FORECASTING ANALYSIS OF AGEN JATIM BRANCH TUBAN PERFORMANCE

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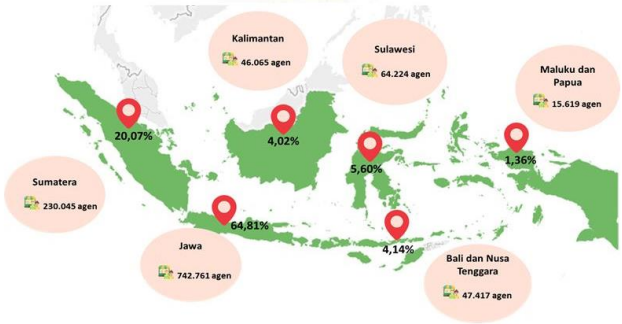
Abstract. *The goal of financial inclusion is to increase growth, particularly in the financial industry. Branchless banking is one of the branchless financial services within the framework of financial inclusion. This research aims to understand and describe the role product of the Bank Jatim branchless banking, known as the Agen Jatim, through the financial performance of the Agen Jatim branch Tuban in terms of the number of agents, amount of saving, and NoA (Number of Amount). The research uses quantitative methods by collecting agent data from 2021-2023, then forecasting analysis is carried out regarding the performance of East Java Agents, Tuban Branch, using the ARIMA method. The ARIMA model will then be developed and adjusted to historical data and model evaluation will be carried out by comparing forecasting results with actual data. The expected results of this research are to find out the financial performance results of the Tuban Branch of the East Java Agent for the period January 2024, so that it is hoped that the presence of Agen Jatim branch Tuban for the period January 2024, so it is hoped that the presence of Agen Jatim in the Tuban Regency community will be able to increase awareness, especially in rural communities, of banking products.*

Keywords – *Financial Inclusion, Branchless Banking, Banking Products*

I. INTRODUCTION

Tuban regency is one of regency in East Java province which is located on the north coast of Java Island. It has an area of 1,904.70 km^2, with a coastline of ±65 km, and inhabited by ±1 million people. Tuban regency has 328 villages and 20 sub-districts, the majority of whose residents make their living as farmers because of the diversity of natural resources, as well as the diverse topography and soil structure. Tuban regency has a lot of economic potential from a variety of sources, including agriculture, fisheries, plantations, tourism, trade, animal husbandry, mining, forestry and extraction of other natural resources. [1].

In the modern era, company especially in the banking sectors are always faced with the challenge of being able to anticipate and plan their various operational activities. Financial performance in a company has very close relationship with measuring and assessing company performance [2]. According to Banking Law Number 10 of 1998, bank is a company that collect funds from people for saving and then provide these funds to the people with credit or other means to help improve their standard of living. [3]. In line with global trends that include life protection, Bank Indonesia issued policies to encourage intermediation and financial inclusion functions. The current global economy is a financial market that, through banks, then investors allocate capital to the business sector, thus forming the ecosystem and production and consumption patterns in the future [4]. Economic security in the banking system is carried out to prevent threats that occur to banks so it can create conditions for stable, efficient functioning and profit maximization [5].



Source: Otoritas Jasa Keuangan

Figure 1. Distribution of Branchless Banking in Indonesia

Many Indonesian people still do not use financial products and services offered by financial institutions, one of the reasons is their place far from banking locations. Beside that, poor financial access for rural people is also caused by limited facilities and infrastructure, so the solution sought is financial inclusion. Financial inclusion refers to efforts to expand public participation in the financial system. Financial inclusion is an access to the financial system for every people of a country and very important for reducing poverty and minimizing income disparities by providing financial services to low-income and underprivileged segments of society [6]. This helps in reducing social and economic disparities and improves overall well-being. Financial inclusion in banking makes a positive and significant contribution to the stability of the banking sector, thereby increasing bank resilience and can also help in increasing revenue, reducing costs and expanding banking market share [7]. The aim of this inclusion is to make the financial system stable. Branchless banking in the framework of inclusive finance has been launched by the Financial Services Authority (OJK) in the Financial Services Authority Regulation (POJK) No.19/POJK.03/2014 concerning Officeless Financial Services. The aim of this program is to facilitate all Indonesian people to use saving accounts without branch offices. The results of the OJK SNLIK survey show an increase in the financial inclusion index in 2019 to 76.2% compared to 2016, when the financial inclusion program was just being promoted, this index only reached 67.8%. The distribution of Laku Pandai Agents occurred quite quickly, where in the third quarter of 2019 Laku Pandai Agents grew rapidly on the island of Java with a percentage of 64.81%, while based on the Big Island, the regions that had the lowest percentage of Laku Pandai Agents were Maluku and Papua, namely only 1.35% [8].

