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Does Board Gender Diversity Affect Financial Distress

Yandi Suprapto[1)], Irvin Ng[2)]
[1, 2] Fakultas Manajemen dan Bisnis, Universitas Internasional Batam, Batam, Indonesia
Email: yandi.suprapto@uib.edu

SINTA 2

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ABSTRACT

Females were regarded as incompetent as a leader before the current modern era. But, female in managerial positions has been increasing since 2015. As part of corporate governance, there is only a few research regarding gender diversity's relationship with financial distress with different results on different context. This research investigates the role of board gender diversity on firms' financial distress. Multiple linear regression is used as the method of study. In general, board gender diversity does not have any relationship with financial distress in the infrastructure firms. When dissected into 4 sub-sectors, 1 out of 3 sub-sectors with 1 other sub-sector excluded, shown a negative relationship between board gender diversity and financial distress while the other 3 sub-sectors do not show any significant relationship.

Keywords: Corporate Governance; Financial Distress; Gender Diversity.

INTRODUCTION

Before the modern era, females were never considered for their ability in holding a position of leadership as they were regarded as incompetent based on stereotypes where females don't have broad insights into the business world as well as being relatively inexperienced. Based on this reason, only males were holding managerial positions in the past (Fitriana & Cenni, 2021). The role of females in society was also affected due to this reason in which they were left out on most occasions compared to their male counterparts (Kartika & Kanada, 2017). Issues that are related to gender equality don't seem to have any solution and will always be a problem in every aspect of livelihood. This particular matter isn't just an issue for Indonesia (Ismail et al., 2020). On the bright side, gender equality has been seeing improvements in which it is being widely accepted by people from many countries (Sari et al., 2021).

Based on Badan Pusat Statistik (BPS) Indonesia's data, only 22,32% of managers in Indonesia were female in 2015. But more and more females in managerial positions are seen where there is an increase to 32,5% of managers in Indonesia are female in the statistics released by BPS Indonesia in 2021. Compared to Europe, Indonesia has more females in managerial positions whereas, in Europe, only 30% of managers are female (García & Herrero, 2021). Đặng et al. (2020) stated that literature related to gender diversity in executive positions has become increasingly important based on the fact that there is a positive trend in the number of female executives throughout countries.

Financial distress is a situation faced by companies when the mentioned firms are unable to clear their liabilities when it's due (Farooq & Noor, 2021). If a company is in financial distress, it will show certain characteristics such as paying out fewer dividends, recording net losses, facility closures, to being insolvent (Isayas, 2021). Whenever a company is facing financial distress, restructuring debts will often be a choice in hopes of improvements in its financials (Isayas, 2021). Otherwise, they will file for bankruptcy (Isayas, 2021). Many parties will suffer when a company faces financial distress, such as investors, creditors, and often time suppliers as financial distress comes with a high cost because legal costs will be incurred, interest on debts increases, and opportunity costs for projects with positive NPV (Net Present Value) because of difficulties in obtaining funds whereas companies will no longer be able to issue new shares or bonds (Yousaf et al., 2020).

Board gender diversity is a part of corporate governance. Literature investigating the effects of corporate governance towards firm performance, firm value, and many other company factors including financial distress is commonly found (Bhat et al., 2018; Endrikat et al., 2021; Gafoor et al., 2018; Mishra & Kapil, 2018; Orazalin, 2019; Sobhan, 2021). But literature concerning board gender diversity affecting financial distress in companies isn't as common as the forementioned literature. García & Herrero (2021) and Ali et al. (2022) who studied the effect of board gender diversity towards financial distress in Chinese and European firms found that having females on the board of directors decreases the probability of a firm facing financial distress situation as having female directors would moderate a firm's risk due to their risk-averse traits. On the other hand, Saima & Arefin (2022) didn't find any significant relationship between board gender diversity and financial distress in Bangladesh.

In the context of Indonesia, Samudra (2021) found a significantly negative relationship between female directors and financial distress out of 389 Indonesian manufacturing firms. Eliya & Suprapto (2022) previously stated that when the board of directors within a company has the characteristic of being heterogeneous, it would positively affect the general condition of mentioned firm. But a different result is found in Ariska et al.'s (2021) research where there is no significant relationship between females on the board of directors and financial distress in Indonesian manufacturing firms. Koerniawan & Malelak (2021) does not find any significant relationship between female directors and financial distress in manufacturing firms in Indonesia. As there are many differences in previous research conducted, it is important to investigate more regarding female directors' relationship with financial distress to reduce the gap in the literature conducted.

