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Does Exchange Rate Influence Trade Balance in Nigeria (1986-2022)?

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ABSTRACT: Due to trade balance disparities and the recession in numerous African nations, exchange rate discourse has recently gained prominence throughout the continent. Because of their high reliance on imports and limited production capacity, developing nations find it challenging to create enough foreign money to fund imports, which means that the exchange rate has an impact on their trade balance. Sequel to this, this paper examines the effect of exchange rate on trade balance in Nigeria between 1986 and 2021. Using ARDL methodologies, this study shows that exchange rates have a significant impact on trade balance, highlighting its critical role in the international finance of the country. The study recommends A policy that aims to depreciate the Nigerian exchange rate to improve the TrB can be advocated because the results indicate that a depreciation of the currency may have a positive impact on the TrB over the long term. However, this recommendation to devalue the Naira shouldn't be so drastic as to negatively impact the importation of capital goods that are vital to the expansion and development of the Nigerian economy.

Keywords: Exchange Rate, Economic Growth, Trade Balance, ARDL.

INTRODUCTION

Due to trade balance disparities and the recession in numerous African nations, exchange rate discourse has recently gained prominence throughout the continent (Nicita, 2013). Because of their high reliance on imports and limited production capacity, developing nations find it challenging to create enough foreign money to fund imports, which means that the exchange rate has an impact on their trade balance. In particular, the decline in their foreign reserves and enormous import costs have caused many large African countries, like Nigeria, to enter a recession (Adekunle et al., 2024; Gbadebo et al., 2024Barkat et al., 2024; Ben Doudou et al., 2022; Mehtiyev et al., 2021; Wicesa et al., 2021)

As the scenario reports indicate, the currency rate also presents a huge problem with Africa's trade balance. Furthermore, African nations have been dealing with significant currency rate swings since the global financial crisis of 2008–2009 (Adekunle et al., 2023; Adewuyi et al., 2021; Mesagan et al.,

2021; Udoh & Udeaja, 2019; Bekun et al., 2023). Macroeconomic imbalances were produced in several African nations between 2015 and 2016 by shocks to commodity prices and the depreciation of their corresponding exchange rates, according to the African Development Bank (AfDB, 2018). Africa's inflation rate thus increased dramatically from roughly 3.5% in 2015 to 5.4% in 2016. The study's argument is that commerce and economic growth are always impacted by chronic exchange rate depreciation (Adelowokan et al., 2015; Aderemi et al., 2019; Aliyu et al., 2009; Aliyu, 2010, 2011; Azeez et al., 2012; Benson & Victor, 2012).

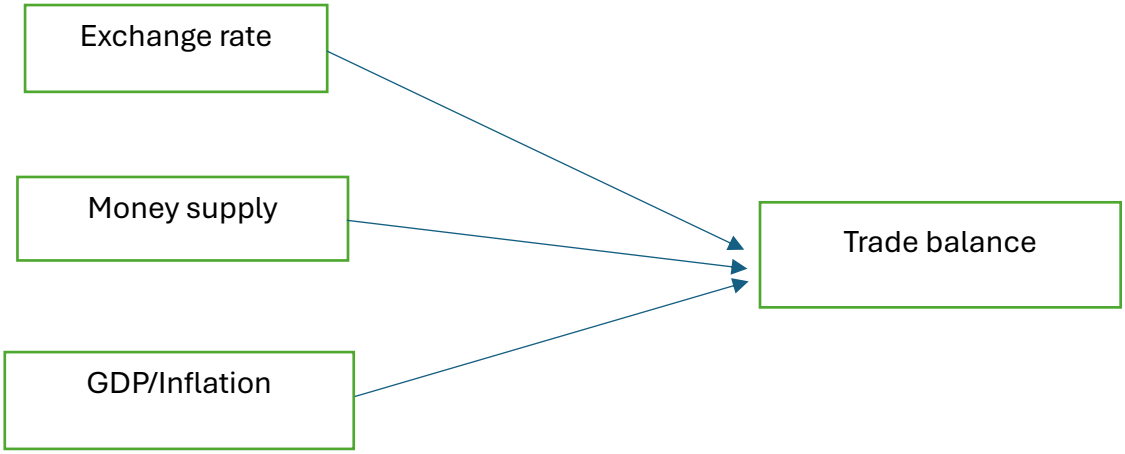
A regime of variable currency rates has been established by several countries, including Nigeria. Because of Nigeria's present flexible exchange rate structure, supply and demand factors can control the currency rate. Such a mechanism can significantly alter the value of Naira given the volume of international market activity (Nguse et al., 2021). This makes it difficult to predict the path to exchange rate stability and, in turn, how it will affect the trade balance. Many academics became interested in the connection amid TrB and EXR implications because of this (Hassan et al., 2023). Given the circumstances in Nigeria, trade direction is determined by currency movement. The nation's foreign reserve, for example, dropped from $42.9 billion in 2013 to $33.9 billion in 2014, then to $28.8 billion in 2015 and $26.1 billion in 2016, before reaching $39.2 billion in 2019.

