Contribution of Stock Market Towards Economic Growth: An Empirical Study on Bangladesh Economy

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Abstract

The economic growth of a country is influenced by many different factors. This study aims to investigate the causal relationship between stock market development and economic growth in Bangladesh as well as the impact of stock market performance upon the economic growth of Bangladesh. The stock market performance has been measured by market capitalization ratio, number of listed companies, total value traded and turnover ratio; and the economic growth was represented by real gross domestic product. The periods taken for study were from year 1994 to year 2015.The effect of the stock market reform will also be addressed to explain the relationship. The study has been conducted using Augmented Dickey-Fuller Unit Root Test, Johansen Cointegration Test and the Granger Causality Test. The findings of the research should help the policy makers and regulators to look after their interest in the financial sector of the country.

Keywords: Causality Test, Cointegration Test, Economic Development, Market Capitalization, Stock Market, Unit Root Test

Introduction

Stock markets play a vital role in global economy where the financial markets generate finance for the economic growth. This paper focuses on certain factors that can be used to measure stock markets' effect on a country's economic growth.

Levine (1996) mentioned that stock markets' effect can be negative because of huge numbers of investors sell their stocks in the market and lack of control on the performance of a firm. The financial sector in Bangladesh is evolving towards greater investment and inclusive economic growth. This study analyses the effect of stock market development on their respective

GDP per capita by considering stock market indicators, like, market capitalization, total value of stocks traded, stock turnover ratio and total number of listed companies.

Shahbaz et.al. (2008) stated that stock market development is a crucial factor for economic growth as there is a strong relationship between economic growth and stock market development in the long run. Stock market development has the direct impact in economic development. Gerald (2006) stated that, stock market development is important because financial intermediation supports the investment process by mobilizing household and foreign savings.

Mishkin (2001) mentioned that an organized and managed stock market fuel investment opportunities by recognizing and financing productive projects and lead to economic activity, domestic savings mobilization, capital proficiency allocation, risk diversification, and exchange of goods and services facilitation.

The stock market of Bangladesh has experienced some major ups and downs during the last 20 years. Apart from having major stock market crashes in 1996 and 2010, Bangladesh economy has sustained average GDP growth of 6% per year over the last one and half decades.

The Principal purpose of this study has been made to identify he causal relationship between stock market development and economic growth of Bangladesh. In this paper it has also been tried to divulge the non-stationarity data in the series of stock market development and economic growth by using modern statistical techniques.

Objectives of the study

The basic objective of this study is to analyze the causal relationship between stock market performance and economic growth of Bangladesh. Specific objectives are:

i. To analyze the effect of stock market performance on economic growth of Bangladesh.

ii. To focus on the effect of stock market development on their respective GDP per capita by considering indicators like, market capitalization ratio, total value of stocks traded and stock turnover ratio.

Literature review

A large number of experiential studies have represented the contribution of stock market towards economic growth. Rogers (2003) noted that the importance of economic growth is not arguable and spans across disciplines affecting all areas of society directly and indirectly. In his neoclassical growth model, Solow (1956) explained that identifying the fundamental driving forces of growth and explaining the great variation in

cross country economic performance over time is one of the biggest challenges for growth economists.

Hence, the theoretical academic viewpoint provides conflicting aspects for the causal influence between stock market and economic growth. However, few empirical studies have concentrated on analyzing the reverse relationship.

Bencivenga and Smith (1991) and Levine (1991) proposed endogenous growth models to identify the channels through which financial markets affect long-run economic growth. They explained that more capital can be kept in financial markets through productive investments, which in the end will raise the rate of economic growth.

King and Levine (1993) identified the innovation as the vital instrument of growth. Because, financial markets help in efficient resource allocation through evaluating the potential innovative projects, financing the most promising ones and monitoring the carrying out of investment. Hence, an economy will exposed to a higher growth rate of productivity.

Bagehot (1873) and Hicks (1969) mentioned that the industrialization in England was triggered by the development of their financial sector through the injection of people's money.

Levine and Zervos (1996) observed that the provision of liquidity provided by efficient stock markets attracts investors to commit their fund into investment projects which in turn boost the economic growth of a country.

Rousseau and Wachtel (2000) studied the relationship between financial markets and economic growth by analyzing 47 economies during 1980-1995 and detected that increased economic activity is the result of greater financial sector development.