PT. Bank Pembangunan Daerah Jawa Timur, Tbk or known as "Bank Jatim" is one of the Regional Development Bank in Indonesia which was founded on 17 August 1961 and has its head office in Surabaya, East Java. As a Regional Development Bank, Bank Jatim focuses on financing and supporting development in the East Java region by providing various banking products and services to individuals, businesses and institutions in East Java. Bank Jatim provides various products and services, including savings (saving, deposit and giro), as well as loans, both for individuals and businesses, such as consumer loans, business credit and property financing. In order to continue to make changes and growth in economic activities. Bank Jatim continues to develop products, services and expand its office network in order to provide convenience, especially to meet people's needs in carrying out transaction activities through banking. Bank Jatim continues to support the financial inclusion program, one of which is expanding the branchless banking agent product.

Agen Jatim are a promising business potential for the communities because they can be opened by individuals, employees and legal entities. There are many advantages of Agen Jatim that are not available from other bank’s agents, Agen Jatim very flexible, there are no sanctions given to Agen Jatim if they do not meet the predetermined transaction targets. There is a distribution of fees given to Agen Jatim, where the fees obtained will not be deducted from tax, so it is very profitable for business people who open Agen Jatim. Customers who transaction in the form of transfers between Bank Jatim accounts at Agen Jatim will also not be subject to administration fees. The facilities obtained include being able to make transfers, open accounts, cash deposits, PLN payments, purchase tokens, cash withdrawals, purchase credit, BPJS payments, PBB payments, PKB tax payments, and credit applications. Based on this, the number of Agen Jatim in Tuban regency continues to increase year to year. The following is the growth performance of Agen Jatim branch Tuban from 2021-2023.

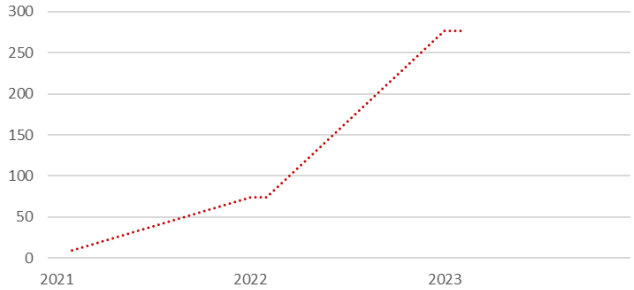


Figure 2. Growth Performance Agen Jatim branch Tuban 2021-2023

Based on previous research [9], the economic conditions in Air Molek Village before the existence of the Agen BRILink were still low, this was due to village access being far from banking. The presence of Agen BRILink in Air Molek Village helps village communities in carrying out transactions where it is easy for people to withdraw their funds so that economic activities in the village run smoother than before. As for previous research that discussed similar things, according to the results of research [10], the people in Sukasari Village and Gandasari Village, Kadupandak District, were very enthusiastic about the existence of BRILink because the community's banking needs could be met because of the affordable location for carrying out transactions. However, there is an obstacle for the people of Sukasari Village and Gandasari Village, Kadupandak District, when using BRILink, namely the lack of network stability so that transaction activities are hampered. BRILink agent owners in Sukasari Village and Gandasari

Village, Kadupandak District get fees using a profit sharing system, namely the BRILink agent gets 50% and the BRI gets 50%. Research [11], the existence of Agen46, Bank BNI Blitar Branch Office was able to increase the number of small and medium enterprises (MSMEs) where 461 of 907 MSMEs have carried out active transactions, this is equivalent to 50.83% and 2.37% of the total MSMEs in Blitar Regency and City have participated in this program. If it can be maximized, it will have a positive impact on MSME players, namely it can increase income and banks will get more funds from third parties.

Based on the location of Tuban regency, which is mostly a rural area, as well as being closer to the micro businessman, the existence of an Agen Jatim who is Bank Jatim's branchless banking is very important. Not all of banking products in the micro sector have been fully touched, so having an Agen Jatim helps overcome this problem. This condition caused by micro businessman in Tuban regency who in the rural areas, which are far from banking offices. Currently, the Agen Jatim in Tuban area growth and develop significantly. The average number of Agen Jatim in Tuban area for the 2023 period is 277 agents with an average savings of IDR. 94,079,936.85. The existence of Agen Jatim can increase financial literacy, especially in the micro sector. The aim of this research is to find out the role of Agen Jatim through forecasting analysis of the financial performance of Agen Jatim branch Tuban for the period January 2024 in terms of number of agents, amount of saving, and NoA (Number of Amount). Based on the business potential in Tuban Regency, researchers are interested in conducting research on the existence of branchless banking in providing easy transactions, especially for the Tuban people.

Branchless Banking

Otoritas Jasa Keuangan (OJK) Indonesia launched the branchless banking program for the inclusive financial services in 2015. Financial inclusion is the key to social inclusion, which is useful in fighting poverty and income inequality by opening up blocked opportunities for progress for disadvantaged segments of society [12]. However, the financial revolution is taking place rapidly due to advances in financial technology, giving rise to opportunities and threats to the stability of the financial system. Financial inclusion is being intensively implemented to increase growth, especially in the financial sector, and support efforts to accelerate economic development. Based on OJK survey, still many societies who do not know, use or obtain banking and other financial services, so it is important to have financial inclusion [13]. Financial inclusion plays an important role in building a strong foundation, especially a country's financial infrastructure, which in turn will facilitate economic growth and development [14]. In 2012, Indonesian government launched the National Financial Inclusion Strategy (SNKI) program, which envisaged a branchless banking system. The aim of this program is to increase the affordability of financial services for all levels of society throughout Indonesia. It is hoped that this policy system will enable government institutions and stakeholders to work together well [15].