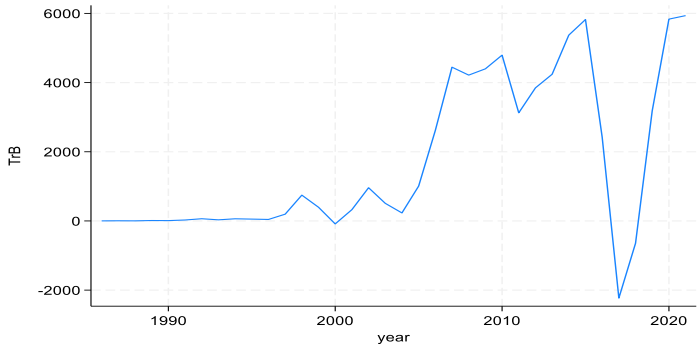
The question of how much currency rate volatility—that is, appreciation and depreciation—affects Nigeria's trade balance and economic growth emerges. Several empirical arguments have been made regarding the exchange rate system that countries can implement to improve their trade balance. According to (Hamilton, 1996, 2003; Mesagan, 2022; Mesagan et al., 2022; Truong & Van Vo, 2023) exchange rates that are extremely volatile and unpredictable can negatively impact the performance of the trade balance due to price and output, which can worsen total export and exacerbate external competitiveness. Furthermore, ongoing exchange rate appreciation and depreciation may cause businesses to lose money and lessen the advantages of international trade (Kang & Dagli, 2018). The reasoning is that fluctuations in the local currency could have a detrimental effect on the amount of business (Alessandria & Choi, 2021; Bosupeng et al., 2024; Dogru et al., 2019; Mesagan et al., 2022; Truong & Van Vo, 2023). Examining studies conducted in other African nations, Asiamah et al. (2019) verified that fluctuations in Ghana's local currency have a major impact on the amount of foreign investment that enters the country. Because the impact of exchange rates on commerce has received less attention in emerging countries, especially in Africa, this study is crucial. This study uses a sample of eight of the most important African economies, based on data accessible from 1986 to 2021.

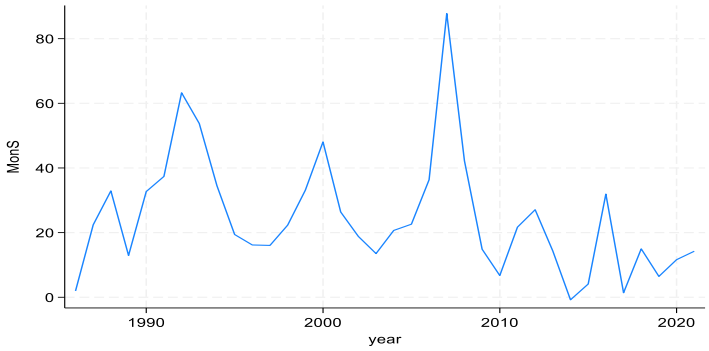
We analyze the data in this study using the ARDL cointegration approach, which was created by Pesaran and Shin (1999). But because it allows the variable of interest (trade balance and exchange rate) to be broken down into its appreciation and depreciation components, the ARDL is more suitable. For instance, Mokgokong & Choga, 2024 and Ahmed et al. (2023) utilized the method for exchange rate pass-through, and Tunaer Vural, 2016 used it to calculate changes in home prices. Additionally, Arize et al., 2017 utilized it to determine anomalous transfer of prices in energy markets, while Verheyen (2013) utilised it to analyze the factors that influence multilateral exports. Additionally, it has been used in related studies by Adewuyi et al. (2021), Rafiq, (2013), Bahmani-Oskooee et al.

