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## Araştırma Makalesi • Research Article

# Relationship Between Bank Profitability and Balance Sheet Structure: Sample of Türkiye\*

## Relationship Between Bank Profitability and Balance Sheet Structure: Sample of Türkiye

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### ÖZ

Bankacılık sektörünün güçlü olması, ülke ekonomilerinin de güçlü olması anlamını taşımaktadır. Bankalar da tıpkı diğer işletmeler gibi kâr amacı gütmektedirler Dolayısıyla banka karlılığı üzerinde etkili olan faktörlerin tespiti de bu anlamda önem taşımaktadır. Bu çalışmanın amacı bankaların bilanço yapısına ilişkin oranların karlılık üzerindeki etkisini incelemektir. Araştırmada Türkiye Bankalar Birliği'ne (TBB) üye olan ve Türkiye'de faaliyet gösteren 14 bankanın 2005-2022 yıllarına ait verilerinden yararlanılmıştır. Çalışmada bağımlı değişken olarak muhasebe temelli performans göstergesi varlık karlılığı (ROA) ve özsermaye karlılığı (ROE) oranları kullanılmıştır. Bağımsız değişkenler ise toplam mevduat/toplam varlıklar oranı ile alınan krediler/toplam varlıklar oranıdır. Ampirik analizlerde Panel Düzeltilmiş Standart Hataları Yöntemi (PCSE- Panel Corrected Standard Errors) kullanılmıştır. Yapılan analiz sonucunda bilanço yapısı oranları ile ROA ve ROE arasında pozitif ve istatistiksel olarak anlamlı bir ilişki tespit edilmiştir. Bir başka deyişle varlıklar içerisindeki mevduatların ve alınan kredilerin artması varlık başına ve özsermaye başına karlılığı artırmaktadır.

### ABSTRACT

A strong banking sector means that the country's economy is also strong. Banks, like other businesses, aim to make a profit. Therefore, determining the factors affecting bank profitability is important in this sense. The aim of this study is to examine the effect of ratios related to the balance sheet structure of banks on profitability. In the research, data for the years 2005-2022 of 14 banks operating in Türkiye, which are members of The Banks Association of Türkiye (TBB), were used. In the study, accounting-based performance indicators return on assets (ROA) and return on equity (ROE) ratios were used as dependent variables. The independent variables are the total deposits/total assets ratio and the loans received/total assets ratio. Panel Corrected Standard Errors Method (PCSE) was used in empirical analyses. As a result of the analysis, a positive and statistically significant relationship was detected between balance sheet structure ratios and ROA, ROE. In other words, increasing deposits and loans within assets increases profitability per asset and per equity capital.

## 1. Introduction

The oldest institution in history bearing the name of a bank is the Bank of Barcelona, which was founded in 1401, and the first state bank was established in Venice in 1587. With the emergence of the concept of capitalism in the world towards the end of the 19th century; Banks specialize in investment and business banking by providing medium and long-term loans (Idiab et al., 2011, 1025- 1026).

The working areas of banks today are quite diversified. This diversity in the sector and expansion in transactions have not changed the intermediary function of banks in collecting deposits and granting loans, which are their basic functions, but on the contrary, they have improved them. In this regard, while the functions of banks are shaped on the basis of the existence of risk and insecurity in the financial markets and the intermediary role in the credit market, the bank is in a position to specialize in taking and re-granting loans

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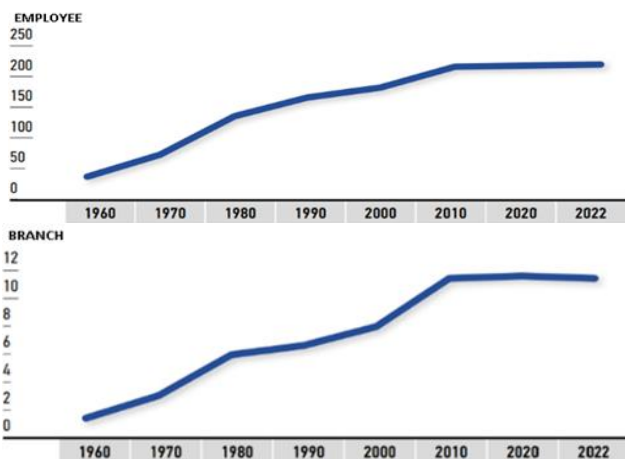
between the ultimate debtor and creditor and playing the role of intermediary in this market. In this respect, we can divide the basic functions of banks into three: producing services, transferring resources and creating purchasing power. The organizational structures of banks, the products and services they offer, also vary depending on the type of bank. The functions of banks are at the economic level in the macro sense and at the business level in the micro sense. With their financial intermediary function between markets, banks can be considered as a micro-level commercial business (Altay, 2016, 7).