The majority of studies regarding female directors' relationship towards financial distress that are conducted in Indonesia is done by studying manufacturing sector companies. If the average debt-to-asset ratio (DAR) is compared across company sectors, infrastructure average firms have the highest risk of default due to lack of assets compared to their debts while manufacturing firms have ranked 2nd and 7th if taken apart into 2 separate categories, which is consumer cyclicals and consumer non-cyclicals. Although, this comparison has excluded the financial firms as banks and other financial institution has different operational procedure as well as financing sources resulting in a different type of financial report. Based on this comparison, sparked an interest to investigate female directors' effect towards financial distress within companies with the highest average leverage in Indonesia.

Table 1. Debt-to-Assets Ratio of Indonesian Companies

RANK (WORST TO BEST)	SECTOR	DAR
1	Infrastructures	123.779
2	Consumer Cyclicals	0.991
3	Transportation & Logistic	0.604
4	Energy	0.592
5	Basic Materials	0.535
6	Industrials	0.508
7	Consumer Non-Cyclicals	0.473
8	Properties & Real Estate	0.363
9	Technology	0.350

Source*:* IDX Quarterly Statistics, 2022

García & Herrero (2021) previously concluded that having female directors would improve monitoring toward managers in a company as well as reduce agency conflicts within it resulting in a lower probability of facing financial distress. Whenever there is more female within the board, a company's leverage would be lower as the outcome would be lower risk and lower financing costs of a company (Ali et al., 2022; García & Herrero, 2021; Yousaf et al., 2020). Samudra (2021) argues that females generally have a different mindset and point of view compared to their male counterparts that if they are combined, a better perspective and synergy would be achieved rather than having only males on board. (Maier & Yurtoglu, 2022) states that as there is board gender diversity, firms would have unique expertise within the board of directors which helps in mitigating financial distress risks.

H1: Gender diversity negatively affects financial distress

METHOD

Table 2. Samples

Information	Amount
Infrastructure sector companies listed on Indonesia Stock Exchange	58
Companies that conduct initial public offerings after 2017	(13)
Insufficient annual reports	(3)
Insufficient data on annual reports	(4)
The number of sample companies that meet the criteria	38
The number of sample data for the 2017-2021 research period	190 sample

Source: Data Processed, 2023

This research will use infrastructure firms listed in The Indonesia Stock Exchange (IDX) as the population of this study. Above mentioned sector is composed of 4 (four) sub-sectors, which are utilities, telecommunication, transportation infrastructures as well as heavy construction and civil engineering based on IDX Yearly Statistics 2022 published by IDX. Out of the total of 58 companies, 39 companies were taken as samples in this study as these companies met the research sampling criteria based on the purposive sampling technique with requirements listed below.

Information that is made available to the public referred as secondary data is gathered for the purpose of this research (Digdowiseiso et al., 2022). Data were collected from the official website of IDX who published companies' annual reports and the period of this study ranged from 2017 to 2021. This research uses Stata 16 SE for statistics and regressions as panel data is being used and multiple linear regression compatible statistics program is needed in order to obtain the necessary evidence above conclusive results of this study. With Stata 16 SE, 5 models are used in this study with the equation as follows:

$$FDit = \alpha + \beta 1 FemDit \quad \text{..... (1)}$$
$$FDit = \alpha + \beta 1 FemDit + \beta 2 FSit \quad \text{..... (2)}$$
$$FDit = \alpha + \beta 1 FemDit + \beta 2 FSit + \beta 3 BSit \quad \text{..... (3)}$$
$$FDit = \alpha + \beta 1 FemDit + \beta 2 FSit + \beta 3 BSit + \beta 4 DERit \quad \text{..... (4)}$$
$$FDit = \alpha + \beta 1 FemDit + \beta 2 FSit + \beta 3 BSit + \beta 4 DERit + \beta 5 ROAit \quad \text{..... (5)}$$

Where:

