COMPARISON OF THE EFFECTIVENESS OF RELATIVE VALUATION RATIOS (PE AND PBV) IN PREDICTING SHARE PRICES BOOK IV BANKING AND DIGITAL BANKS

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ARTICLEINFO	ABSTRACT
Keywords: *Valuation, PER, PBV, Digital Bank, Book Bank 4*	Valuation of a share is something that must be done by every investor in order to know the fair value of the share. Currently there is a digital bank industry that is booming where the share price is quite high compared to the share price of ordinary banks, so this study aims to assess the share price of digital banks compared to ordinary banks using the relative valuation method with PER and PBV ratios and analyzed using panel data analysis to determine the effectiveness of the valuation. The results of this study prove that the relative valuation method can be used and is quite effective for valuing the shares of digital banks and ordinary banks
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1. INTRODUCTION

Indonesia's economic growth since the administration of President Joko Widodo has increased and stabilized at 5-6% per year, Indonesia's economic growth can be seen in Figure 1.1 below, which can be seen that although Indonesia's economic growth is stable, it is experiencing a downward trend, especially in 2020. Indonesia's economy has fallen to below 3%, but this has also been experienced by many countries in the world due to the systemic case of the Covid pandemic. One that drives the economy of a country is the banking business in that country. In which the banking business plays an important role in financial development and industrialization by directing funds from depositors to borrowers. During this process the bank will benefit from different spreads than the interest charged. Their intermediary role can be said to be a catalyst for economic growth [1].

Banks are financial institutions whose role is to support the smooth flow of payments, monetary policy implementers and tools to achieve financial system stability that are carried out in accordance with the principle of trust. Therefore, in carrying out its functions, banks are required to be in a healthy condition so that they can carry out these functions properly. A bank is said to be healthy or has good performance, if it is able to carry out its activities normally and is able to pay off all its obligations smoothly and in accordance with existing banking regulations [2]–[6].

The growth of digital banks in Indonesia is very rapid, banks in Indonesia are competing to make their banks digital, one of the reasons is the massive technological developments so that banks must move to become digital, another thing is because the shares of digital banks have increased very significantly such as the champion bank (ARTO) which experienced an increase from 100s of silver to tens of thousands after becoming a digital bank after its shares were acquired by GO-JEK even though the acquisition was only 20%. This reason will make banking competition in Indonesia no longer only look at bank assets but also digitization of the bank.

Along with the stable economic growth in Indonesia and the development of banks, the capital market industry has also been affected which can be seen from the growth of investors investing in the Indonesian stock exchange, this can be seen in Figure 1.3 below. Indonesian investors have more than 3 million investors consisting of 1.2 million mutual fund investors, 1.2 million stock investors and 382 thousand SBN investors. This has increased dramatically from 2014 when researchers first invested in the capital market because at that time capital market investors were still around 700 to 800 riba so that the increase was almost 3x in the 2014 to 2020 range.

The fact that the economy in Indonesia is growing stably is followed by the development of the banking and capital market business. If seen from the growth of capital market investors in Indonesia, it is not followed by the quality of investors in making investments, the majority of investors in Indonesia experience herding bias because on average they follow advice from other people to decide to invest, so

*Comparison of the Effectiveness of Relative Valuation Ratios (PE and PBV) in predicting Share Prices Book IV Banking and Digital Banks. **Apriwandi, et.al***

130

many capital market practitioners provide training to these investors. in order to decide for themselves the selection of an investment. The Financial Services Authority has also made regulations so that all securities in Indonesia educate their clients, but even though many practitioners and securities companies want to educate investors, the training material delivered is still very minimal in knowledge than foreign investors who have because on average they teach relatively high valuation. which has many weaknesses, so this research wants to find out how effective relative valuations such as price to earnings ratio and price to book value are in assessing the market value of a company, especially in the banking sector [1], [7]–[10].

More recently, research has developed to include other predictive variables such as dividend yield, price-to-earnings ratio, book-to-market ratio, return on equity, and various interest rate measures that are commonly tested to predict stock prices and returns. However, the evidence is mixed. As research initiated by Ball and Brown [11] provides evidence that there is a correlation between accounting information and stock prices, specifically the correlation between annual report earnings data and stock prices, they found that if a company has excess profits, investors can get abnormal returns as a result. from accounting information. This shows the relationship between accounting earnings and stock prices. Thus, investors use stated accounting information when they trade stocks.