Since non-bank brokerage firms are just developing in Turkey, it is known that banks form the basis of the financial system and play an important role in the functioning of the economy, the evaluation of society's savings and their allocation as loans to their areas of use (Eriş, 2019, 307).

The aim of this study is to examine the effect of ratios related to the balance sheet structure of banks on profitability. In the research, data for the years 2005-2022 of 14 banks operating in Turkey, which are members of the Banks Association of Türkiye (TBB), were used. In the study, accounting-based performance indicators return on assets (ROA) and return on equity (ROE) ratios were used as dependent variables. The independent variables are the total deposits/total assets ratio and the loans received/total assets ratio. This study, which covers a 17-year period of banks and uses only balance sheet structure variables, will be the first. In this sense, it is expected to contribute to the literature.

## 2. Banking Sector in Turkey

Looking at the general outlook of the Turkish banking sector; as of December 2022, 57 banks operate in the sector with 11,034 branches and 206,253 employees.



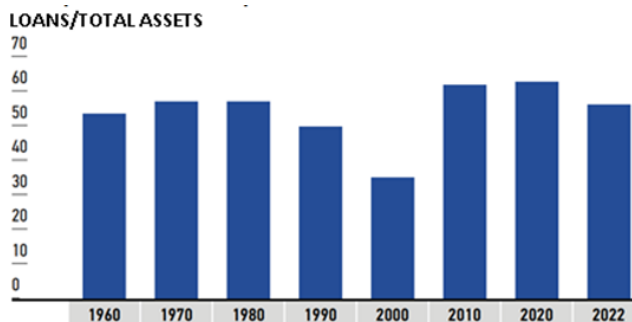
**Figure 1.** Number of Branches and Employees of Banks

**Source:** The Banks Association of Türkiye (BAT)

According to Figure 1 below, while there has been a visible increase in both the number of employees and the number of branches since 2000, there has been no significant change after 2010. The total assets of the banking sector increased

by 56% in the December 2022 period compared to the end of 2021, reaching 14.347 billion TL. Loans increased by a total of 2,680 billion TL compared to the end of 2021, reaching 7,581 billion TL as of December 2022.

Figure 2 shows the share of loans in total assets by years.



**Figure 2.** Share of Loans in Total Assets

**Source:** The Banks Association of Türkiye (BAT)

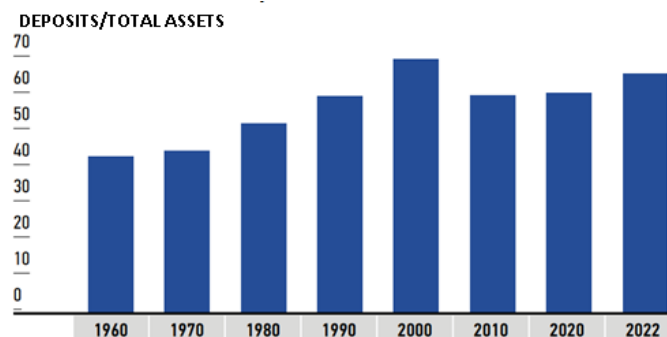
As of the end of 2022, the share of loans in total assets was 53%. While 53% of the stock loan amount of the Turkish banking sector consists of commercial and corporate loans, 20% belongs to consumer loans and credit cards. 67% of the total loan amount is in Turkish Lira and 37% is in foreign currency.

In the said period, the share of total deposits in total assets was 62%. According to Figure 3 below, the highest deposit/total assets ratio was in 2000.