FD = Financial Distress
FemD = Percentage of female director (Gender Diversity)
FS = Firm Size
BS = Board Size
DER = Leverage
ROA = Profitability

It is also important to note that, outliers are found in this study's sample. Outliers mentioned, are detected with the "extremes" command out of Stata 16 SE which detects sample values that deviate too far from observation. A total of 18 outliers that are removed from observation are listed below:

Table 3. Outliers

Name	Year	Zscore
PT Bakrie Telecom Tbk	2017	-60.815356
PT Bakrie Telecom Tbk	2018	-60.790916
PT Bakrie Telecom Tbk	2019	-2745.415
PT Bakrie Telecom Tbk	2020	7685.855
PT Bakrie Telecom Tbk	2021	-1318.257
PT Garuda Maintenance Facility Aero Asia Tbk	2020	-2.9025088
PT Himalaya Energi Perkasa Tbk	2017	15.07329
PT Himalaya Energi Perkasa Tbk	2018	30.538109
PT Himalaya Energi Perkasa Tbk	2020	16.86851
PT Leyand International Tbk	2018	-2.9576555
PT Leyand International Tbk	2019	-5.9066522
PT Leyand International Tbk	2020	-9.7269254
PT Leyand International Tbk	2021	-17138.886
PT Protech Mitra Perkasa Tbk	2017	15.508646
PT Protech Mitra Perkasa Tbk	2018	120.77017
PT Protech Mitra Perkasa Tbk	2019	98.607053
PT Protech Mitra Perkasa Tbk	2020	185.53681
PT Protech Mitra Perkasa Tbk	2021	454.61387

Source: Data Processed, 2023

Table 4. Measurement of Variables

Variable Name	Variable Type	Measurement	Formula	Source
Financial Distress	Dependent	Altman Z-Score	1.2 Net Working Capital/Total Asset + 1.4 Retained Earnings/Total Assets + 3.3 EBIT/Total Assets + 0.6 Share Price(Market Value of Equity)/Book Value of Debt + 1.0 Sales Revenue/Total Assets >2.99 Safe Zone 1.81 - 2.99 Grey Zone <1.81 Distress Zone	García dan Herrero, 2021; Maier dan Yurtoglu, 2022; Chen dan Liang, 2022; Salma dan Arefin, 2022; Isayas, 2021; Farooq dan Noor, 2021; Farooq et al., 2021; Younas et al., 2021; Ali et al., 2021.
		EPS Dummy	If EPS is negative for financial report year, "1" is given to represent financial distress. Otherwise, "0" for non-distressed firms	Oare dan Appiah, 2021; Ariska et al., 2021; Bravo-Urquiza dan Moreno-Ureba, 2021; Yousaf et al., 2020; Mariano dan Izadi, 2020.
Gender Diversity	Independent	Percentage of Females on Board	Female Director/Number of Directors x 100%	García dan Herrero, 2021; Salma dan Arefin, 2022; Ali et al., 2021; Samudra, 2021; Ariska et al., 2021; Koerniawan dan Malelak, 2020
		Female Dummy	"1" represents if a firm has a female director. Otherwise, "0"	Salma dan Arefin, 2022
Firm Size	Control	Total Asset	(log)TotalAsset	García dan Jose, 2021; Saima dan Arefin, 2022; Ali et al., 2021; Koerniawan dan Malelak, 2020
Board Size	Control	Total of Directors	Total of Directors	(García dan Jose, 2021; Saima dan Arefin, 2022; Ali et al., 2021; Koerniawan dan Malelak, 2020
Leverage	Control	Debt-to-Equity Ratio	Total Debt/Total Equity	Saima dan Arefin, 2022; Ali et al., 2021; Koerniawan dan Malelak, 2020
Profitability	Control	ROA	Net Income/Total Asset	García dan Jose, 2021; Saima dan Arefin, 2022; Ali et al., 2021

Source: Data Processed, 2023

Hypothesis testing, which is a test to examine a relationship's significance between two or more variables in research, will be the main intention in conducting this research (Sepriani & Candy, 2022). The outcome of this study will be an investigation of how gender diversity

directly affects financial distress in firms. Other than independent and dependent variables, control variables are being used as well in order to isolate other external factors that may affect the dependent variables as well (García & Herrero, 2021).