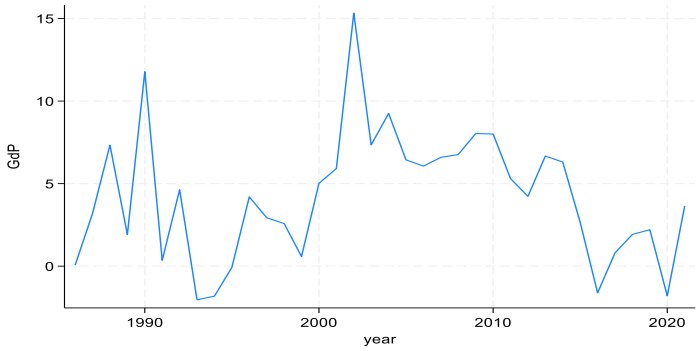
(2021), Elahi et al., 2016. Determining how the exchange rate affects Nigeria's trade balance is therefore crucial.

Based on the above analysis, the research model framework is as follows:









METHOD

To compute the trade balance for this study, the ratio of merchandise imports to merchandise exports is used, the official exchange rate index is used to assess the exchange rate, MonS stands for the money supply. Curiously, this study presents trade balance as a logical variable that captures the manifestation of most aggregate components, including GDP and exchange rate. These factors are incorporated into the economic growth statistic to avoid possible endogeneity and multicollinearity issues. To the best of the author's knowledge, only the explanatory factors necessary for establishing trade balance were included in the study.

TrB = *f*(ExcR, MonS, GDP, InF) 1

Definition of Variables

TrB = Trade Balance (merchandise imports to merchandise exports)

ExcR = Exchange Rate (official exchange rate index)

MonS = Money Supply (broad money growth as %)

GDP = Gross Domestic Product (gross domestic product as annual growth)

InF = Inflation Rate (inflation measured over annual rate)

$$\mathrm{TrB} = \emptyset_0 + \emptyset_1 \mathrm{ExcR} + \emptyset_2 \mathrm{MonS} + \emptyset_3 \mathrm{GDP} + \emptyset_4 \mathrm{InF} + \mu \quad 2$$

$$\Delta TrB = \emptyset_0 + \sum_{s=1}^{J} . \emptyset_{1s} \Delta TrB_{.t-n} + \sum_{s=1}^{J} . \emptyset_{2s} \Delta ExcR_{.t-n} + \sum_{s=0}^{J} . \emptyset_{3s} \Delta MonS_{.t-n} + \sum_{s=0}^{J} . \emptyset_{4s} \Delta GDP_{.t-n} + \sum_{s=0}^{J} . \emptyset_{5s} \Delta InF_{.t-n} + \partial_1 TrB_{t-1} + \partial_2 ExcR_{t-1} + \partial_3 MonS_{t-1} + \partial_4 GDP_{t-1} + \partial_5 InF_{t-1} + \mu \quad 3$$

$$\Delta TrB = \emptyset_0 + \sum_{s=1}^{J} . \emptyset_{1s} \Delta TrB_{.t-n} + \sum_{s=1}^{J} . \emptyset_{2s} \Delta ExcR_{.t-n} + \sum_{s=0}^{J} . \emptyset_{3s} \Delta MonS_{.t-n} + \sum_{m=0}^{J} . \emptyset_{4m} \Delta GDP_{.t-n} + \sum_{m=0}^{J} . \emptyset_{5m} \Delta \text{InF}_{.t-n} + \partial_1 TrB_{t-1} + \partial_2 ExcR_{t-1} + \partial_3 MonS_{t-1} + \partial_4 GDP_{t-1} + \partial_5 InF_{t-1} + \in ECT_{t-1} + \in_t \quad 4$$

RESULT AND DISCUSSION

Cointegration Evaluation Using Bound Testing Approach in 1986-2021

Table 1. Cointegration Evaluation Using Bound Testing Approach in 1986-2021

Test Statistic	Value	K
F-statistic	5.908983	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Cointegration among our variables of interest is indicated in Table 1 above. It is basically evident that the F-statistic (5.48) is higher than both the lower (1.97) and upper (3.12) bounds. As a result, we may move forward with our ARDL analysis, both short- and long-term.

