual effectiveness of the implementation of ESG principles. Therefore, further research is recommended to expand the scope of banks, extend the observation period, and use performance-based ESG indicators to gain a deeper understanding of the impact of sustainability on financial performance.

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