Forecasting

Forecasting is an important application, the aims is to predict future events [16]. Forecasting very important in the companies because can see the picture for decision making. Forecasting method is a part of the characteristic of machine learning or statistic which has become common in several literatures discussing forecasting and the community [17]. A company that can live sustainably is a company that able to project future conditions and financial report forecasting is used to see the company's survival in terms of its performance and financial position [18]. The results of forecasting are not far from the results of reality so previous period data is needed to serve as a guide in making the forecast [19]. Ratio comparison figures can be obtained by comparing the accounts in the financial statements with each other. These comparative figures can come from one reporting period or several reporting periods [20]. Forecasting uses specific statistical and scientific approaches to provide consistent and relevant information about past, present, and future events [21].

ARIMA (*Autoregressive Integrated Moving Average*) Model

Time series data in the ARIMA (Autoregressive Integrated Moving Average) model must be stationary, its mean that the average variation of the data used must be constant [22]. There are things that happen when the data is not stationary, so the differencing process is used to make the data stationary. The field of statistics often uses the Autoregressive Integrated Moving Average (ARIMA) model to analyze time series data. ARIMA has a better ability to model seasonal patterns and trends in stable data [23]. If the AR (Autoregressive), MA (Moving Average), or ARMA (Autoregressive Moving Average) model can not explain what the difference is, then a mixed model called ARIMA (Autoregressive Integrated Moving Average) or ARIMA (p,d,q) is used. Linear functions of the present value, previous value, and previous error are used in a stationary series mixed model.

II. RESEARCH METHOD

Research Type

This research uses a quantitative research method, the research method that uses numbers and statistics in collecting data, so that data analysis can be measured. This research uses forecasting analysis to test the performance

results of Agen Jatim for the next period. This research examines the role of Agen Jatim as Bank Jatim's branchless banking in facilitating transactions, especially for the Tuban people.

Data Source

The data used in this research is secondary time series data that obtained from Bank Jatim in the form of the performance of Agen Jatim for the period January 2021 to December 2023.

Data Analysis

The research uses quantitative data, data analysis uses forecasting analysis using the ARIMA (Autoregressive Integrated Moving Average) method. ARIMA analysis is used because it has great accuracy for short-term forecasting, while for long-term forecasting it is not accurate, it will flat (flat/constant) for quite a long period [24]. The following are the stages of forecasting analysis using ARIMA modeling time series data according to [25]:

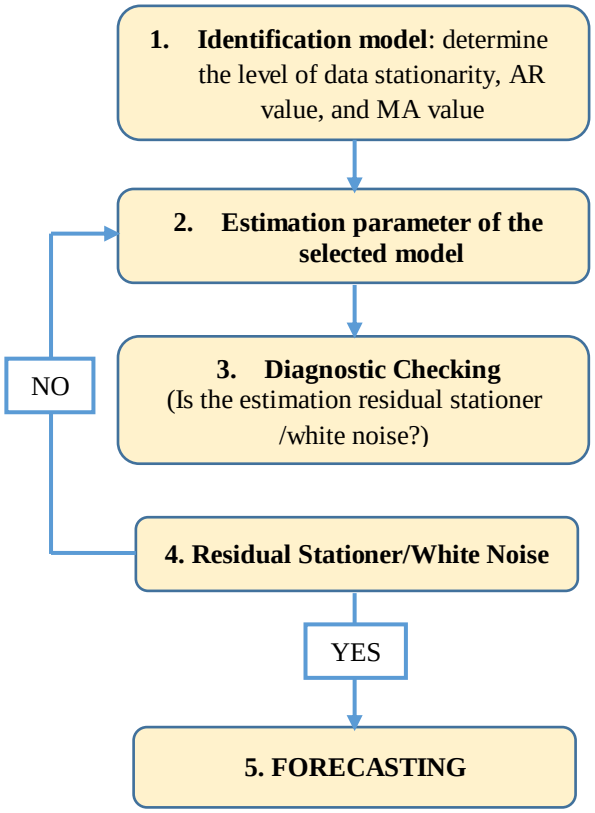


Figure 3. ARIMA Model Stages

Stage 1 (identify model)

First of all do the stationarity test to calculate the d value. Before determining the ARIMA model (p,d,q), do the modifications first so it becomes stationary data. The way to do this is through a differencing process, reducing the data value for one period to the previous period. If the data is stationary, the next step is to determine p and q for the ARIMA parameters by looking at the autocorrelation (ACF) and partial autocorrelation (PACF) patterns in the data. Test results will help choose the right model.

Stage 2 (estimate the selected parameters)

Parameter estimation, if more than one candidate is selected, parameter estimation will be tested one by one. After all estimates have been carried out, the best model is selected.