**Figure 3.** Share of Deposits in Total Assets

**Source:** The Banks Association of Türkiye (BAT)

According to Banking Regulation and Supervision Agency (BRSA) data, total non-performing receivables of the



Turkish banking sector as of December 2022 increased by 2% compared to the end of 2021, reaching 163 billion TL. While 46% of this amount belongs to commercial loans, 36% to SME loans, 0.4% belongs to housing loans. The NPL conversion rate of the sector was 2.11%. The capital adequacy ratio of the Turkish banking sector is at 19.46% as of December 2022, well above the legal and target ratio. The legal leverage ratio of the sector was 7.8% (BRSA, 2022).

Total assets of the banking sector increased by 64% in December 2023 compared to the end of 2022, reaching 23.5 trillion TL. Total loans reached 11.9 trillion TL as of

December 2023. The share of loans in total assets was 51%. While 45% of the stock loan amount of the Turkish banking sector consists of corporate loans, 28% belongs to SME loans and 27% belongs to individual loans. The total deposits collected by banks with 168 million accounts, 53 thousand ATMs and 2 million POS devices are 14.9 trillion TL. 8.7 trillion TL of this amount belongs to savings deposits, and 6.2 trillion TL belongs to commercial and other deposits. The capital adequacy standard ratio of the Turkish banking sector was realized at 19% as of December

2023 (BAT, 2024).

There is a significant difference in scale between the average of European Union (EU) countries and Türkiye in terms of the banking sector. However, looking at Table 1, it can be said that this gap is closing in the long term. While the banking sector in Turkey had a size of 59 percent of GDP in 2002; In the twenty-year period, this rate reached 100 percent. This rate is around 300 percent in the EU.

**Table 1.** EU-Türkiye Comparison in Terms of Selected Banking Indicators

Indicator	Country	2002	2010	2020	2022
Asset/GDP	EU	258	346	362	274
	TÜRKİYE	59	87	121	96
Loan/Asset	EU	59	53	59	62
	TÜRKİYE	30	56	62	53
Deposits/GDP	EU	130	166	203	159
	TÜRKİYE	38	53	69	59

**Source:** The Banks Association of Türkiye (BAT)

Likewise, according to Table 1, the share of loans in assets in terms of balance sheet structure increased by over 20 points in the 2002-2022 period in Turkey, approaching the EU averages. Deposits are well behind the EU average. Banking sector indicators per capita show the convergence between Türkiye and the EU more clearly since 2002. While EU banking sector assets per capita were 28 times that of Turkey in 2002, they decreased to 11 times in 2022.

### 3. Literature Review

Banks, which are the main actors of the financial sector, are very important for the country's economy. Therefore, it is possible to find many studies in the literature on the

factors affecting bank profitability. Some of the highlights of these studies are given below.

Lopez-Espinosa et al. (2011) investigated whether the accounting standards applied in different countries have an effect on the net interest margin of banks. As a result of the analysis conducted on a sample of 15 countries, it was determined that the accounting standards to which banks are subject had an impact on the net interest margin. In addition, the net interest margins of developed countries were lower than those of developing countries.

In another study conducted by Gounder and Sharma (2012) on banks in the Fiji Islands, positive significant relationships were found between credit risk, operating expenses, market power, implicit interest payments, Lerner index and net interest margin. A negative and significant relationship was found between management quality and liquidity risk and net interest margin.

Doğan and Yıldız (2013) investigated the effect of board

size on bank performance on the data of 12 banks in the Istanbul Stock Exchange (ISE) for the period 2005-2010. While conducting the analysis of the research, regression and correlation methods were mostly used. The findings obtained from the analyzes reveal negative and statistically significant results between accounting-based performance indicators such as Return on Assets (ROA) and Return on Equity (ROE) and the size of the bank's board of directors.

Gunter et al. (2013) on banks operating in Austria, it was stated that there is a significant relationship between bank-based variables such as net wage income, personnel expenses, other operating expenses and balance sheet structure and net interest margin. In addition, it has been determined that macroeconomic variables such as GNP growth, GNP deflator and short and long-term interest rates affect the net interest margin.

When the results obtained from the study conducted by Hussain (2014) in Pakistan were examined, it was observed that operating expenses, inflation, market share, sectoral growth, depreciation expenses, bank size, liquidity variables and market capitalization were the determinants of the net interest margin. Additionally, no significant relationship was found between GNP, bank ownership structure and credit market development variables and net interest margin.