Research model that is used in this study has 1 (one) independent variable which is firm's board gender diversity measured by the percentage of female directors over the total of directors present on board, and 1 (one) dependent variable which is financial distress measured by Altman's Z-Score. Control variables that are used in order to isolate external factors' effects other than the independent variable will be firm size measured by natural logarithm of total asset, board size measured by the total of directors on the board, leverage measured by debt-to-equity ratio, as well as profitability measured by return-on-asset ratio. Dependent variable of this study has a substitute of measurement in order to complete a robustness check, in which a dummy variable of negative EPS as a substitute of Altman's Z-Score. Table 4 shows the formula for each measurement.

RESULTS AND DISCUSSION

Table 5. Descriptive Statistics

Variable	Descriptive Statistics			
	Min	**Max**	**Std. Dev**	**Mean**
ZScore	-2.58505	14.36956	2.30943	2.10268
FemaleDire~r	0	0.66667	0.15655	0.10186
FirmSize	7.79e+07	2.77e+14	4.34e+13	2.34e+13
BoardSize	2	10	1.60877	4.85790
DER	-3.43356	370.57412	28.93746	4.49144
ROA	-1396.863	0.46437	101.35178	-7.58072

Source: Data Processed, 2023

Table 5 shows descriptive statistics of variables used in this study, composed of minimum, maximum, standard deviation, and mean values. The lowest value of Altman Z-Score is seen at PT Garuda Maintenance Facility Aero Asia Tbk in 2021 with a value of -2.59 while the highest value is seen at PT Himalaya Energi Perkasa Tbk in 2021 with a value of 14.37. The average Z-Score of infrastructure companies shows a value of 2.1, indicating that the majority of infrastructure companies are in the grey zone based on Altman Z-Score's interpretation. The female director has 0 minimum value as 61% of infrastructure companies don't have any female directors on the board. The highest percentage of female directors is 67% found in 2 companies, which are PT Solusi Tunas Pratama Tbk in 2020 as well as PT Cardig Aero Services Tbk in 2020 and 2021. The mean value of female director indicates that only 10% of the board in infrastructure companies are female.

With correlation matrix shown on Table 6, the independent variable of this study which is gender diversity measured by percentage of female director has a positive relationship with the dependent variable, which is Altman Z-Score. This relationship aligns with the hypothesis of the study, in which whenever there is an increase in female directors' percentage, there will also be an increase in Altman Z-Score as well. Therefore, financial health of the company

increases reducing financial distress probability of company. Other than that, control variables show a negative correlation with Altman Z-Score except for ROA.

Table 6. Correlation Test

	ZScore	Female~r	FirmSize	BoardS~e	DER	ROA
ZScore	1.0000					
FemaleDire~r	0.2161	1.0000				
FirmSize	-0.5058	-0.2500	1.0000			
BoardSize	-0.1458	0.1054	0.5487	1.0000		
DER	-0.3089	0.0792	0.2759	0.1393	1.0000	
ROA	0.4026	0.1741	-0.0381	0.0324	-0.3634	1.0000

Source: Data Processed, 2023

As seen in Table 7, the percentage of female directors on board doesn't affect financial distress in 5 of the models with each of the tests showing a probability above 0.05. Even so, it is found that gender diversity's significance towards financial distress gets increasingly significant as control variables are added to the model. With probability score starts from 0.673 without any control variables and gradually decreases to 0.294 as control variables are added.

Table 7. Infrastructure Sector Regression

	(1)	(2)	(3)	(4)	(5)
	Z-Score	**Z-Score**	**Z-Score**	**Z-Score**	**Z-Score**
Female Director %	0.3851	-0.0008	0.7927	0.6597	0.8607
	-0.42	(-0.00)	-0.95	-0.8	-1.05
Firm Size		-1.2747***	-1.7555***	-1.7139***	-1.6201***
		(-3.16)	(-4.23)	(-4.15)	(-4.16)
Board Size			0.4462***	0.4266***	0.4488***
			-3.34	-3.25	-3.35
DER				-0.0338***	-0.0362***
				(-5.09)	(-4.62)
ROA					-1.1709
					(-0.83)
Constant	2.0598***	18.5422***	22.4115***	22.0856***	20.7495***
	-8.89	-3.48	-4.18	-4.13	-4.17
Adj. R-squared	-0.0052	0.1617	0.2171	0.2422	0.2529
Obs.	172	172	172	172	172
="* p<0.10	** p<0.05	*** p<0.01"			

Source: Data Processed, 2023

Within telecommunication companies, it also doesn't show any significant relationship between gender diversity with financial distress. As the probability score shows 0.965, significance increases as control variables are considered in the regression. As control variables

are added, the probability score of gender diversity decreases to 0.512, showing increased significance towards financial distress.

