



The Impact of Green Banking on Profitability (Study on Banking Sector Listed on Indonesia Stock Exchange (IDX) Period 2016-2022)

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ABSTRACT

The objective of this study is to determine the impact of green banking on profitability of banks in Indonesia. The sample of this research is the Indonesian banking sector during the period 2016 to 2022. The data utilized in this study were obtained from secondary sources, specifically from 9 banks. In total, there were 63 observations. The measurement of profitability ratio is conducted through the utilization of Return on Asset (ROA). The study using data panel analysis resulting green banking using 21 reported items of Green Banking Disclosure Index positively have impact on profitability of banks. It implies that the increasing green banking practices will increase the profitability of banks, highlighting the use of the separate green banking index measurements outside of the total green banking index might be considered by future researchers

INTRODUCTION

The global challenge of climate change, exacerbated by the consumption of non-renewable natural resources and human activities, has prompted countries, including Indonesia, to commit to reducing carbon emissions between 29% and 41% from 2020 to 2030 (Masripatin, 2017). This commitment reflects a growing awareness of environmental issues, leading to collaborative efforts to prevent or mitigate the impacts of climate catastrophes. In response to the heightened awareness, Indonesian banks are incorporating socially and ecologically responsible corporate practices. Bank Indonesia's regulations mandate that national banks consider environmental factors before issuing credit and investment projects, recognizing the banking industry's indirect involvement in environmental impact through its financial activities (Park & Kim, 2020).

The concept of green banking has emerged as a strategy for banks to minimize environmental damage by prioritizing environmentally friendly activities. Green banking aligns with sustainable development principles, aiming to deliver environmental benefits to the state and society (Yuniarti, 2013). Commercial banks are urged to play a proactive role in green banking by investing in low-emission technologies and favoring loans to industries with lower greenhouse gas emission intensity (Furrer et al., 2012). While several banks claim to be green, the practices and documentation of these claims vary, and there is no universally accepted method for assessing environmentally responsible banking practices. However, the publication of Sustainability Reports serves as one way to gauge a bank's commitment to green banking.

The financial services industry, particularly banks, holds significant potential to mediate between economic development and environmental preservation. Ethical banking practices prioritize not only profit but also environmental and corporate social responsibility, promoting sustainable financing. Green banking not only benefits the environment but also reduces legal, credit, and reputation risks for banks (Budiantoro, 2014). Based on the study in Indian Banks by Sandhu & Atwal (2016), when it comes to making banks a profitable business, there are a lot of possibilities and challenges that can be found in establishing 'green banking'. Profitability is a crucial factor in assessing a bank's overall performance, and a decline in profitability can impact the bank's ability to operate and erode public confidence. Return on Assets (ROA) is a key profitability proxy for the banking industry. A higher ROA indicates greater profit generation and a stronger position in terms of asset utilization (Tenriola, 2019). The study notes fluctuations in ROA from 2016 to 2021, influenced by factors such as the COVID-19 pandemic, increased loans distribution, and credit quality (Dendawijaya, 2020). Banks adopting green banking practices may reduce their legal, credit, and reputation risk exposure. The Risk Profile, Good Corporate Governance, Earnings, and Capital (RGEC) method, introduced by Bank Indonesia, provides a comprehensive assessment of a bank's soundness, with NPL, LDR, and CAR as proxy measurements influencing profitability (Pramana & Artini, 2016).

The research aims to investigate whether Green Banking influences the profitability of banking sector companies listed on the Indonesia Stock Exchange from 2016 to 2022. The study's benefits include providing investors with insights for evaluating business performance, serving as a reference for academic understanding of green banking and profitability factors, and assisting companies in gaining industry insights and enhancing profitability.

LITERATURE REVIEW

Green Banking

Green Banking prioritizes environmental sustainability in banking activities, aiming for a paperless, energy-efficient, and socially responsible approach. It began in the early 1990s, focusing on eco-friendly operations and investments. Deka (2015) defines it as an effort to reduce a bank's carbon footprint and promote sustainable practices. Green banking benefits include operational efficiency, reduced errors, and cost savings. In the US, it involves renewable energy financing, while in China, government regulations support a low-carbon economy. In Indonesia, the focus is on integrating green concepts for sustainable development, impacting banking performance positively (Dharwal & Agarwal, 2013; Diah, Aryani, & Prasetyo, 2020; Rachman & Saudi, 2021).