Doğan (2015) aimed to compare the financial performances of participation banks operating in the Banking Sector in Turkey between 2012 and 2014 by using the Gray Relational Analysis (GRA) method. As a result of the GRA method, "Albaraka Türk" ranked first in terms of financial performance. Another finding obtained as a result of the research is that the financial performance of a participation bank with a high "Return on Assets" may also be high.

Entrop et al. (2015) examined the factors affecting the net interest margin in banks in Germany. It has been concluded that there is a significant relationship between market power, inflation, GDP, interest risk, operating expenses, periodic difference between assets and liabilities and LIBOR volatility variables and net interest margin.

Alsu (2017) examined how changes in the capital structure of businesses over the years affect the profitability of the business. According to the results of panel regression analysis, it has been determined that there is a positive significant relationship between greater equity preference and profitability. The study found that there is no statistically significant relationship between long-term foreign resource preference and profitability. On the other hand, it has been determined that there is a positive significant relationship between the choice of legal reserve as an auto financing source and profitability.

In his study on Bangladesh banks, Chowdhury (2018) found that sustainability performance had a positive and significant effect on ROA and ROE. He also stated that banks investing in green projects earn more profits.

Sinitin and Socol (2020) conducted a panel data analysis using data from 17 banks operating in 13 member countries of the European Union for the period 2000-2017. The findings showed that economic growth and inflation have a positive impact on ROE and ROA.

Horobet et al. (2021) tried to identify the factors affecting bank profitability based on the data of banks operating in different countries in Europe for the period 2009-2018. For this purpose, in their study by applying the two-stage generalized moments approach, they concluded that the concentration rate of the banking market has a negative effect on ROE and ROA.

In his study, Yaman (2021) examined the financial data of 20 banks operating in Turkey between 2009 and 2018 with panel data analysis. According to the results, it has been observed that the variables of financial assets, capital adequacy, deposit items, loan investments, ability to pay short-term debts and converting expenses into income have a positive effect on profitability. On the other hand, liquid assets, loans received and employee expenses have a negative impact on profitability.

Karadžić and Đalović (2021) examined which factors and with what intensity affect the profitability of large banks in Europe. The study used fairly balanced panel models with annual data on 47 large banks from 14 European countries during the 2013-2018 period. As a result of the research, GDP growth rate, inflation rate and market concentration have a positive effect on profitability, while the membership of the European Union has a negative impact on profit, meaning that banks with headquarters outside the EU are more profitable.

Bumin (2023) used data from 18 deposit banks for the period 2012-2022 in his study to determine the factors affecting the

profitability of deposit banks operating in Turkey. As a result of the study, a positive and statistically significant relationship was found between capital ratio and non-interest income and ROA and ROE. Likewise, there is a positive and statistically significant relationship between deposit share and capital ratio and net interest margin.

Doğan ve Yıldız (2023) aim to identify the internal and external factors that affect the profitability of banks operating in Turkey. For this purpose, the study used data from 23 public, private, and foreign banks, covering the period from 2007 to 2020. Two dependent variables were used as the profitability indicators of banks, namely, the Return on Equity (ROE) and the Return on Assets (ROA). In order to increase the reliability of the models developed during the study, Dynamic Generalized Method of Moments (GMM) and Fixed Effect Model (FEM) were applied. Results of the analysis indicate a positive and statistically significant relation between inflation rate and GDP growth rate, and ROA and ROE. According to the results of GMM, there was a positive relation between ROA and ROE.

In his study to determine the factors affecting the profitability of the Turkish banking sector, Sezal (2024) tried to determine whether there is any causality between the variables by using the 2011-2022 period data of the banks using the Toda Yamamoto test. According to the results of the study, it was determined that there is a causal relationship between ROA and the "Fee, Commission and Banking Services Income/Average Total Assets" and "Operating Expenses/Average Total Assets" ratios.

#### 4. Methodology

In this part of the study, information about the study's data set and sample, as well as dependent and independent variables, is given, and then tests for stationarity and cross-sectional dependence are conducted, and the results of the PCSE estimator are included. PCSE is a method used to correct inter-unit correlation. Beck and Katz (1995) stated that the Panel Corrected Standard Errors (PCSE) method, which produces large asymptotic based standard errors, is also appropriate to use in small panels (Tatoğlu, 2012: 260). Therefore, PCSE was preferred in the study.