Stage 3 (choose the best model)

At this stage, diagnostic test is carried out, namely parameter significance tests and residual assumption tests. If the residual is white noise, it indicates that the selected model fits the data. On the other hand, if the residual is not white noise, it means that the selected model is not suitable. So the process must be repeated from the beginning again or iterated. The final process is forecasting.

Research Framework

An overview of the flow carried out in this research, with the flowchart below to get a clear picture of the research:

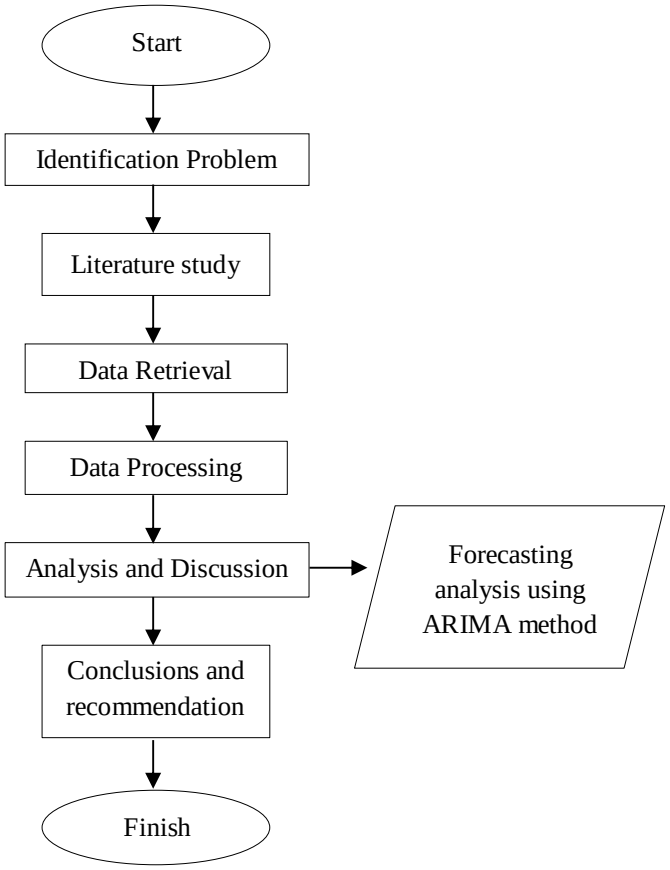


Figure 4. Research Framework

The research carried out starts from identifying the information needed to solve the problem. Information was obtained by collecting data from several sources, both previous literature and based on actual information obtained from Bank Jatim. Next, do analyze and understand the literature study texts that have been obtained in accordance with the problems taken in this research. The next step is to collect data performance of Agen Jatim branch Tuban . The data that has been obtained then carried out to the process of data analysis and interpretation to provide a clear picture or description of the characteristics, patterns and relationships in the data. The data analysis that was decided was to use forecasting analysis using ARIMA method so that it was hoped that could find out the results of the performance of Agen Jatim branch Tuban for the period January 2024. The forecast analysis carried out was using the ARIMA method, the application used was eviews, with stages, identifying the model for determine the level of stationarity data, AR and MA values, estimate the parameters of the selected model, and do the diagnostic test to calculate estimates of stationary residuals or white noise. If the data shows stationary, then do the forecasting analysis, if not, return to the stage First. After the forecasting analysis has obtained the result for the period January 2024, it can draw conclusions and results from the research that has been done.

III. RESULT AND DISCUSSION

The data of this research obtained from Bank Jatim regarding the number of agent, amount of saving, and NoA of Agen Jatim branch Tuban from January 2021 – December 2023.

a. Number of Agen Jatim

The first stage is do the stationary test, the Agen Jatim data for the period January 2021-December 2023 is entered into the Eviews tool. The research data is stationary or not, is by looking at a graph of the data

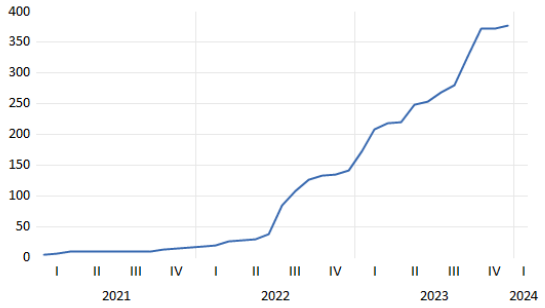


Figure 5. Plot Data Graph for Number of Agen Jatim branch Tuban

The graph shows that the data is not stationary on average, it can be seen from the movement of the number of Agen Jatim branch Tuban each year which tends to experience an inconsistent increase, so differencing data is needed to determine "d" value using the Augmented Dickey-Fuller (ADF) test on the Unit Root Test. Eviews tools can do the differencing twice. If stationary test result the data is not stationary, then a Box-Cox transformation must be carried out [26]

Null Hypothesis: Y has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.520580	1.0000
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

*MacKinnon (1996) one-sided p-values.