Environmental, Social and Governance (ESG)

Environmental, Social, and Governance (ESG) is a framework assessing sustainability and ethics in investments. Noviantanti (2020) defines it as integrating corporate policies with environmental, social, and governance concepts. Environmental criteria cover energy use, waste, carbon footprint, and resource management. Social factors involve relationships with communities and other entities, while governance focuses on sustainable management. ESG emphasizes the link between financial performance and sustainable practices, disclosed in reports like Corporate Sustainability Reports (Putri, 2019). Investors consider ESG factors to identify profitable opportunities while contributing to long-term financial performance and sustainability, acknowledging the interconnectedness of financial and ethical considerations.

Banking Industry

A bank, as defined by Darmawi (2011) and Hasibuan (2009), is a financial institution focused on collecting funds from the public and providing credit, driven by both profit motives and social considerations. It plays a vital role in the financial sector by facilitating the flow of money through services like credit provision, payment traffic, and money circulation, ultimately contributing to the welfare of the community. Maintaining a healthy bank, as mandated by Indonesian banking laws (Law No.7/1992 and amendments), involves assessing various aspects such as Capital Adequacy, Asset Quality, Management Quality, Earnings, and Liquidity, ensuring soundness and prudence (PBI No.6/10/PBI/2004). The Risk Profile, Good Corporate Governance, Earnings, and Capital (RGEC) method, replacing CAMELS, evaluates qualitative and quantitative factors, including credit, market, liquidity, operational, legal, strategic, compliance, and reputation risks (Circular Letter 13/24/DPNP of 2011). Green Banking Disclosure, measured by a 21-item index, aligns with

central bank criteria, emphasizing environmental disclosures in annual reports (Bose et al., 2017).

Profitability

Profitability, crucial for evaluating a company's health, reflects its ability to generate profits over time. Profitability analysis involves ratios like Return on Assets (ROA), which assesses a company's efficiency in utilizing assets for profit generation. Investors are attracted to profitable companies for capital investment. ROA, measuring the effectiveness of asset utilization, is a key metric, with higher values indicating better asset efficiency (Riyanto, 2011; Brigham and Houston, 2006).

Control Variable

This study includes control variables to assess factors beyond green banking influencing corporate profitability, using the RGEC approach. Capital Adequacy Ratio (CAR) ensures a bank's ability to manage risks and maintain sufficient capital (Kuncoro & Suhardjono, 2011). Non-Performing Loan (NPL) reflects credit risk, impacting a company's revenue and financial burden (Latumaerissa, 2017). Loan to Deposit Ratio (LDR) measures a bank's efficiency in deploying funds from customer deposits for profitable lending (Riyadi, 2015).

The Impact of Green Banking on Profitability

Studies on the impact of green banking on profitability exhibit varying results, potentially due to differences in measurement criteria and indicators. This study employs content analysis using 21 disclosure indicators developed by Bose et al. (2017) to assess green banking practices. Such practices align with Environmental, Social, and Governance (ESG) principles, integrating environmental, social, and governance factors into banking operations. The adoption of sustainable practices, including the development of eco-friendly financial products and environmental risk management, is associated with long-term economic benefits and enhanced reputation. Research in India (Ramila and Gurusamy, 2015), Indonesia (Putri et al., 2022; Ajuna et al., 2015), and others highlight the positive impact of green banking on profitability, emphasizing increased return on assets (ROA) and enhanced financial success through practices like corporate social responsibility (CSR) fund utilization (Putri et al., 2022). Studies by Rachman and Saudi (2021), Akhter et al. (2021), and Ratnasari et al. (2018) support the notion that green banking practices positively influence bank profitability, with a higher green banking index correlating with more effective and profitable operations.

METHODOLOGY

Type and Source of Data

This study uses a quantitative approach using secondary data sources obtained from official websites of the Indonesia Stock Exchange (IDX). The data used in this research is based on the financial reports of commercial banks listed on the Stock Exchange Indonesia (IDX) during the period 2016-2022 that have successively reported on the green banking practices. In addition, the data can be obtained through the company's website and relevant literature.