Shleifer and Summers (1988) argued that the development of stock exchange markets can be detrimental to economic growth by encouraging counterproductive corporate takeovers.

According to Mayer (1988) and Stiglitz (1994), stock markets only promote short-term profits and ignore the long-term prospects, which is a significant factor to economic growth and development.

Olweny and Kimani (2011) examined the Nairobi Stock Exchange and concluded that a higher economic growth is an indicator of higher stock index. They found a unidirectional (one-way) causality running from stock market performance to economic growth, where the stock market performance (captured by NSE 20-share index) has a statistically positive influence on economic growth but the opposite impact did not exist.

Methodology

The study employed secondary data. The periods taken for study were from year 1994 to year 2015. The dependent variable was Real GDP and the independent variables were market capitalization ratio, total value of stocks traded and stock turnover ratio. Data set including the above mentioned variables were being collected from World Development Indicators of the World Bank and from Dhaka Stock Exchange. STATA software was being used to analyze the data set.

Data Processing and Pre-estimation Diagnostics

In this study the data used is in logged form, and hence changed in to natural logarithms in order to improve its interpretability, and consequentiality to the statistical analysis.

Testing for Stationarity

In order to avoid the possibility of biased results emanating from a likely existence of unit roots in the variables under study, the researchers performed stationarity test using the ADF (Augmented Dickey Fuller) test and PP (Phillips-Perron test unit root) test procedure.

Testing for Cointegration

To perform this, the Johansen-Juselius test procedure was used to test for the possibility of a long-run equilibrium relationship among the variables under examination. This way, the researchers were able to analyze whether the time series under study share a common stochastic drift or not.

Testing for the Causality

The Granger-causality test was also used to investigate direction of causation between stock market performance and economic growth. The outcome from the Granger-causality test was used to determine whether the variables under study can be used to predict each other or not. At the same time, the variables used in the granger-causality test were all assumed to be stationary i.e. **I (0) process.**

Causal Relationship between Stock Market and Economic Growth

In here, the trends of the variables adopted in the study in chart form will be presented. It also contains time series results for model estimation. N'Zue(2006) argues that, time series or panel data are more suited to addressing the relationship between economic growth and stock market performance because their regression is able to capture the specificity of an individual country. Further usefulness is that it allows us to capture the

unique characteristics and point out specific indicators in a given country that impact strongly on economic growth, thereby boosting economic policy.

The tool used to determine the causal relationship between stock market performance and economic growth includes descriptive statistics, the unit root Augmented Dickey Fuller (ADF) test proposed by Dickey and Fuller; Johansen's cointegration test and Granger-causality test proposed by Engle and Granger. However, in order to produce dynamic results, after the researcher finds the variables under study to be cointegrated, we shall conduct a Vector Error Correction Model.

This model is marginally superior to an unrestricted VAR (Vector Error Correction Model) and much better in predicting the short-run as well as the long-run dynamics between stock market performance and economic growth.

Statistical characteristics of all the variables are shown in Table 1. These variables are the gross domestic product (GDP), market capitalization ratio, total value of stocks traded and stock turnover ratio. Statistically, this study employed the Jarque-Bera test to test for normality in the time series data variables used. The researcher set the hypothesis below:

H0: JB=0 (normally distributed)

H1: JB≠0 (not normally distributed)

The Jarque-Bera (JB) test statistic is used to test whether stock market performance and economic growth individually follow the normal probability distribution. The JB test of normality is an asymptotic, or large-sample, test that computes the skewness and kurtosis measures and uses the following test statistic:

JB = n [S2 /6 + (K-3)2 /24]

Where n = sample size, S = skewness coefficient, and K = kurtosis coefficient.

For a normally distributed variable,

S = 0 and K = 3.

Therefore, the JB test of normality is a test of the joint hypothesis that S and K are 0 and 3 respectively. We conclude that all the variables are normally distributed i.e. No evidence against the null hypothesis and the data appears to be consistent with the null hypothesis.