(a)

Null Hypothesis: D(Y) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.639483	0.0100
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

(b)

Table 1. (a) Unit root test on Level (b) Unit root test on 1st Difference

Table 2(a) shows that the probability of the unit root test at the level is 1.00 > 0.05 so that this data can be said to be non-stationary at the level. Meanwhile, in Table 2(b) it get stationary data at the 1st difference because the value is 0.01 < 0.05, so get value of order d = 1. The next step, do the correlogram test to determine ARIMA model (p, d, q). In the correlogram test, there are 2 functions that determine the ARIMA model (p, d, q), namely ACF and PACF. ACF is an Autocorrelation function and PACF is a Partial Autocorrelation Function. Autocorrelation Function (ACF) calculates and plots the autocorrelation of a time series. Autocorrelation is the correlation between observations of a time series separated by k unit, while ACF is a plot used to show the correlation between points, up to a unit lag [27].

Date: 05/11/24 Time: 21:06
Sample (adjusted): 2021M02 2023M12
Included observations: 35 after adjustments

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.417	0.417	6.6314	0.010
		2	0.028	-0.177	6.6616	0.036
		3	0.004	0.080	6.6622	0.083
		4	0.149	0.151	7.5957	0.108
		5	0.171	0.044	8.8533	0.115
		6	0.156	0.101	9.9412	0.127
		7	0.275	0.247	13.446	0.062
		8	0.242	0.037	16.253	0.039
		9	0.002	-0.140	16.253	0.062
		10	-0.056	0.019	16.418	0.088
		11	-0.127	-0.247	17.283	0.100
		12	-0.024	0.007	17.316	0.138
		13	0.029	-0.032	17.366	0.183
		14	0.137	0.109	18.531	0.184
		15	0.023	-0.121	18.566	0.234
		16	-0.218	-0.160	21.819	0.149

Table 2. Correlogram on 1st difference

The Autocorrelation (ACF) and Partial Autocorrelation (PACF) decrease from the first lag, so that the first possibility is p = 1; q = 0 and the second possibility p = 0 ; q = 1. The ARIMA (p,d,q) models that can be formed

are ARIMA (1,1,0) or AR(1) and ARIMA (0,1,1) or MA(1). Next, an AR(1) and MA(1) estimation test was carried out using the estimation equation.

Dependent Variable: D(Y)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 05/11/24 Time: 21:09
Sample: 2021M02 2023M12
Included observations: 35
Convergence achieved after 9 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.33359	7.651146	1.350594	0.1863
AR(1)	0.413114	0.192300	2.148283	0.0394
SIGMASQ	167.6633	58.14437	2.883569	0.0070

R-squared	0.177219	Mean dependent var	10.62857
Adjusted R-squared	0.125795	S.D. dependent var	14.48343
S.E. of regression	13.54185	Akaike info criterion	8.136610
Sum squared resid	5868.215	Schwarz criterion	8.269926
Log likelihood	-139.3907	Hannan-Quinn criter.	8.182630
F-statistic	3.446243	Durbin-Watson stat	1.831617
Prob(F-statistic)	0.044111		

Inverted AR Roots	.41

(a)

Dependent Variable: D(Y)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 05/11/24 Time: 21:12
Sample: 2021M02 2023M12
Included observations: 35
Convergence achieved after 12 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.56697	5.262782	2.007868	0.0532
MA(1)	0.450150	0.163287	2.756799	0.0096
SIGMASQ	163.6350	51.40728	3.183110	0.0032

R-squared	0.196987	Mean dependent var	10.62857
Adjusted R-squared	0.146799	S.D. dependent var	14.48343
S.E. of regression	13.37818	Akaike info criterion	8.113414
Sum squared resid	5727.226	Schwarz criterion	8.246730
Log likelihood	-138.9847	Hannan-Quinn criter.	8.159435
F-statistic	3.924957	Durbin-Watson stat	1.894032
Prob(F-statistic)	0.029892		

Inverted MA Roots	-.45

(b)

Table 3. (a) Estimate equation AR(1) ; (b) Estimate equation MA(1)

The best ARIMA model is look at test results using an estimate equation with criteria including higher adjusted R-squared, lower Akaike Info Criterion (AIC), and lower Schwarz Criterion [28]. The estimation equation result shows that Adjusted R-squared AR(1) < MA(1), Sum squared resid AR(1) > MA(1), Akaike info criterion AR(1) > MA(1), and Schwarz criterion AR(1) > MA(1). So it can be concluded that MA(1) or the ARIMA model (0,1,1) is better than AR(1) or the ARIMA model (1,1,0). The next step is do the diagnostic check through the white noise test of the model, namely the residual autocorrelation test and the residual heteroscedasticity test. Research [29] states that value of correlogram Q statistic must > 0.05 because if less than 0.05 it is assumptions and empirical properties.