One of the most common ways of assessing the relative value of stocks among practitioners is to compare the numbers listed in financial statements using financial ratios. The main advantage of using financial ratios rather than income statement amounts is that they are independent of company size. Comparison of financial ratios is used to assess the company's financial condition, operations and attractiveness as an investment. Therefore, the main purpose of financial reports is to provide information about company performance to internal and external users to make decisions. From an information economy perspective, accounting and financial reporting play an important role in an efficient capital market [11]–[13].

Based on the description of the background and research problems above, the purpose of conducting this research is as follows, to analyze the effectiveness of relative valuation in assessing stock market prices with research objects in book 4 banks and digital banks in 2016 – 2020.

2. METHOD
Type and Data Source

This study uses variables and measurements that aim to find relationships between independent variables and independent variables. The dependent variable in this study is the stock price or stock price by measuring the daily closing price of the Indonesian stock exchange. The independent variable in this study is relative valuation which is measured using 2 variables, namely: PBV or price to book value which is measured by price (daily closing price) and book value (annual book value). PER or price to earnings ratio as measured by price (daily closing price and profit value (annual profit value).

The sample data in this study are book 4 banking companies from 2016 to 2020. The data is taken from the closing price of the stock exchange every day on idx.or.id or on other websites. Financial data will be taken from each company's report on the company concerned which is taken annually [14]. The data used in this study is monthly data on the closing price of shares each month with annual financial reports that are used with the same value every month.

A Book 4 bank is a bank with the highest core capital of at least IDR 30,000,000,000,000 or thirty trillion rupiahs. This bank classification is based on the Financial Services Authority Regulation (POJK) Number 6/POJK.03/2016 concerning Business Activities and Office Networks Based on Bank Core Capital. Apart from Book 4 Banks, there are Book 1 Banks, Book 2 Banks, and Book 3 Banks. The Book Bank itself stands for Commercial Banks based on Business Activities, abbreviated as BUKU. In this study, 3 book 4 banks in Indonesia will be used, namely Bank Mandiri, Bank BNI and Bank BRI.

Digital Bank is a bank that has a system that can facilitate the transaction process in banking, such as being able to open a digital account, buy banking products digitally, borrow digitally, etc., so that not all banks are digital banks, but digital banks are definitely a bank. There are 8 digital banks in Indonesia, but because this research collects data from 2016, only 6 digital banks had IPOs that year and due to limited data, only 3 banks were selected, namely Bank BCA, Bank Jago and Bank BTPN.

Analysis Method
Descriptive and Regression Analysis with panel data

Descriptive analysis is research conducted to determine the existence of an independent variable, either only on one variable or more (stand-alone variable) without making comparisons and looking for

*Comparison of the Effectiveness of Relative Valuation Ratios (PE and PBV) in predicting Share Prices Book IV Banking and Digital Banks. **Apriwandi, et.al***

131

relationships between these variables and other variables. Regression models are mathematical statistics that describe the relationship between two or more factors. This study uses multiple linear regression to conduct research. Linear regression tries to relate two variables.
The regression model used in this study is:

$$Y = a + B1\ X1 + B2\ X2 + e$$

      Y = Stock Price
      B1 and B2 = Parameters
      X1 = PBV
      X2 = PER

3. RESULT AND DISCUSSION

This section will explain the descriptive analysis and the relationship between the independent and dependent variables, in addition to testing the ability of relative valuation in assessing stock prices on the Indonesian stock exchange. This test uses Ordinary Least Square (OLS) with a significance level of 5%.

A. Indonesia Book Bank 4 as Sample Data
Descriptive Analysis

Table 1 below explains the descriptive analysis of the sample data collected by the researcher. The total sample consists of 3 companies for 60 periods, so the total sample is 180 samples from 2016 to 2020. From the table it can be seen that the average stock price for book 4 banks is around 4000 with a PER of 11 and a PBV of 0.72, while the price deviation is 1945 with a PER of about 6.5 and a PBV of about 0.36. The lowest price is 1745 with a PER of 4.58 and a PBV of 0.21. Meanwhile, the highest price is 9054 with a PER of 39.40 and a PBV of 1.69. Skewness and Kurtosis to test whether the data is normally distributed with the conditions of Skewness 0 and Kurtosis 3.