Population and Sample

In this study, the population consists of all conventional commercial banks operating in Indonesia between 2016 and 2022. The sample used of this research was obtained using a method of purposive sampling with criteria including banks that have implemented green banking practice, published sustainable report during the research period and displayed comprehensive information as well as the other data required for this study. This study employed a purposive sampling method. According to Sugiyono (2017), purposive sampling is a sampling method for data sources that consider certain characteristics in line with the desired criteria to decide the number of samples to be analyzed. Thus, in this study researcher has 9 sample of banks that match the criteria as follows:

Table 1. List of Research Sample

No.	Code of Companies	Companies Name
1.	BBCA	PT. Bank Central Asia Tbk
2.	BBRI	PT. Bank Rakyat Indonesia (Persero) Tbk
3.	BMRI	PT. Bank Mandiri (Persero) Tbk
4.	BBNI	PT. Bank Negara Indonesia (Persero) Tbk
5.	BBTN	PT. Bank Tabungan Negara (Persero) Tbk
6.	BNGA	PT. Bank CIMB Niaga Tbk
7.	BNII	PT. Bank Maybank Indonesia Tbk
8.	BJBR	PT. Bank Pembangunan Daerah Jawa Barat dan Banten Tbk
9.	BNLI	PT. Bank Permata Tbk

Dependent variable in this study is Return on Asset, which as the proxy to calculate the profitability. ROA is used to evaluate the ability of management to generate profits as a whole (Dendawijaya, 2009). The profitability ratio is one of the metrics used to assess financial success, and ROA is a general form of a profitability ratio (Darsono, et al., 2014). The higher the ROA, the higher the level of profit that the firm can make, and the better position that the company is in when it comes to making use of its assets. This will enhance the company's attractiveness to investors. Regulation No. 13/24 / DPNP issued October 25th, 2011, from Bank Indonesia specifies that a bank's minimum return on assets is 1.5 %. In this research, based on Bank Indonesia's May 31st, 2014, circular letter number 6/23/DPNP, the formula of ROA can be determined by (Horne & Wachowicz, 2013).

$$\text{Return on Asset (ROA)} = \frac{\text{Profit After Tax}}{\text{Total Assets}} \times 100\%$$

According to Kuncoro (2003), independent variable is a variable that can effect changes in related variables and have a positive or negative impact on other related variables. This study uses the Green Banking Disclosure Index (GDBI) as the independent variable to measure the Green Banking practice. Green Banking can be measured using content analysis techniques applied to annual reports and the disclosure literature. GDBI is an assessment that may be used to determine whether a bank is complying with the green banking concept in its operations. Measurement GDBI use content analysis to identify and explain green banking practices based on 21 green banking disclosure items created by Bose et al., (2017) where the annual report as well as the published sustainability report on banking will be analyzed. Using a dichotomous scale, a score of 1 (one) will be assigned if the financial report or sustainability report has green reporting indicators for banking, and a score of 0 (zero) will be assigned if there is no disclosure indicator. The following formula is used to compute each bank's Green Banking Disclosure Index referring to the methods of Ullah & Rahman, (2015) and Masud et al., (2017):

$$\text{GDBI} = \sum_{i=1}^n di$$

Description:

GDBI : Disclosure of green banking bank i year t

di : 1 if reporting, 0 otherwise

n : Number of expected green banking indicator disclosures

Capital Adequacy Ratio (CAR)

The formula to calculate CAR is capital divided by risk weighted assets. According to regulation No. 15/12/PBI/2013 of Bank Indonesia, banks are obliged to provide a minimum capital of 8% of Risk-Weighted Assets (RWA). The CAR ratio can be stated as follows (Hasibuan, 2009):

$$\text{Capital Adequacy Ratio} = \frac{\text{Its Owned Capital}}{\text{Risk Weighted Assets}} \times 100\%$$

Non-Performing Loan (NPL)

Based on regulation No. 13/24/2011 DPNP extracted from the Bank Indonesia, Bank Indonesia has set a maximum NPL ratio of 5% when evaluating a bank, while an NPL ratio of 2% to 5% indicates that the bank is in good shape. The bad credit ratio was calculated by the formula of Non-Performing Loan as below (Ismail, 2010):

$$\text{Non Performing Loan} = \frac{\text{Bad Debt}}{\text{Total Credit}} \times 100\%$$