Date: 05/11/24 Time: 21:13
Sample (adjusted): 2021M02 2023M12
Q-statistic probabilities adjusted for 1 ARMA term

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.046	0.046	0.0789	
		2	0.029	0.027	0.1127	0.737
		3	-0.055	-0.058	0.2365	0.888
		4	0.143	0.148	1.0916	0.779
		5	0.102	0.093	1.5375	0.820
		6	0.056	0.037	1.6799	0.891
		7	0.178	0.194	3.1520	0.790
		8	0.223	0.215	5.5370	0.595
		9	-0.098	-0.148	6.0141	0.646
		10	0.038	0.047	6.0871	0.731
		11	-0.162	-0.210	7.5102	0.677
		12	0.056	-0.069	7.6859	0.741
		13	-0.045	-0.075	7.8069	0.800
		14	0.143	0.095	9.0651	0.768
		15	0.037	0.007	9.1520	0.821
		16	-0.182	-0.180	11.421	0.722

Table 4. Correlogram Q-statistic MA(1) or ARIMA (0,1,1) model

The results of the Q statistical correlogram on the ARIMA (0,1,1) model shows that the average probability value is greater than 0.05 so the ARIMA (0,1,1) model can do the forecasting.

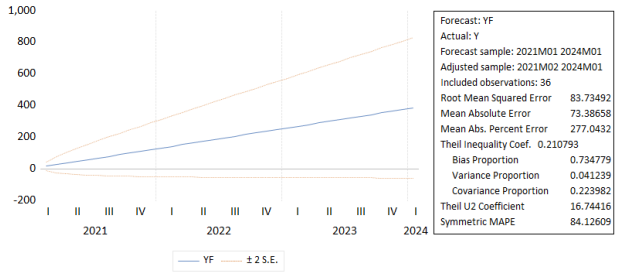


Figure 6. Forecating Result Number of Agen Jatim branch Tuban period Januari 2024

The Agen Jatim branch Tuban forecasting graph shows an increase in January 2024 with number of 385.41 agents. Target number of Agen Jatim branch Tuban on January 2024 is 387, so the forecasting result with the target is not much different, so forecasting using ARIMA model very recommended for Bank Jatim to determine the next target the number of Agen Jatim branch Tuban. The increase in number of Agen Jatim shows that the presence of Agen Jatim in Tuban Regency is very influential, especially for the Tuban people. Based on research [30], after survey to the 10 branchless banking agent, it showed that the people who use the branchless banking services are mostly people who work in the informal sector, such as farmer, fishermen and industry, they prefer to use that agent services around their home. This is in accordance the conditions in Tuban Regency where the profession majority is as farmers, fishermen, traders, livestock breeders and so on, they prefer to make transactions with the nearest Agen Jatim rather than going to the bank which far from their home. The number of Agen Jatim branch Tuban has a big influence on the number of transactions carried out by the Tuban people. The increasing number of Agen Jatim, the more people will know about Bank Jatim and make transactions using Bank Jatim and this can be made easier by the presence of Agen Jatim. If the number of Agen Jatim branch Tuban continues to increase every month, many Tuban people will make transactions using Bank Jatim, this will make Bank Jatim as a transactional bank in Tuban Regency.

b. Amount of Saving

Before doing modeling or forecasting using time series data for next period, the very important things to do is stationary test [31].

Figure 7. Plot Data Graph Amount of Saving Agen Jatim branch Tuban

The research of [32] state that, if the data from stationary test is not constant so the data is non-stationary data so it must be decomposed immediately . However, the data graph on the amount of saving Agen Jatim branch Tuban shows that the amount of saving Agen Jatim unstable, increases and decreases simultaneously, so the data is classified as non-stationary data, so it must do the stationary test using the Augmented Dickey-Fuller (ADF) test on the unit root test.

Null Hypothesis: Y has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.755163	0.3953
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

(a)

Null Hypothesis: D(Y) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.562443	0.01114
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

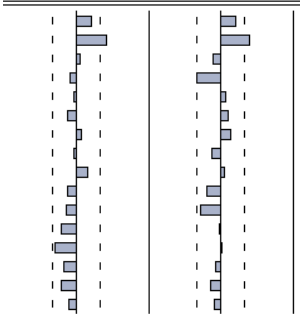
*MacKinnon (1996) one-sided p-values.

(b)

Table 5. (a) Unit root test on Level (b) Unit root test on 1st Difference

Based on the results of the Augmented Dickey-Fuller (ADF) test, it was found that the data was stationary at the 1st difference because the value was 0.01 < 0.05, so that the value of order d = 1 was obtained. After obtaining the stationary data, the correlogram was checked by paying attention to the ACF and PACF values for determine the ARIMA model (p,d,q).

Date: 05/22/24 Time: 16:37
Sample (adjusted): 2021M02 2023M12
Included observations: 35 after adjustments



	Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1			0.210	0.210	1.6758	0.195
2			0.442	0.416	9.3382	0.009
3			0.051	-0.114	9.4454	0.024
4			-0.096	-0.347	9.8316	0.043
5			-0.033	0.068	9.8796	0.079
6			-0.135	0.109	10.694	0.098
7			0.080	0.132	10.990	0.139
8			-0.046	-0.120	11.093	0.196
9			0.156	0.063	12.301	0.197
10			-0.124	-0.190	13.099	0.218
11			-0.153	-0.287	14.358	0.214
12			-0.209	-0.023	16.818	0.157
13			-0.315	0.023	22.676	0.046
14			-0.176	-0.082	24.588	0.039
15			-0.222	-0.142	27.785	0.023
16			-0.099	-0.098	28.448	0.028