Table 1: Descriptive Statistics

	GDP	MCR	TVT	TOR
Mean	5.48	14.50	4.86	61.76
Median	5.265	13.47	1.755	48.595
Maximum	7.06	36.1	14.25	212.56
Minimum	3.83	1.81	0.32	12.65
SD	0.93	10.71	4.80	48.80
SK	-0.07	0.53	0.86	1.65
Kurtosis	-0.97	-0.95	-0.75	3.19
Jarque-Bera	0.659	0.517	0.323	0.911
Observations	20	20	20	20

Table 1 displays general information about the Gross Domestic Product (GDP), Market Capitalization (MC), Turnover Ratio (TR) and Total Value Traded (TVT) of DSE (Dhaka Stock Exchange). The all stock market indices are positively skewed except GDP. It indicates there is more number of occurrences of all these indices. During the selected period of the analysis i.e, since 1994 all selected indices such as market size and liquidity are showing very high fluctuations and that too at a higher level. The values of Kurtosis show that except MCR, all indices are showing a leptokurtic shapes. The leptokurtic distribution means that the concerned distributions are more "peaked" and have "flatter tails; and hence greater possibility of extreme outcomes, than is the case in the normal distribution. Consistent with the skewness and kurtosis findings, the Jarque-Bera statistic is insignificant at 5%level, thereby we are accepting the hypothesis, so the data in DSE are normally distributed.

Model Specification

Economic growth is expressed as a function of total value traded (TVT), market capitalization ratio (MCR), and turnover ratio (TOR).

Ln GDP = f (Ln MCR, Ln TVT, Ln TOR)

Ln GDP = $\beta 0 + \beta 1$ Ln TVT + $\beta 2$ Ln MCR + $\beta 3$ Ln TOR + μt

All explanatory variables are expected to have positive effects on GDP, i.e., $\beta 1, \beta 2, \beta 3 > 0$. Where, GDP is the Gross Domestic Product, TVT is the Ratio of Total Value Traded, MCR is Market Capitalization Ratio, and TOR is Turnover Ratio, Ln stands for logarithm transformation.

Analysis of Results and Discussion of Findings

Testing for Sationarity

Time-series data are often assumed to be non-stationary and thus it is necessary to perform a pretest to ensure there is a stationary cointegrating relationship among variables in order to avoid the problem of spurious regression. To do so, this study adopted the Augmented Dickey – Fuller

(ADF) test and PP test (Phillips-Perron test unit root) for testing the Stationarity of the time series data. The ADF test and PP test statistic outcome of the time series data for the period, 1994 – 2015 shows that all-time series data are stationary at first difference at 1% level of significance. See table 2 and 3 below:

Table 2: Results of ADF Test without 1st difference

Variables	ADF				
	Test Statistics	1%	5%	10%	P-value
Ln GDP	-3.876	-3.75	-3.0	-2.63	0.5206
Ln MCR	-3.131	-3.75	-3.0	-2.63	0.7451
Ln TVT	-2.572	-3.75	-3.0	-2.63	0.5194
Ln TOR	-2.691	-3.75	-3.0	-2.63	0.0834

Table 3: Results of ADF Test with 1st difference

Variables	ADF				
	Test Statistics	1%	5%	10%	P-value
D. Ln GDP	-3.876	-3.75	-3.0	-2.63	0.0022
D. Ln MCR	-3.131	-3.75	-3.0	-2.63	0.0244
D. Ln TVT	-2.572	-3.75	-3.0	-2.63	0.0989
D. Ln TOR	-2.691	-3.75	-3.0	-2.63	0.0755

The ADF test without 1st difference shows that, P-values are more than 5%, that means, data are non-stationary. But, all time series data have become stationaryat 1st difference at 1% level of significance. The PP test also shows the same result. See the below tables 4 and 5:

Table 4: Results of PP Test without 1st difference

Variables	Phillips-Perron test unit root				
	Test Statistics	1%	5%	10%	P-value
Ln GDP	-2.451	-3.75	-3.0	-2.63	0.128
Ln MCR	-2.407	-3.75	-3.0	-2.63	0.139
Ln TVT	-1.848	-3.75	-3.0	-2.63	0.357
Ln TOR	-2.225	-3.75	-3.0	-2.63	0.197

Table 5: Results of PP Test with 1st difference

Variables	Phillips-Perron test unit root				
	Test Statistics	1%	5%	10%	P-value
D. Ln GDP	-5.652	-3.75	-3.0	-2.63	0.000
D. Ln MCR	-6.419	-3.75	-3.0	-2.63	0.000
D. Ln TVT	-5.219	-3.75	-3.0	-2.63	0.000
D. Ln TOR	-4.630	-3.75	-3.0	-2.63	0.000

This implies that, all the time series data taken from year 1994-2015 are stationary. This means the data are time dependent and does not contain unit root.