Table 1: Bank Descriptive Analysis of Book 4

	Price	PER	PBV
Mean	4.086	11,03	0,72
Standar Deviasi	1945,85928	6,51673338	0,36929278
Min	1.745	4,58	0,21
Max	9.054	39,40	1,69
Skew	1,03103839	2,17948024	0,19895674
Kurtosis	0,06057145	4,9340665	-0,9895052

Regression Test with Panel Data

The panel data model approach is the simplest because it only combines time series and cross section data. This model does not pay attention to the time or individual dimensions, so it is assumed that the behavior of company data is the same in various time periods. This method can use the Ordinary Least Square (OLS) approach or the least squares technique to estimate the panel data model. Table 2 below is the result of the common effect model.

Table 2 CEM Result

Dependent Variable: Y
Method: Panel Least Squares
Date: 01/11/22   Time: 18:37
Sample: 2016M01 2020M12
Periods included: 60
Cross-sections included: 3
Total panel (balanced) observations: 180

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-157.4208	219.8093	-0.716170	0.4748
X1	91.62152	11.49457	7.970849	0.0000
X2	4490.707	202.8393	22.13924	0.0000
R-squared	0.743402	Mean dependent var		4085.944
Adjusted R-squared	0.740502	S.D. dependent var		1945.859

S.E. of regression	991.2383	Akaike info criterion	16.65231
Sum squared resid	1.74E+08	Schwarz criterion	16.70553
Log likelihood	-1495.708	Hannan-Quinn criter.	16.67389
F-statistic	256.3973	Durbin-Watson stat	0.105787
Prob(F-statistic)	0.000000		

Fixed Effect Model (FEM)

This model assumes that the differences between individuals can be accommodated from the intercept differences. To estimate the Fixed Effects panel data model using the dummy variable technique to capture differences in intercepts between companies, differences in intercepts can occur due to differences in work culture, managerial and incentives. However, the slopes are the same between companies. This estimation model is often also called the Least Squares Dummy Variable (LSDV) technique. Table 3 below shows the Fixed Effect model.

Table 3 FEM Test Result

Dependent Variable: Y
Method: Panel Least Squares
Date: 01/11/22   Time: 18:38
Sample: 2016M01 2020M12
Periods included: 60
Cross-sections included: 3
Total panel (balanced) observations: 180

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1206.023	192.0523	-6.279663	0.0000
X1	36.41086	6.084129	5.984565	0.0000
X2	6793.453	231.0955	29.39674	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.944534	Mean dependent var	4085.944
Adjusted R-squared	0.943266	S.D. dependent var	1945.859
S.E. of regression	463.4811	Akaike info criterion	15.14279
Sum squared resid	37592574	Schwarz criterion	15.23149
Log likelihood	-1357.851	Hannan-Quinn criter.	15.17875
F-statistic	745.0227	Durbin-Watson stat	0.357618
Prob(F-statistic)	0.000000		

Random Effect Model (REM)

This model will estimate panel data where the disturbance variables may be related to each other over time and between individuals. In the Random Effect model, the difference in intercepts is accommodated by the error terms of each company. The advantage of using the Random Effects model is that it eliminates heteroscedasticity. This model is also called the Error Component Model (ECM) or the Generalized Least Square (GLS) technique. Table 4 is the result of the Random Effect Model.

Table 4 Random Effect Result Model

Dependent Variable: Y
Method: Panel EGLS (Cross-section random effects)
Date: 01/11/22   Time: 18:40
Sample: 2016M01 2020M12
Periods included: 60
Cross-sections included: 3
Total panel (balanced) observations: 180
Swamy and Arora estimator of component variances

Comparison of the Effectiveness of Relative Valuation Ratios (PE and PBV) in predicting Share Prices Book IV Banking and Digital Banks. Apriwandi, et.al

133

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-157.4208	102.7780	-1.531659	0.1274
X1	91.62152	5.374608	17.04711	0.0000
X2	4490.707	94.84315	47.34878	0.0000

Effects Specification

			S.D.	Rho
Cross-section random			0.000000	0.0000
Idiosyncratic random			463.4811	1.0000

Weighted Statistics

R-squared	0.743402	Mean dependent var	4085.944
Adjusted R-squared	0.740502	S.D. dependent var	1945.859
S.E. of regression	991.2383	Sum squared resid	1.74E+08
F-statistic	256.3973	Durbin-Watson stat	0.105787
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.743402	Mean dependent var	4085.944
Sum squared resid	1.74E+08	Durbin-Watson stat	0.105787

Hypothesis Testing

The results obtained in table 4 of the REM model, in that table the F-stat value is 745 with a probability of 0.00 which is below the significance value of 0.05 so that it can be ascertained that the PER and PBV variables together influence stock prices. The results of the coefficient of determination from table 4.8 are the FEM model, R-square is worth 0.94 and Adjusted R-square is worth 0.94. That means this model can predict stock prices by 94% and the rest cannot be explained in the model.