Table 6. Correlogram on 1st difference

ACF will be used to determine the order of the MA process, while PACF will determine the order of the AR process [33]. The Autocorrelation (ACF) and Partial Autocorrelation (PACF) plots have decreased compared to the second row (figure 6), so that the first possibility is p = 1; q = 2 , second possibility p =2 ; q = 1, third possibility p = 0 ; q = 1, fourth possibility p = 0 ; q = 2. The ARIMA (p,d,q) models that can be formed are ARIMA (1,1,2), ARIMA (2,1,1), ARIMA (2,1,2), ARIMA (1,1, 1), ARIMA (0,1,1), ARIMA (0,1,2), ARIMA (1,1,0), or ARIMA (2,1,0). If the ARIMA model has been formed, the next step is do the estimation test using the estimate equation. Estimate equations can be used to quickly present statistical results [34].

Dependent Variable: D(Y)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 05/22/24 Time: 19:39
Sample: 2021M02 2023M12
Included observations: 35
Convergence achieved after 33 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1865699.	2435211.	0.766135	0.4494
AR(1)	0.175123	0.140135	1.249680	0.2208
MA(2)	0.734449	0.186375	3.940716	0.0004
SIGMASQ	3.88E+13	1.01E+13	3.850277	0.0006

R-squared	0.422976	Mean dependent var	2364520.
Adjusted R-squared	0.367135	S.D. dependent var	8323937.
S.E. of regression	6621925.	Akaike info criterion	34.40334
Sum squared resid	1.36E+15	Schwarz criterion	34.58110
Log likelihood	-598.0585	Hannan-Quinn criter.	34.46470
F-statistic	7.574650	Durbin-Watson stat	2.026119
Prob(F-statistic)	0.000612		

(a)

Dependent Variable: D(Y)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 05/22/24 Time: 19:40
Sample: 2021M02 2023M12
Included observations: 35
Convergence achieved after 13 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1397667.	3761340.	0.371587	0.7127
AR(2)	0.519833	0.177621	2.926638	0.0064
MA(1)	0.131899	0.147301	0.895434	0.3775
SIGMASQ	4.93E+13	1.11E+13	4.443017	0.0001

R-squared	0.266840	Mean dependent var	2364520.
Adjusted R-squared	0.195889	S.D. dependent var	8323937.
S.E. of regression	7464258.	Akaike info criterion	34.61434
Sum squared resid	1.73E+15	Schwarz criterion	34.79210
Log likelihood	-601.7510	Hannan-Quinn criter.	34.67570
F-statistic	3.760915	Durbin-Watson stat	1.922311
Prob(F-statistic)	0.020614		

(b)

Dependent Variable: D(Y)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 05/22/24 Time: 19:40
Sample: 2021M02 2023M12
Included observations: 35
Convergence achieved after 13 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1397667.	3761340.	0.371587	0.7127
AR(2)	0.519833	0.177621	2.926638	0.0064
MA(1)	0.131899	0.147301	0.895434	0.3775
SIGMASQ	4.93E+13	1.11E+13	4.443017	0.0001

R-squared	0.266840	Mean dependent var	2364520.
Adjusted R-squared	0.195889	S.D. dependent var	8323937.
S.E. of regression	7464258.	Akaike info criterion	34.61434
Sum squared resid	1.73E+15	Schwarz criterion	34.79210
Log likelihood	-601.7510	Hannan-Quinn criter.	34.67570
F-statistic	3.760915	Durbin-Watson stat	1.922311
Prob(F-statistic)	0.020614		

(c)

Dependent Variable: D(Y)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 05/22/24 Time: 19:46
Sample: 2021M02 2023M12
Included observations: 35
Convergence achieved after 45 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1810357.	4263316.	0.424636	0.6740
AR(1)	0.721272	0.324968	2.219516	0.0339
MA(1)	-0.467331	0.413975	-1.128889	0.2676
SIGMASQ	5.99E+13	9.91E+12	6.040538	0.0000

R-squared	0.110338	Mean dependent var	2364520.
Adjusted R-squared	0.024242	S.D. dependent var	8323937.
S.E. of regression	8222425.	Akaike info criterion	34.79437
Sum squared resid	2.10E+15	Schwarz criterion	34.97213
Log likelihood	-604.9015	Hannan-Quinn criter.	34.85573
F-statistic	1.281565	Durbin-Watson stat	2.268287
Prob(F-statistic)	0.297981		

(d)

Dependent Variable: D(Y)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 05/22/24 Time: 19:48
Sample: 2021M02 2023M12
Included observations: 35
Convergence achieved after 8 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2335087.	1784915.	1.308234	0.2001
MA(1)	0.113471	0.133171	0.852074	0.4005
SIGMASQ	6.57E+13	1.19E+13	5.529354	0.0000

R-squared	0.024144	Mean dependent var	2364520.
Adjusted R-squared	-0.036847	S.D. dependent var	8323937.
S.E. of regression	8475905.	Akaike info criterion	34.82554
Sum squared resid	2.30E+15	Schwarz criterion	34.95886
Log likelihood	-606.4469	Hannan-Quinn criter.	34.87156
F-statistic	0.395864	Durbin-Watson stat	1.869603
Prob(F-statistic)	0.676349		