Testing for Cointegration

Any equilibrium relationship among a set of variable implies that their stochastic trends must be linked. We seek to determine whether there exists long-run equilibrium relationship among the variables of the study. In doing so, the Johansen cointegration test was used. This test identifies the number of long-run relationship that exists among the sets of integrated variables. The trace statistic tests the null hypothesis that there are at most r cointegrated equations. Therefore, a rejection of the null hypothesis means that there are more than r cointegrating relationships.

Table 6: Johansen test for cointegration

Trend: constant Number of observation=22

Lags=3 Sample: 1994-2015

Hypothesized No. of CE	LL	Eigen value	Trace Statistics	5 % Critical Value	1% Critical Value
None	-7.435823		79.4752*	47.21	54.46
At most 1	16.1127	0.91616	32.3782*	29.68	35.65
At most 2	24.40815	0.58239	15.7873	15.41	20.04
At most 3	30.935768	0.49698	2.7320	3.76	6.65
At most 4	32.301784	.13393			

Table 7: Johansen test for cointegration

Hypothesized No. of CE	LL	Eigen value	Trace Statistics	5 % Critical Value
None	-7.435823		47.0971	27.07
At most 1	16.112705	0.91616	16.5909	20.97
At most 2	24.40815	0.58239	13.0552	14.07
At most 3	30.935768	0.49698	2.7320	3.76
At most 4	32.301784	.13393		

From 6 and 7, the trace statistic of 79.4752 and 32.3782 clearly exceed the critical values of 47.21 and 29.68 respectively at 5 percent confidence interval, hence, we are not accepting the null hypothesis and conclude that there is at least one cointegrating relationship and therefore, a long run equilibrium relationship exists among the variables.

The eigen value test also supported this claim of long run equilibrium relationship among the variables. The maximum eigen value statistics of 47.0971 exceed the critical values of 27.07 at 95 percent confidence level, thus, we are not accepting the null hypothesis of no cointegrating relationships among the variables.

Vector Error Correction Model

Error correction model has been adopted to know, depending on the lags, if there is any short-run relationship among the variables individually. Then, without any lags, overall short-run relationship among the variables has been tested.

Table 7: Error Correction Model

Variable	Coefficient	Standard Error	t-Value	Probability
Cel				
L1	**-0.4588305**	**0.0773186**	**-5.93**	**0.000**
Ln MCR				
L1D	-0.095372	0.0443394	-2.15	0.031
L2D	-0.1490267	0.0387568	-3.85	0.000
Ln TVT				
L1D	0.0796943	0.0771554	1.03	0.302
L2D	-0.0387349	0.0567284	-0.68	0.495
Ln TOR				
L1D	-0.0787114	0.0724109	-1.09	0.277
L2D	0.1701492	0.0581607	2.93	0.003

Table 7 shows that the error correction term has negative sign (-0.4588186) and which is significant, that means that there is long run causal relationship among GDP, MCR, TVT, and TOR. The result of the Error Correction Model estimation above also revealed that both lag 1 and lag 2 value of market capitalization ratio (MCR) are negatively significant at 5% and 1% level of significance which mean that both lag 1 and lag 2 of Ln MCR may be short run causal relationship on Ln GDP and only lag 2 of Turnover ratio (TOR) are significant at 1% level. That means lag 2 of Ln TOR may be short run causal relationship on Ln GDP. On the other hand both lag values of total value traded (TVT) are not significant 5% level of significance. So, we want to check our independent variables (Ln MCR, Ln TVT, Ln TOR) have short run causal relationship on Ln GDP or not.