ARDL Long Run Output for the Study in 1986-2021

Table 2. ARDL Long Run Output for the Study in 1986-2021

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
TRB(-1)	1.275076	0.225778	5.647482	0.0000
TRB(-2)	-0.750040	0.401749	-1.866938	0.0416
TRB(-3)	-0.090560	0.435167	-0.208104	0.8379
TRB(-4)	0.389027	0.297107	1.309386	0.2101
EXR	5.754415	6.145021	0.936435	0.0539
EXR(-1)	-2.681356	7.386721	-0.362997	0.7217
EXR(-2)	-5.687846	7.422384	-0.766310	0.4554
EXR(-3)	9.445244	7.444728	1.268716	0.2239
EXR(-4)	-11.96167	6.197505	-1.930078	0.0527
MONS	13.91276	15.13362	0.919328	0.3725
MONS(-1)	-24.59505	15.72140	-1.564431	0.1386
MONS(-2)	30.36494	16.32847	1.859632	0.0327

MONS(-3)	0.734778	17.27620	0.042531	0.9666
MONS(-4)	-29.61444	14.82027	-1.998239	0.0442
GDPC	88.61160	101.9667	0.869025	0.3985
INF	-16.40730	25.03302	-0.655426	0.0221
C	1170.287	1603.141	0.729996	0.4766

The long-term outcomes are displayed in Table 2. The exchange rate is statistically significant and has a 5% long-term probability. This indicates that an increase in the exchange rate has a major beneficial impact on the trade balance (TrB) over the long term. This implies that a 5.75% rise in the TrB will occur over time with a 1% increase in the EXR. In the agricultural market, exports become more expensive and imports less expensive when there is a positive shock to the domestic currency exchange rate. The demand for domestic goods will therefore decline due to competition from foreign markets, which will cut domestic output and prices. The findings are consistent with those of Matlasedi (2016), who assessed the effect of the effective exchange rate on the TrB in South Africa and found that the EXR has a negative long-term impact on the TrB in South Africa, and Schaling et al. (2014), who assessed the exchange rate and the TrB in South Africa and found that an increase in the real exchange rate eventually causes the trade balance to decline. This outcome is also in line with economic theory, particularly the elastic approach to a balance of payments adjustment, which holds that increased import prices following a currency depreciation led to lower demand and lower import volume, which improves the TrB because of the price effect of imports. Imports become more affordable when the value of Naira increases, which means that more people would likely buy them, which will affect the TrB. Furthermore, with currency depreciation, exports become more affordable from the perspective of consumption in the foreign nation, which increases demand for exports. Exports have a pricing effect that raises both their volume and value in terms of the home currency, which raises the export TrB.

As a result, an increase in the money supply (MonS) may be beneficial since the country needs fewer exports to buy the same number of imports, and it may also have a positive effect on domestic cost-push inflation because the increase is suggestive of lowering import prices to export prices. The money supply (MonS) has a positive effect on TrB and is statistically significant, meaning that in the long run, an increase in MonS has a significant long-term positive effect on TrB. In other words, a 1% increase in the MonS will significantly result in a 30.36 unit increase in the TrB. The findings are consistent with those of Dongfack (2019), who assessed how the EXR movement affected TrB in Ethiopia. After that, it was shown that MonS had a short-term favorable effect on Ethiopia's TrB. The effect of the actual EXR on the TrB in South Africa was assessed by Matlasedi (2016). An increase in MonS was found to have a long-term favorable effect on the TrB in South Africa. There is a statistically significant negative impact from the inflation rate (INF). This indicates that a decline in the INF has a substantial, long-term detrimental impact on the TrB. In other words, over time, a 1% change in the INF will substantially raise the TrB by 16.4%. If INF rises quickly enough, production may rise as well, reducing the nation's unemployment rate. The findings are consistent with those of Abbas (2020), who assessed Iran's money supply and TrB. A timely expansion of the money supply has been found to enhance the trade balance. Likewise, Adeyemi et al. (2020) assessed how money demand affected