The results of the hypothesis are declared significant if the prob value is below 0.05, a positive coefficient number means that the independent variable has a one-way relationship with the dependent variable, while a negative coefficient means that the independent variable has the opposite relationship with the dependent variable. Based on table 4 of the FEM model, the following are the results of testing the hypothesis: The relationship between PER and Price has a coefficient of 36.41 with a Prob of 0.00. These results say that PER has a significant positive (unidirectional) relationship, which means that if PER increases by 1 it will make Price increase by 36.41. The PBV to Price relationship has a coefficient of 6793,453 with a Prob of 0.00. These results state that PBV has a significant positive (unidirectional) relationship, which means that if PBV increases by 1, the price will increase by 6,793,453.

Analysis of testing hypothesis 1 (H1) proves that Relative Valuation has a significant positive relationship which has been proven correct because the PBV and PER tests have a significant positive relationship to the stock price of book 4 banks. The results confirm the research that has been conducted by [15]–[17] which proves that the use of Relative Valuation has an influence in predicting issuer stock prices, especially banking.

B. Indonesia Digital Banks as Sample Data
Descriptive Analysis

Table 5 below explains the descriptive analysis of the sample data collected by the researcher. The total sample consists of 3 companies for 60 periods so that the total sample is 180 samples from 2016 to 2020. From the table it can be seen that the average share price of book 4 banks is around 2656 with a PER of -4.62 and a PBV of 1.95, while deviations the price is 1826 with a PER of around 628.64 and a PBV of around 3.87. The lowest price is 116 with a PER of -159 and a PBV of 0.27. Meanwhile, the highest price is 6633 with a PER of 14.33 and a PBV of 24.55 Skewness and Kurtosis to test whether the data is normally distributed with the conditions of Skewness 0 and Kurtosis 3.

*Comparison of the Effectiveness of Relative Valuation Ratios (PE and PBV) in predicting Share Prices Book IV Banking and Digital Banks. **Apriwandi, et.al***

134

Table 5 Table of Descriptive Analysis of Digital Banks

	Price	PER	PBV
Mean	2.656	(4,62)	1,95
Standar Deviasi	1826,11344	28,6402516	3,87653475
Min	116	(159,63)	0,27
Max	6.633	14,33	24,55
Skew	0,14806907	-3,6044861	4,35341573
Kurtosis	-0,7880966	14,1048433	19,1706133

Regression Test with Panel Data

The panel data model approach is the simplest because it only combines time series and cross section data. This model does not pay attention to the time or individual dimensions, so it is assumed that the behavior of company data is the same in various time periods. This method can use the Ordinary Least Square (OLS) approach or the least squares technique to estimate the panel data model. Table 6 below is the result of the common effect model.

Tabel 6 Result CEM test

Dependent Variable: Y
Method: Panel Least Squares
Date: 01/11/22   Time: 21:20
Sample: 2016M01 2020M12
Periods included: 60
Cross-sections included: 3
Total panel (balanced) observations: 180

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1564.588	177.0444	8.837263	0.0000
X1	123.8809	13.57132	9.128134	0.0000
X2	854.5040	100.2664	8.522338	0.0000

R-squared	0.321447	Mean dependent var	2656.261
Adjusted R-squared	0.313780	S.D. dependent var	1826.113
S.E. of regression	1512.723	Akaike info criterion	17.49774
Sum squared resid	4.05E+08	Schwarz criterion	17.55095
Log likelihood	-1571.796	Hannan-Quinn criter.	17.51931
F-statistic	41.92462	Durbin-Watson stat	0.055651
Prob(F-statistic)	0.000000		

Fixed Effects Model (FEM)

This model assumes that the differences between individuals can be accommodated from the intercept differences. To estimate the Fixed Effects panel data model using the dummy variable technique to capture differences in intercepts between companies, differences in intercepts can occur due to differences in work culture, managerial and incentives. However, the slopes are the same between companies. This estimation model is often also called the Least Squares Dummy Variable (LSDV) technique. Table 7 below shows the Fixed Effect model

Tabel 7 Hasil Uji FEM

Dependent Variable: Y
Method: Panel Least Squares
Date: 01/11/22   Time: 21:22
Sample: 2016M01 2020M12
Periods included: 60
Cross-sections included: 3
Total panel (balanced) observations: 180

Comparison of the Effectiveness of Relative Valuation Ratios (PE and PBV) in predicting Share Prices Book IV Banking and Digital Banks. Apriwandi, et.al