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. test ([D_lngdp]: LD.lnmcr LD.lntvt LD.lntor)

 ( 1)  [D_lngdp]LD.lnmcr = 0
 ( 2)  [D_lngdp]LD.lntvt = 0
 ( 3)  [D_lngdp]LD.lntor = 0

           chi2(  3) =    2.50
         Prob > chi2 =    0.4762
```

Ho: There is no short run causal relation among GDP and different independent variables (MCR, TVT, TOR)

H1: There is short run causal relation among GDP and different independent variables (MCR, TVT, TOR).

From above result, it shows that LnMCR, LnTVT, and LnTOR cannot explain LnGDP because our p-value is higher than 5% which indicate that we cannot reject null hypothesis, which means there is no short run causal relationship between GDP and those independent variables.

Granger Causality Test

The Granger Causality test examines whether X causes Y is to see how much of the current Y can be explained by past values of X and then to see whether adding lagged values of X can improve the explanation. A variable granger causes another if the X^2-statistic is significant at p-value of 5 percent or less.

H_0: Lagged independent variables (Ln MCR, Ln TVT, Ln TOR) (2 lagged variable) does not cause Ln GDP.

H_1: Lagged independent variables (Ln MCR, Ln TVT, Ln TOR) (2 lagged variable) does cause Ln GDP.

Table 8: Granger Causality Test

Lagged 2				
Dependent variable	Independent variable	χ^2	d.f	P-value
Ln GDP	Ln MCR	8.2994	2	0.016**
Ln GDP	Ln TVT	3.1604	2	0.206
Ln GDP	Ln TOR	1.2964	2	0.523
Ln GDP	ALL	13.42	6	0.037**
Ln MCR	Ln GDP	0.35663	2	0.837
Ln MCR	Ln TVT	0.42023	2	0.810
Ln MCR	Ln TOR	1.8676	2	0.393
Ln MCR	ALL	7.8113	6	0.252
Ln TVT	Ln GDP	7.40	2	0.025**
Ln TVT	Ln MCR	0.30136	2	0.860
Ln TVT	Ln TOR	0.1066	2	0.948
Ln TVT	ALL	9.5418	6	0.145
Ln TOR	Ln GDP	1.9531	2	0.377
Ln TOR	Ln MCR	1.519	2	0.468
Ln TOR	Ln TVT	1.9957	2	0.369
Ln TOR	ALL	10.942	6	0.090**

When we select lagged 2, table 8 says that our null hypothesis is rejected at 5% level of significance because p-value is not higher than 1%. So, lagged Ln MCR, Ln TVT, Ln TOR variables can cause Ln GDP.

H_0: Lagged independent variables (Ln MCR, Ln TVT, Ln TOR) (4 lagged variable) does not cause Ln GDP.

H_1: Lagged independent variables (Ln MCR, Ln TVT, Ln TOR) (4 lagged variable) does cause Ln GDP.

Table 9: Granger Causality Test

Lagged 4				
Equation	Excluded	χ^2	d.f	P-value
Ln GDP	Ln MCR	181.69	4	0.000**
Ln GDP	Ln TVT	47.501	4	0.000**
Ln GDP	Ln TOR	58.806	4	0.000**
Ln GDP	ALL	316.01	12	0.000**
Ln MCR	Ln GDP	234.49	4	0.000**
Ln MCR	Ln TVT	226.89	4	0.000**
Ln MCR	Ln TOR	409.35	4	0.000**
Ln MCR	ALL	1384.90	12	0.000**
Ln TVT	Ln GDP	1396.30	4	0.000**
Ln TVT	Ln MCR	243.51	4	0.000**
Ln TVT	Ln TOR	586.50	4	0.000**
Ln TVT	ALL	2927	12	0.000**
Ln TOR	Ln GDP	983.36	4	0.000**
Ln TOR	Ln MCR	713.11	4	0.000**
Ln TOR	Ln TVT	708.59	4	0.000**
Ln TOR	ALL	3064.4	12	0.000**

When we select lagged 4, table 9 says that our null hypothesis is rejected because p-value is not higher than 1%. So, lagged Ln MCR variable can cause Ln GDP. We can also say that our null hypothesis is not rejected because p-value is higher than 1%. So, lagged Ln TVT variable does not cause Ln GDP.We can say that our null hypothesis is not rejected because p-value is higher than 1%. So, lagged Ln TOR variable does not cause Ln GDP. We can say that our null hypothesis is rejected because p-value is not higher than 5%. So, lagged All independent variable (Ln MCR, Ln TVT, Ln TOR) can cause Ln GDP.

Autocorrelation

We have conducted the autocorrelation test to detect non-randomness in data and to identify an appropriate time series model if the data are not random.

H0: There is no autocorrelation at lag order

H1: There is autocorrelation at lag order

Table 10: Autocorrelation Test

Lag	χ^2	d.f	Probability
1	12.2187	16	0.72879
2	12.2564	16	0.72615

Table 10 shows that all lag values are not significant because the probability values are higher than 5% level. That means our null hypothesis is not rejected, which implies that there is no autocorrelation of lag 1 and lag 2.

Regression Analysis

The regression results reveal that market capitalization ratio, total value traded, turnover ratio as explanatory variables have explained the variations in the economic growth (GDP) of Bangladesh.

Table 11: Regression Analysis

Variable	Coefficient	S.E	t-value	P-value
Constant	2.21819	0.2470257	8.98	0.000
Ln MCR	-0.0989408	0.0462046	-2.14	0.046