##### 4.1. Dataset and Sample

In the study, data for the years 2005-2022 of 14 banks that are members of the Banks Association of Türkiye (BAT) and operating in Turkey were used to determine the relationship between banks' balance sheet structure ratios and profitability ratios. The financial data of the banks in question were obtained from the statistical data system on the official website of BAT. In the study, a 17-year period was included in the analysis and a total of 252 observations were obtained. The dependent and independent variables included in the research are summarized in Table 2.

**Table 2.** Dependent and Independent Variables Used in the Study

Variable	Explanation	Code
Return on Assets	Net Profit/Total Assets	ROA
Return on Equity	Net Profit/Equity	ROE
Deposit Rate	Total Deposits/Total Assets	DEP_AS
Loan Rate	Loans Received/Total Assets	LON_AS

## 4.2. Research Model

Since there are both time effects and cross-section effects in determining the effect of balance sheet structure ratios on profitability rates, panel data analysis was used in the study. With panel data analysis, N horizontal sections and T time dimensions corresponding to each horizontal section are analyzed. In this study, regression models from panel data analyzes were used. Using the variables in Table 2 and using data from the literature by Alexakis et al. (2010) and Aydemir et al. (2012) based on their studies, the following models were created.

$$ROA_{it} = \beta_1 DEP\_AS_{it} + \beta_2 LON\_AS_{it} + \alpha + \varepsilon_{it}$$

$$ROE_{it} = \beta_1 DEP\_AS_{it} + \beta_2 LON\_AS_{it} + \alpha + \varepsilon_{it}$$

## 5. Findings

The first analysis to determine the effect of ratios related to the balance sheet structure on profitability is descriptive statistics. The descriptive statistics results obtained are summarized in Table 3. As seen in Table 3, the variable with the lowest standard deviation is "ROA" and the variable with the highest standard deviation is "ROE". When the arithmetic means of the variables were examined, it was determined that the variable with the lowest arithmetic mean was "ROA"(1,598) and the variable with the highest arithmetic mean was "DEP\_AS" (63,838). Flamini et al. (2009) have identified average ROA and ROE of 389 banks from 41 countries in Africa as 2.3% and 12.5%. Additionally, the variable with the least difference between the largest and smallest value is ROA. It has been determined that the variable with the largest difference is ROE.

**Table 3.** Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
ROA	252	1,5989	1.4032	-12.554	6.729
ROE	252	14,597	16.019	-178.637	60.285
DEP_AS	252	63,838	7.6370	48.023	85.302
LON_AS	252	9,648	5.968	0	30.653

It was tested whether the variables whose descriptive statistics were determined were stationary, that is, whether their mean and variance were constant. The IPS method, one

of the unit root tests, was used to test the stationarity of the dependent and independent variables.

**Table 4.** Im-Pesaran-Shin Unit Root Test

Düzey	t-statistic	Prob.
ROA	-8.2849	0.0000
ROE	-7.1043	0.0000
DEP_AS	-9.5790	0.0000
LON_AS	-9.6776	0.0000

According to the results in Table 4, it was determined that the dependent and independent variables used in the study were stationary.

After it was determined that the series were stationary, tests were carried out to determine which regression model should be used in the established models. These tests are Breusch-Pagan Lagrange Multiplier (LM), Pesaran scaled LM and Pesaran Cross-Sectional Dependence (CD) tests.

**Table 5.** Results of the Cross Section Dependence Tests

Tests	ROA	ROE	DEP_AS	LON_AS
Breush-Pagan LM	459.224	569.37	361.634	376.907
Pesaran scaled LM	26.256	34.421	19.023	20.155
Pesaran CD	15.891	19.607	9.118	9.990

Table 5 shows the results of cross-sectional dependence. According to the results obtained from LM and CD tests, the null hypothesis stating that there is no dependence between cross-sections for all series was rejected. In other words, there is a cross-sectional dependence. Therefore, regression models should be estimated using robust estimators.