TrB in Nigeria. Research has shown that the trade balance improves when money supply and demand are equal. This finding concluded that money demand had a significant impact on the trade balance, increased the output of goods, and stimulated investment, which led to enhanced growth. A country's currency depreciates proportionately when its money supply is continuously expanded, which may result in cheap exports because the currency has lost value. When the currency depreciates, it increases exports while decreasing imports because they become more expensive. This finding is also consistent with economic theory, specifically the elasticities approach to a balance of payments adjustment, which holds that after a currency depreciation, import prices rise, causing decreased demand and a decrease in import volume, which improves the import trade balance because of the price effect of imports.

ARDL Short Run Output for the Study in 1986-2021

Table 3. ARDL Short Run Output for the Study in 1986-2021

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TRB(-1))	0.451573	0.254872	1.771761	0.0967
D(TRB(-2))	-0.298467	0.219918	-1.357172	0.1948
D(TRB(-3))	-0.389027	0.297107	-1.309386	0.2101
D(EXR)	5.754415	6.145021	0.936435	0.3639
D(EXR(-1))	5.687846	7.422384	0.766310	0.4554
D(EXR(-2))	-9.445244	7.444728	-1.268716	0.2239
D(EXR(-3))	11.961668	6.197505	1.930078	0.0527
D(MONS)	13.912762	15.133625	0.919328	0.3725
D(MONS(-1))	-30.364940	16.328470	-1.859632	0.0827
D(MONS(-2))	-0.734778	17.276199	-0.042531	0.9666
D(MONS(-3))	29.614439	14.820272	1.998239	0.0542
D(GDPC)	88.611602	101.966658	0.869025	0.3985
D(INF)	-16.407305	25.033024	-0.655426	0.5221
CointEq(-1)	-0.876497	0.155520	-5.635911	0.0242

If the variables are out of equilibrium in the short period, they will eventually drift back to the equilibrium point, as Table 3 demonstrates that the error correction term (ECT) is considerable and negative in the near term. With an ECT coefficient of -0.87, the model will return to equilibrium at a rate of -87 percent. The EXR is statistically significant and has a beneficial short-term impact. This indicates that an increase in the EXR has a major favorable impact on the TrB in the long run. This implies that over time, a 1% rise in the EXR will substantially raise the TrB by +11.9%. The findings are consistent with those of Asiamah et al. (2019), who used data from 1968 to 2019 to assess if currency rate depreciation improves Pakistan's trade balance. Additionally, Khatoon et al. (2022) looked at the short- and long-term connections between the trade balance and currency rate fluctuations. Additionally, it was shown that the J-curve phenomena apply to Bangladesh.

The results are consistent with the findings of Alley (2014), who assessed the effect of EXR movement on TrB in Ethiopia and found that MonS have a positive impact on the TrB of Ethiopia in the short term. The MonS has positive effects and is statistically significant, meaning that an increase in the MonS has a significant short-term positive effect on the TrB.

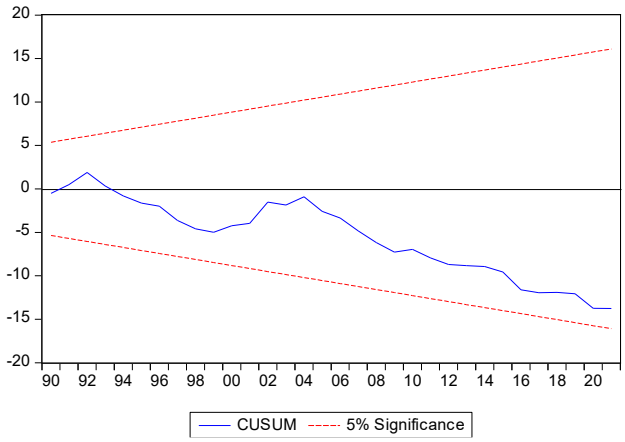


Figure 3. CUSUM Stability Test (2024)