Ln TVT	0.2062061	0.0504121	4.09	0.001
Ln TOR	-0.1316895	0.0586714	-2.24	0.038
R^2	0.5441			
R^2 Adjusted	0.4681			
F (3, 18)	7.16	0.0023		

Dependent Variable (Ln GDP)

Ln GDP=2.21819-0.0989408Ln MCR+0.2062061Ln TVT-0.1316895Ln TOR.

(0.00) (0.046) (0.01) (0.038)

Table 11 shows that if market capitalization ratio is increased one units, economic growth (GDP) is decreased 0.0989408 units. Again if total value traded is increased one unit, economic growth (GDP) is increased 0.2062061unit. Again if turnover ratio is increased one unit, economic growth (GDP) is decreased -0.1316895unit.This implies that all independent variable like as market capitalization ratio, total value traded, turnover ratiohave increased this in turn will have a significant impact on economic growth (GDP). However, the result shows that market capitalization is statistically significant to Bangladeshi gross domestic product at 5% level of significance. That means that our null hypothesis is rejected, that implies market capitalization ratio has significant impact on economic growth. On the other hand total value traded is highly significant to Bangladeshi gross domestic product at 1% level of significance. That means that our null hypothesis is rejected, that implies total value traded has significant impact on economic growth. On the other hand turnover ratio is statistically significant to Bangladeshi gross domestic product at 5% level of significance. That means that our null hypothesis is rejected, that implies turnover ratio has significant impact on economic growth.

Policy Implications and Conclusion

The core objective of this research was to analyze the relationship between stock market performance and economic growth of Bangladesh. The periods taken for study were from year 1994 to year 2015. During this period of study the capital market of Bangladesh have gone through several ups and

downs, i.e. stock market crash of 1996 and 2010, establishment and incorporation of CDBL in 1998, IPO offering of Grameenphone in 2007, stock market reform etc. From the study, it has been found that, there is a long run relationship between stock market development and economic growth in Bangladesh.

Given the empirical results reported above, the following policy implications are drawn. At first, since capital market performance is represented by market capitalization ratio, total value traded and turnover ratio have statistical impact either negative or positive, on economic growth.As the study revealed that the stock market capitalization and economic growth has a long-run causal relationship, stock market regulators should address policy issues to boost up the investor's confidence by offering better policy formulation.

Secondly, total value traded has contributed positively to the economy. This implies that, it has a significant impact on economic growth in Bangladesh. This in turn increases the amount of trade made in a year and equally increases the level of funds traded in that period. This also increases the number of securities traded and invariably improves the economic growth of the country.

Ultimately, this translates into the number of turnover of securities which in turn contributes to the economic growth of Bangladesh. Hence, the stock market of Bangladesh need to improve its operational activities to compete with the other capital markets worldwide.

The study recommends further improvement of the stock market by eradicating the barriers to growth and development of the stock exchanges. Thus, it will help to increase the awareness among investors and inspire them to go for more investment. In addition, more companies, including small and medium enterprises should get encouragement to come forward and get enlisted in the stock market to allow access of more investible funds from the people, which in turn will help to boost up the entire financial system as well as economic growth of Bangladesh.

Scope for further research

Similar study can be conducted incorporating other variables rather than the ones used in this study. Further work may also be done to find out the impact of economic growth on stock market performance. Cross-national study involving other developing countries on similar issue can also be conducted in future.

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