A different result is shown while examining the heavy construction and civil sub-sector. Referring to Table 8, gender diversity does have a significantly positive relationship on the measure of financial distress with a probability score showing 0.028, below 0.05. But, the significance of the relationship faded as control variables were added to the model. As the probability score shows 0.0977, the significant effect of gender diversity on financial distress diminished.

Table 8. Transportation Infrastructure Sub-Sector Regression

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
	Z-Score	**Z-Score**	**Z-Score**	**Z-Score**	**Z-Score**
Female Director %	1.6256	0.9725	0.3624	-2.4997	-0.9381
	(1.32)	(0.66)	(0.16)	(-1.24)	(-0.84)
Firm Size		-0.7046**	-0.6560**	-1.5312***	-0.8436**
		(-2.12)	(-2.13)	(-2.87)	(-2.75)
Board Size			-0.1178	-0.3138	-0.1008
			(-0.67)	(-1.70)	(-0.99)
DER				0.7172	0.1317
				(1.64)	(0.95)
ROA					11.1789***
					(7.42)
Constant	1.2027**	10.4986**	10.5557**	22.4361***	12.7462***
	(2.82)	(2.22)	(2.14)	(3.25)	(3.22)
Adj. R-squared	0.0353	0.1071	0.0783	0.3399	0.8056
Obs.	24	24	24	24	24
="* p<0.10	** p<0.05	*** p<0.01"			

Source: Data Processed, 2023

In general, gender diversity does not have any significant relationship towards financial distress in the infrastructure sector of Indonesian companies. Even when classified into different sub-sectors, the majority of the results still don't show any significant relationship between gender diversity and financial distress. Except for the utility sub-sector, most data of the utility sector are categorized as outliers and excluded, there is insufficient data to do a regression in which will not be considered in this discussion. Insignificant relationships in most sectors excluding utility sub-sector aligns with the research of Saima & Arefin (2022), Ariska et al. (2021), and Koerniawan & Malelak (2021). Ariska et al. (2021) argue that high gender diversity on the board of directors, doesn't necessarily mean that firms could prevent financial distress from happening as every favorable decision-making in the company would be depending on the ability of directors. It is also likely the that lack of gender diversity on the board of directors causes the insignificance of its relationship to financial distress.

Interestingly, it is found that gender diversity has a significantly positive relationship towards Altman Z-Score as a measurement of financial distress in the heavy construction and civil sub-sector. Whenever there is an increase of 1 point of gender diversity on board, the Z-

Score of the company would increase by 3.15 points. Therefore, the increase of Z-Score indicates a better financial health of the firm, which would mean that gender diversity has a significantly negative relationship towards financial distress. This result aligns with the research of García & Herrero (2021), Samudra (2021), Ali et al. (2022), and Yousaf et al. (2020). García & Herrero (2021) and Ali et al. (2022) argue that reduces agency conflicts and increases monitoring of managers as well as capital structure in the means of controlling financial risk in which, reduces the probability of financial distress. Samudra (2021) states that a better synergy within the board of directors would be achieved when there is the presence of females on the board of directors based on the difference in ideas and perspectives between male and female directors. Despite this finding, infrastructure sector in general as well as majority of the sub-sectors included in the infrastructure firms doesn't show any significant relationship between female directors and financial distress. Hence, hypothesis of this study (**H1**) is rejected.