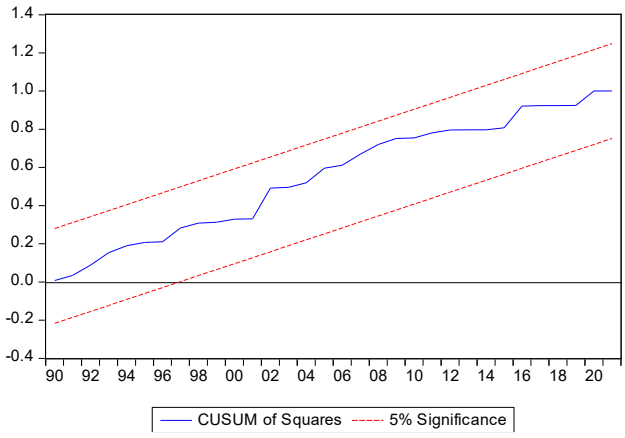


Figure 3. CUSUM of Squares Stability Test (2024)

Serial Correlation Test for the study in 1986-2021

Table 4. Serial Correlation Test for the Study in 1986-2021

F-statistic	0.308144	Prob. F(2,13)	0.7400
Obs*R-squared	1.448353	Prob. Chi-Square(2)	0.4847

Heteroskedasticity Test for the study in 1986-2021

Table 5. Heteroskedasticity Test for the Study in 1986-2021

Heteroskedasticity Test: ARCH			
F-statistic	0.051064	Prob. F(1,29)	0.8228
Obs*R-squared	0.054489	Prob. Chi-Square(1)	0.8154

We are unable to reject the null hypothesis since this suggests that the variable in the model is regularly distributed. Likewise, the Breusch-Godfrey Serial Correlation LM Test was used to determine whether a serial correlation was present. Since the likelihood esteem is more prominent than the 5% importance level, the invalid speculation, which expresses that there is no sequential connection, can't be discredited. Also, the result of the test for heteroscedasticity. We cannot dismiss the invalid speculation since this recommends that the variable in the model is routinely dispersed. Similarly, the Breusch-Godfrey Sequential Connection LM Test was utilized to decide if a sequential relationship was available. Since the likelihood esteem is more prominent than the 5% importance level, the invalid speculation, which expresses that there is no sequential connection, can't be refuted. Also, the result of the test for heteroscedasticity.

CONCLUSION

This study's main objective was to examine the short- and long-term effects of exchange rates on Nigeria's trade balance. Using the Autoregressive Distributive Lag (ARDL) approach, the estimated ARDL results showed that EXR has positive significant effects on TrB in Nigeria in the short term, indicating that the EXR has a significant effect on the TrB in Nigeria in the short term. In the long term, the results showed an adverse significant connection between the TrB and the EXR, indicating that EXR has an enormous adverse effect on Nigeria's trade imbalance over the long term, confirming that the J-curve is valid in this instance.

The results of the study have consequences for policy. A policy that aims to depreciate the Nigerian exchange rate to improve the TrB can be advocated because the results indicate that a depreciation of the currency may have a positive impact on the TrB over the long term. However, this recommendation to devalue the Naira shouldn't be so drastic as to negatively impact the importation of capital goods that are vital to the expansion and development of the Nigerian economy.

The government must put policies in place to increase output and encourage investment in industries focused on exports. Additionally, the results showed that raising MonS enhances TrB. The TrB improves when the money supply and demand are equal, and productivity can rise in response to a sharp rise in MonS. To improve the trade balance, the monetary authorities may adopt an expansionary monetary policy by gradually raising the MonS. This would enable companies to obtain loans to grow their enterprises and boost export production, which will improve the TrB. To avoid devaluing the currency, this suggestion to implement an expansionary monetary policy should not be too forceful.

Furthermore, it's crucial to consider the potential implications of government regulations and policies, as well as the broader economic impact both locally and globally. Lal et al. (2023) With exchange rate volatility, countries must adapt and innovate to maintain trade balance surplus. This necessitates collaborative efforts between government bodies, businesses, and financial institutions. By taking a proactive approach and addressing challenges head on, it's possible to mitigate risks and ensure a smooth transition to trade openness (Kim Lien et al., 2022). Though future research can focus on exchange rate and trade balance in Sub Saharan Africa (SSA) this will broaden the understanding of the multifaceted impacts to navigate the changing landscape of trade balance, ultimately fostering a more inclusive and resilient economy

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