Loan to Deposit Ratio (LDR)

The LDR ratio is calculated by comparing credit to third-party funds where the maximum LDR, however, is limited to 110%. The LDR ratio is determined by comparing credit to third-party funds, with the credit used being the entire amount of credit given to third parties and excluding credit given to other parties, where demand deposits, savings accounts, and time deposits, which are not exchange funds, are the components of third-party funds (Sudirman, 2013):

$$\text{Loan to Deposit Ratio} = \frac{\text{Credit given to the customer}}{\text{Total Deposit from Third Party}} \times 100\%$$

Data Analysis Method

The research employs a robust methodology, starting with a descriptive statistics test to summarize and characterize data based on key statistical measures such as mean, standard deviation, and variance. Subsequently, a panel data regression analysis is utilized, incorporating time series and cross-sectional data to explore the relationship between green banking and profitability in Indonesian banks listed on the stock exchange from 2016 to 2022. The regression analysis involves multiple stages, including the Chow Test and Hausman's Test, which assist in model selection, distinguishing between Common Effect and Fixed Effect models. The research utilizes a comprehensive methodology, starting with a descriptive statistics test to summarize data using key measures like mean and standard deviation (Ghozali, 2018). A panel data regression analysis is then employed, incorporating time series and cross-sectional data (Widarjono, 2018). The study conducts classic assumption tests, examining normality, autocorrelation, multicollinearity, and heteroscedasticity (Ghozali, 2018; Santoso, 2018). F-tests and T-tests assess joint and individual significance of independent variables (Ghozali, 2018). The R-squared test measures the model's ability to explain variations in the dependent variable (Ghozali, 2018).

RESULT

Descriptive Statistics

This study implements the descriptive analysis of Green Banking Index that refers to the study from (Karyani & Obrien, 2020) by calculating the validity test and the reliability test. The validity test is conducted at a significance level of 5% using the r-table value of 0.245 (based on 63 observations). On the other hand, the reliability test is performed using Cronbach's alpha, and it is considered acceptable if the alpha value falls within the range of 0.6 to 0.8.

Table 2. Validity Test

No Item	Category	Mean	Yes	No	Validity Test (r-count)	
1	Bank's environmental policies and awareness	0,984	62	1	0,440	Medium
2	Client project funding information	0,746	47	16	0,667	High
3	Reduction of paper waste	0,984	62	1	0,440	Medium
4	Solutions to reduce water and gas waste	0,714	45	18	0,403	Medium
5	Use environmentally friendly materials	0,921	58	5	0,300	Low
6	Conservation of energy in conducting business operations	0,937	59	4	0,339	Low
7	Employee business travel reduction	0,968	61	2	0,443	Medium
8	Green products	0,984	62	1	0,440	Medium
9	Bank's environmental initiatives	0,984	62	1	0,440	Medium
10	Conducting environmental impact before lending.	0,984	62	1	0,405	Medium
11	Workshop to raise environmental awareness.	0,968	61	2	0,443	Medium
12	Bank receives awards for contribution to environmental.	0,730	46	17	0,487	Medium
13	Bank's clients winning awards for preserving the natural environment.	0,079	5	58	0,210	Very Low
14	Sponsoring environment facilities	0,984	62	1	0,440	Medium
15	The establishment of climate change fund.	0,984	62	1	0,440	Medium
16	Setting up green branches.	0,143	9	54	0,478	Medium
17	Information about internalizing green marketing	0,143	9	54	0,385	Low
18	Training its employees regarding the green movement	0,841	53	10	0,620	High
19	The budget allocated for green banking practice.	0,921	58	5	0,599	High
20	Actual amount spent on green banking activities.	0,921	58	5	0,599	High
21	Use of separate pages for green banking reporting in the annual report.	0,825	52	11	0,211	Very Low
Total Variance Items					9,226	
Cronbach's Alpha					0,663	

The validity test conducted on 21 Green Banking Disclosure Items indicates that 18 items are classified valid, whereas 2 items, specifically item 13 and item 21, are considered to have very poor validity or are invalid. The invalid items are omitted due to its poor reliability for accurate development. The reliability test findings indicate that the Cronbach's alpha coefficient is 0.663, which above the threshold of 0.6 (< 0.6), demonstrating a high level of reliability.