Table 9. Telecommunication Sub-Sector Regression

	(1)	(2)	(3)	(4)	(5)
	Z-Score	**Z-Score**	**Z-Score**	**Z-Score**	**Z-Score**
Female Director %	0.0729	-0.3174	1.2212	0.7845	0.7308
	(0.04)	(-0.21)	(0.98)	(0.65)	(0.66)
Firm Size		-0.5791	-2.5677***	-2.5941***	-2.2683***
		(-1.23)	(-4.65)	(-4.74)	(-4.27)
Board Size			1.1535***	1.1320***	0.8287***
			(5.14)	(5.20)	(3.78)
DER				-0.0311***	-0.0152**
				(-7.66)	(-2.38)
ROA					7.8596***
					(2.68)
Constant	1.8498***	9.5141	29.9397***	30.5820***	27.5416***
	(4.72)	(1.50)	(4.58)	(4.68)	(4.33)
Adj. R-squared	-0.0158	0.0014	0.3818	0.4405	0.5334
Obs.	65	65	65	65	65
="* p<0.10	** p<0.05	*** p<0.01"			

Source: Data Processed, 2023

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Robustness Check

By substituting the main measurement of dependent variable within research with another measurement, is one of few commonly used methods for robustness test to examine and verify a model is robust as well as unbiased study results (Sepriani & Candy, 2022; Liu et al., 2021). In this study, dummy variable of financial distress will be employed in which a company will be scored "1" if negative earnings per share (EPS) is reported in a financial year and "0" otherwise, as this measurement is commonly used in financial distress research (Ariska et al., 2021; Balasubramanian et al., 2019; Bravo-Urquiza & Moreno-Ureba, 2021; Indarti et al., 2020; Mariano et al., 2020; Oware & Appiah, 2021; Yazdanfar & Öhman, 2020; Yousaf et al., 2020; Žiković, 2018). No significant relationship is found between gender diversity expressed by Female Director % towards financial distress in the infrastructure companies. Hence, the research finding is robust as the same results were produced even with different measurement of the same variable.

Table 10. Heavy Construction and Civil Sub-Sector Regression

	(1)	(2)	(3)	(4)	(5)
	Z-Score	**Z-Score**	**Z-Score**	**Z-Score**	**Z-Score**
Female Director %	3.1478**	1.3927	0.7498	1.2573	-0.0372
	(2.24)	(1.15)	(0.52)	(0.90)	(-0.03)
Firm Size		-1.5678***	-1.9082***	-1.6772***	-1.8520***
		(-4.78)	(-4.22)	(-3.70)	(-4.19)
Board Size			0.2755	0.2505	0.2601
			(1.51)	(1.39)	(1.45)
DER				-0.0863**	-0.0190
				(-2.40)	(-1.44)
ROA					8.4785***
					(4.66)
Constant	2.0773***	22.2643***	25.1556***	22.5012***	24.4716***
	(8.58)	(5.08)	(4.72)	(4.21)	(4.77)
Adj. R-squared	0.0325	0.2421	0.2498	0.2744	0.3765
Obs.	69	69	69	69	69
="* p<0.10	** p<0.05	*** p<0.01"			

Source: Data Processed, 2023

CONCLUSIONS

There is no strong evidence between gender diversity and financial distress in Indonesian infrastructure companies including 3 out of 4 sub-sectors of the infrastructure sector. Best financial decisions made by the board depends on the directors' competence, not based on gender. But there's a different outcome in 1 sub-sector, which is heavy construction and civil sub-sector that is also a part of the infrastructure sector shows a significantly negative relationship between gender diversity and financial distress. Unique competence is achieved as different mindset and perspective within diverse gender on the board creates a synergy between male and female directors. Female directors are also risk-averse, that companies with gender diversity on the board would have the firm's leverage risk moderated to a certain safer level. Even so, the significant relationship mentioned diminished as control variables are taken into account. This research proves that only a certain sector could prevent financial distress by having gender diversity on the board of directors.

This research isn't free of limitations as only the infrastructure sector is used. The periods of study used are in the range of 2017 to 2021 and the use of only 1 country certainly limits the outcome of this study. Many other factors including governance factors might affect financial distress and provide better explanations are not considered during this research. It is recommended to include other sectors in order to obtain a wider perspective and outcome that applies to a broader context. A longer observation period, using more than 1 country as well as including other factors that might affect financial distress are also recommended for future research. In the corporate context, firms in Indonesia should consider having more female directors on the board to reduce financial distress risk based on outcomes out of heavy construction and civil sub-sector that proves having gender diverse board of directors reduces the probability of facing financial distress in firms.

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