135

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1815.803	132.4500	13.70935	0.0000
X1	69.85849	14.55049	4.801108	0.0000
X2	597.2898	94.16306	6.343143	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.807638	Mean dependent var	2656.261
Adjusted R-squared	0.803241	S.D. dependent var	1826.113
S.E. of regression	810.0193	Akaike info criterion	16.25938
Sum squared resid	1.15E+08	Schwarz criterion	16.34807
Log likelihood	-1458.344	Hannan-Quinn criter.	16.29534
F-statistic	183.6853	Durbin-Watson stat	0.129037
Prob(F-statistic)	0.000000		

Random Effect Model (REM)

This model will estimate panel data where the disturbance variables may be related to each other over time and between individuals. In the Random Effect model, the difference in intercepts is accommodated by the error terms of each company. The advantage of using the Random Effects model is that it eliminates heteroscedasticity. This model is also called the Error Component Model (ECM) or the Generalized Least Square (GLS) technique. Table 8 is the result of the Random Effect Model.

Table. 8 Random Effect Model
Dependent Variable: Y
Method: Panel EGLS (Cross-section random effects)
Date: 01/11/22   Time: 21:30
Sample: 2016M01 2020M12
Periods included: 60
Cross-sections included: 3
Total panel (balanced) observations: 180
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1839.278	92.01045	19.98988	0.0000
X1	108.4687	6.947380	15.61290	0.0000
X2	676.9058	53.75989	12.59128	0.0000

Effects Specification

		S.D.	Rho
Cross-section random		0.000000	0.0000
Period fixed (dummy variables)			
Idiosyncratic random		720.0124	1.0000

Weighted Statistics

R-squared	0.435720	Mean dependent var	2656.261
Adjusted R-squared	0.144016	S.D. dependent var	1826.113
S.E. of regression	1689.510	Sum squared resid	3.37E+08
F-statistic	1.493704	Durbin-Watson stat	0.061721
Prob(F-statistic)	0.032094		

Unweighted Statistics

R-squared	0.435720	Mean dependent var	2656.261
Sum squared resid	3.37E+08	Durbin-Watson stat	0.061721

Hypothesis testing
F test
The results obtained in table 10 of the REM model, in that table the F-stat value is 183 with a probability of 0.00 which is below the significance value of 0.05 so that it can be ascertained that the PER and PBV variables together influence stock prices.

Coefficient of determination test
The results of the coefficient of determination from table 8 are the FEM model, the R-square is 0.80 and the Adjusted R-square is 0.80. That means this model can predict stock prices by 80% and the rest cannot be explained in the model.

Hypothesis Test Results
The results of the hypothesis are declared significant if the prob value is below 0.05, a positive coefficient number means that the independent variable has a one-way relationship with the dependent variable, while a negative coefficient means that the independent variable has the opposite relationship with the dependent variable. Based on table 4.8 of the FEM model, the following are the results of testing the hypothesis. The relationship between PER and Price has a coefficient of 69.85 with a Prob of 0.00. These results say that PER has a significant positive (unidirectional) relationship, which means that if PER increases by 1 it will make Price increase by 69.85. The PBV to Price relationship has a coefficient of 597.28 with a Prob of 0.00. These results state that PBV has a significant positive (unidirectional) relationship, which means that if PBV increases by 1, the price will increase by 597.28. Based on the test analysis, it is decided that hypothesis 2 (H2) cannot be rejected which proves that Relative Valuation has a significant positive relationship which has been proven correct because the PBV and PER tests have a significant positive relationship in digital banks.

4. CONCLUSION
The conclusions of this study are divided into 2 which concern the two hypotheses predicted at the beginning of the study. First, that there is a significant positive relationship relative valuation (PER and PBV) to stock prices, meaning here proves that the relative valuation method is still able to assess the fair price of book 4 banking companies. Second, that there is also a significant positive relationship between the relative valuation to stock prices, this also proves that digital banks can also be valued with relative valuations. The relative valuation method here, although easy to use, can still calculate stock prices accurately.

Recommendations for future research. First, for future research, it is hoped that not only 3 banking companies can be used in cross section, but all banking companies in that category. The two research models this time are still relatively easy so it is hoped that in the future a moderating or mediating variable will be added to expand the research model. The three studies on relative valuation can be compared between industries or sectors so they don't only focus on the banking industry. Finally, future research is expected not only to collect data in Indonesia but also data abroad, especially in the ASEAN region.

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