Table 3. Descriptive Statistic Result

	ROA	GDBI	CAR	NPL	LDR
Mean	0.014228	0.792063	0.213946	0.028807	0.879143
Median	0.012388	1.000000	0.201327	0.028106	0.884447
Maximum	0.031088	1.000000	0.357690	0.090647	1.165474
Minimum	-0.039166	0.000000	0.158960	0.012475	0.608930
Std. Dev.	0.010550	0.125988	0.041463	0.011849	0.102430

The study presents key statistics for variables such as Return on Assets (ROA), Green Banking (measured by the Green Banking Disclosure Index), Capital Adequacy (CAR), Non-Performing Loans (NPL), and Loan Deposit Ratio (LDR). For instance, ROA reveals variations in profitability among banks, with a

mean of 1.42%. Green Banking, with a mean of 0.79, indicates effective implementation. Capital Adequacy averages at 21.39%, NPL reflects a 2.8% proficiency in handling problematic loans, and LDR indicates a bank's capacity to return depositors' funds at 87.91%. These statistics provide insights into the financial and environmental practices of nine Indonesian banks from 2016 to 2022.

Chow Test

The Chow test is a statistical method employed to select between Common Effect Model (CEM) and Fixed Effect Model (FEM), both of which are outlined in Appendix 6. According to the findings presented in Table 4.4, the Chi-square Cross-section probability is $0.0000 < 0.05$, indicating that H_0 is rejected, and H_a is accepted. Consequently, it is recommended to select the Fixed Effect Model (FEM) over the Common Effect Model (CEM).

Table 4. Chow Test Result

Effects Test	Statistic	d.f.	Prob.
Cross-section F	12.723794	(8,50)	0.0000
Cross-section Chi-square	69.960069	8	0.0000

Hausman Test

Based on the Hausman test results above, which generated a significance value of 0.0002 (significance level < 0.05), then H_0 is rejected. Thus, it can be concluded that the Fixed Effects Model (FEM) is better than Random Effects Model (REM). Because the results have found the most appropriate method to use, there is no need to continue with the Lagrange Multiplier test method.

Table 5. Hausman Test Result

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	21.571808	4	0.0002

Classic Assumption Test Results

The study conducted various diagnostic tests on regression assumptions. The normality test, indicating a significance value of 0.2716 (> 0.05), confirms that residual data follows a normal distribution. Autocorrelation analysis, assessed through the Durbin-Watson test (D-W value of 1.7291), suggests no autocorrelation in the data. The multicollinearity test reveals that variables don't exhibit a correlation value exceeding 0.8, ensuring the absence of multicollinearity issues. Heteroscedasticity is ruled out as the probability values (> 0.05) indicate its non-occurrence in the data. These results affirm the reliability of the regression model and the validity of underlying assumptions.

Regression Analysis Results

Table 6. Regression Analysis Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.014370	0.009880	1.442297	0.0162
GDBI	0.020480	0.004812	4.256391	0.0001
CAR	0.005343	0.015042	0.355206	0.7239
NPL	-0.453818	0.067673	-6.706079	0.0000
LDR	0.004445	0.005964	0.745263	0.4596

The regression analysis reveals significant insights into factors affecting Return on Assets (ROA). The intercept (β_0) has a positive impact on ROA, indicating a baseline positive profitability. The Green Banking Disclosure Index (GDBI) demonstrates a positive influence on ROA, with a coefficient of 0.0001. However, control variables, namely Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), and Loan to Deposit Ratio (LDR), show mixed effects. CAR and LDR exhibit no significant positive impact on ROA, while NPL has a significant negative effect, aligning with previous research. This underscores the importance of effective risk management in maintaining bank profitability.

T Test

Based on the results presented in Table 4.10, it can be inferred that the independent variable projected with Green Banking Disclosure Items has a t-statistic value of 4.256391 and a probability value of 0.0001 which is lower than the significance value of 0.05. Hence, it may be inferred that the adoption of green banking practices has a positive impact on the profitability of banking sector companies listed on the Indonesia Stock Exchange from 2016 to 2022, thereby H_0 is accepted.