**Table 6.** Correlation Analysis

Variables	ROA	ROE	DEP_AS	LON_AS
ROA	1,00			
ROE	0,94	1,00		
DEP_AS	-0,08	-0,05	1,00	
KREDİ_VARLIK	0,00	-0,01	-0,72	1,00

Correlation analysis was performed to test the relationship between dependent and independent variables in Table 6. According to the results; There is a negative relationship between "ROA" and "DEP\_AS". Similarly, there is a negative relationship between "DEP\_AS" and "ROA". At the same time, while there is a positive relationship between "CREDIT\_ASSET" and "ROA", there is a negative relationship between "CREDIT\_ASSET" and "ROE".

In Table 7, the effect of total deposits/total assets ratio (DEP\_AS) and loans received/total assets ratio (LON\_AS) on return on assets (ROA) was realized with the PCSE estimator.

**Table 7.** PCSE Estimator Results (Model 1)

Variables	Coef.	Std. Err.	z	P> z
DEP_AS	0.020	0.002	10.080	0.000
LON_AS	0.024	0.010	2.340	0.019
Prob > chi2		0.000		
Wald chi2(2)		329.420		
R-squared		0.554		

According to the results in Table 7, it was concluded that the "DEP\_AS" variable positively affected the asset profitability ratio by 2% at a 5% significance level. In other words, a 1% increase in the total deposit/total assets ratio increases asset return by 2%. The "CREDIT\_ASSET" variable affects the asset profitability ratio positively and at a 5% significance level. In other words, a 1% increase in the loans received / total assets ratio increases the return on assets by 2.4%. The rate of return on assets explained by independent variables is 55.4%.

In Table 8, the effect of total deposits/total assets ratio (DEP\_AS) and loans received/total assets ratio (LON\_AS) on return on equity capital (ROE) was realized with the PCSE estimator.

**Table 8.** PCSE Estimator Results (Model 2)

Variables	Coef.	Std. Err.	z	P> z
DEP_AS	0.197	0.021	9.120	0.000
LON_AS	0.187	0.104	1.790	0.074
Prob > chi2		0.000		
Wald chi2(2)		214.730		
R-squared		0.445		

According to the results in Table 8, it was concluded that the "DEP\_AS" variable positively affected ROE by 1.97% at a 5% significance level. In other words, a 1% increase in the total deposit/total assets ratio increases the return on equity by 2%. The "CREDIT\_ASSET" variable affects the return on equity ratio positively, but this effect is not statistically significant. In other words, it has been determined that increasing the loans/total assets ratio has no effect on ROA. The rate of return on assets explained by independent variables is 44.5%

## 6. Conclusion

The banking sector affects the country's economy directly or indirectly. A strong and healthy banking system is considered a prerequisite for sustainable economic growth. In other words, the banking sector is very important in terms of bringing idle funds into the economy, contributing to economic growth, foreign resource transfer and tax revenues (Şişman and Doğan, 2016: 367). Especially today, as digitalization becomes more widespread and intensified in the banking sector, artificial intelligence applications are expected to make customer services and transaction processes more efficient, further personalize financial

services and improve customer experience.

When looking at the balance sheet items of the banking system from the perspective of profitability, the factors affecting profitability are important as they affect both the banking system and the country's economy. In this context, answers were sought to the questions in which direction the balance sheet structure variables affecting the profitability of assets and return on equity, which are used as profitability indicators, affect profitability. One of the important findings of the study is the fact that ROA and ROE increase asset sizes of the banks increase. This may be explained by the fact that large banks are more effective than small banks since they make use of the scale economy. These findings show similarity with the studies by Alrashdan (2002); Naceur (2003); Flamini et al. (2009); Thota (2013). In this study, the effect of variables related to the balance sheet structure of banks operating in Turkey and members of TBB in the period 2005-2022 on bank profitability was analyzed with the PCSE estimator. Empirical results have shown that the total deposits/total assets ratio has a positive effect on asset profitability. Additionally, it has been observed that the same variable has a positive effect on return on equity. While there is a positive and significant relationship between the loans taken/total assets variable, which is another balance sheet structure variable, and asset profitability, no significant relationship was found between return on equity capital.

In future studies on bank profitability, different ratios obtained from balance sheets and macro variables related to economic sizes can be included in the analysis. Additionally, analyzes can be performed with different data sets and in different periods.

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