Table 7. T Test

Variable	t-Statistic	Prob.	Significance Level	Result
GDBI	4.256391	0.0001	5%	H_0 is rejected

R-Squared Test

The coefficient of determination (R^2) measures how well the model can explain variations in the dependent variable. The coefficient of determination ranges between zero and one, with a low R^2 value indicating that the independent variables' ability to explain variations in the dependent variables is highly limited. A close to one value indicates that the independent variables provide nearly all the information required for predicting variations in the dependent variables. Based on the data, it reveals a value of 0.86, indicating that 86% of the dependent variable can be explained by the independent variable. The remaining 14% is attributed to other factors not included in this study.

DISCUSSION

The research hypothesis posits a positive relationship between the green banking disclosure index and profitability, and statistical analysis supports this claim, revealing a significant coefficient value of 0.020480 with a probability value of 0.0001 (< 0.05). This aligns with Akhter et al.'s (2021) findings in Bangladesh, emphasizing the positive influence of green banking on company profitability due to associated environmental improvements and risk mitigation. The analysis delves into specific factors within the green banking index, highlighting key drivers of impact on profitability. Sustainable operational practices, energy conservation, paperless operations, and advanced technology usage contribute to enhanced efficiency and profitability. These findings are consistent with Ramila & Gurusamy's (2015) study, indicating that the daily operational emphasis on green banking, including the use of advanced technology and energy conservation, leads to increased profitability.

Notably, the study identifies high average scores in Green Banking Disclosure Index (GDBI) items 1, 3, 5, 6, 7, and 8, showcasing the adoption of sustainable practices for an environmentally friendly environment. This comprehensive approach to green banking includes factors such as the use of advanced technology, elimination of paper usage, and conservation of energy, leading to increased profitability through efficiency gains. These results are consistent with the study conducted by PT Bank Mandiri Tbk in 2019, emphasizing the expansion of online and internet banking, the addition of ATMs, and the resultant enhancement of customer convenience (Sustainability Report of BMRI, 2019). Furthermore, GDBI items related to environmental risk analysis before issuing credit (in alignment with Bank Indonesia Regulation) contribute to risk mitigation and value creation, as found in Mamun & Rana's (2020) study. The study acknowledges high average scores in GDBI items 9, 11, 14, and 18, showcasing banks' commitment to environmental initiatives in the social sphere. Collaborations with environmental institutions, training programs, funding for environmental activities, and receiving awards demonstrate a holistic approach to green banking.

While green branch and green marketing (GDBI items 16 and 17) show lower scores, indicating a slow but increasing implementation, they contribute to banks' overall commitment to sustainability. This comprehensive perspective on green banking, supported by Anggraini et al. (2020), Rachman & Saudi (2021), and Ramila & Gurusamy (2015), reinforces the positive impact on profitability by enhancing reputation and financial performance. The study's thorough exploration of various dimensions of green banking practices provides a nuanced understanding of their multifaceted impact on profitability in the banking sector.

CONCLUSION AND RECOMMENDATION

This study investigates the impact of green banking on the profitability of banking companies listed on the Indonesia Stock Exchange from 2016 to 2022, utilizing a comprehensive set of 21 green banking indicators. The results confirm the hypothesis that green banking has a positive influence on company profitability. Green banking practices, including the adoption of green products and efficient, energy-conscious, and paperless operations, contribute to minimizing costs, thereby increasing profits. The study emphasizes the competitive advantages of implementing green business practices, such as enhancing the company's reputation, as a means to generate profits. Non-Performing Loans (NPL) as a control variable exhibits a negative impact on profitability, while Capital Adequacy Ratio (CAR) and Loan to Deposit Ratio (LDR) do not significantly influence company profitability.

For future researchers, the study suggests exploring alternative proxies for measuring company profitability beyond Return on Asset (ROA) and encourages further investigation into green banking using a broader sample range for example, the use of the separate green banking index measurements outside of the total green banking index might be considered. On the company side, the study recommends companies enhance monitoring capabilities through the implementation of green banking practices, leveraging advanced technology for daily operations to potentially boost profitability. The inclusion of control variables like CAR, NPL, and LDR provides a more nuanced understanding of the relationship between green banking and profitability, offering valuable insights for both academia and industry stakeholders.

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