(e)

Dependent Variable: D(Y)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 05/22/24 Time: 19:49
Sample: 2021M02 2023M12
Included observations: 35
Convergence achieved after 33 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1909701.	1924771.	0.992171	0.3286
MA(2)	0.745607	0.167821	4.442863	0.0001
SIGMASQ	4.01E+13	9.43E+12	4.255529	0.0002

R-squared	0.403745	Mean dependent var	2364520.
Adjusted R-squared	0.366479	S.D. dependent var	8323937.
S.E. of regression	6625359.	Akaike info criterion	34.37891
Sum squared resid	1.40E+15	Schwarz criterion	34.51223
Log likelihood	-598.6309	Hannan-Quinn criter.	34.42493
F-statistic	10.83414	Durbin-Watson stat	1.622609
Prob(F-statistic)	0.000255		

(f)

Dependent Variable: D(Y)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 05/22/24 Time: 19:50
Sample: 2021M02 2023M12
Included observations: 35
Convergence achieved after 23 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2276735.	2118689.	1.074596	0.2906
AR(1)	0.212194	0.133377	1.590933	0.1215
SIGMASQ	6.42E+13	1.12E+13	5.740985	0.0000

R-squared	0.045796	Mean dependent var	2364520.
Adjusted R-squared	-0.013842	S.D. dependent var	8323937.
S.E. of regression	8381350.	Akaike info criterion	34.80405
Sum squared resid	2.25E+15	Schwarz criterion	34.93736
Log likelihood	-606.0709	Hannan-Quinn criter.	34.85007
F-statistic	0.767894	Durbin-Watson stat	2.159694
Prob(F-statistic)	0.472349		

(g)

Dependent Variable: D(Y)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 05/22/24 Time: 19:53
Sample: 2021M02 2023M12
Included observations: 35
Convergence achieved after 8 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1421181.	3347571.	0.424541	0.6740
AR(2)	0.524651	0.171981	3.050630	0.0046
SIGMASQ	5.06E+13	1.06E+13	4.765218	0.0000

R-squared	0.248538	Mean dependent var	2364520.
Adjusted R-squared	0.201571	S.D. dependent var	8323937.
S.E. of regression	7437841.	Akaike info criterion	34.58227
Sum squared resid	1.77E+15	Schwarz criterion	34.71559
Log likelihood	-602.1898	Hannan-Quinn criter.	34.62829
F-statistic	5.291815	Durbin-Watson stat	1.591447
Prob(F-statistic)	0.010340		

(h)

Table 7. Estimate equation
(a) Estimate equation ARIMA (1,1,2) ; (b) Estimate equation ARIMA (2,1,1) ;
(c) Estimate equation ARIMA (2,1,2) ; (d) Estimate equation ARIMA (1,1,1) ;
(e) Estimate equation ARIMA (0,1,1) ; (f) Estimate equation ARIMA (0,1,2) ;
(g) Estimate equation ARIMA (1,1,0) ; (h) Estimate equation ARIMA (2,1,0)

Based on the table above, the results show that the Adjusted R-squared value is larger, the Sum squared resid is smaller, the Akaike info criterion is smaller, and the Schwarz criterion is smaller. So it can be concluded that the ARIMA (2,1,2) model is better than the ARIMA (1,1,2), ARIMA (2,1,1), ARIMA (1,1,1), ARIMA (0,1, 1), ARIMA (0,1,2), ARIMA (1,1,0), and ARIMA (2,1,0). Before do forecasting the ARIMA (2,1,2) model, it must to check the Q-statistic correlogram first.

Date: 05/22/24 Time: 20:02
Sample (adjusted): 2021M02 2023M12
Q-statistic probabilities adjusted for 2 ARMA terms

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.161	0.161	0.9833	
		2	0.083	0.059	1.2569	
		3	0.075	0.054	1.4824	0.223
		4	-0.128	-0.157	2.1701	0.338
		5	-0.116	-0.086	2.7508	0.432
		6	-0.172	-0.136	4.0732	0.396
		7	-0.017	0.066	4.0868	0.537
		8	0.119	0.143	4.7698	0.574
		9	0.235	0.223	7.5299	0.376
		10	-0.046	-0.198	7.6390	0.470
		11	0.006	-0.064	7.6412	0.571
		12	-0.187	-0.257	9.6003	0.476
		13	-0.223	-0.071	12.515	0.326
		14	-0.111	0.031	13.278	0.349
		15	-0.222	-0.070	16.466	0.225
		16	-0.119	-0.174	17.425	0.234

Table 8. Correlogram Q-statistic ARIMA (2,1,2)

Based on [35] if the probability value is greater than 0.05, it can be concluded that H0 is rejected, while Ha is accepted, so it can do forcasting test. This research, the probability of the Q-statistic correlogram is more than

0.05 so the forecasting test can be carried out to determine the amount of saving accounts Agen Jatim branch Tuban period January 2024.

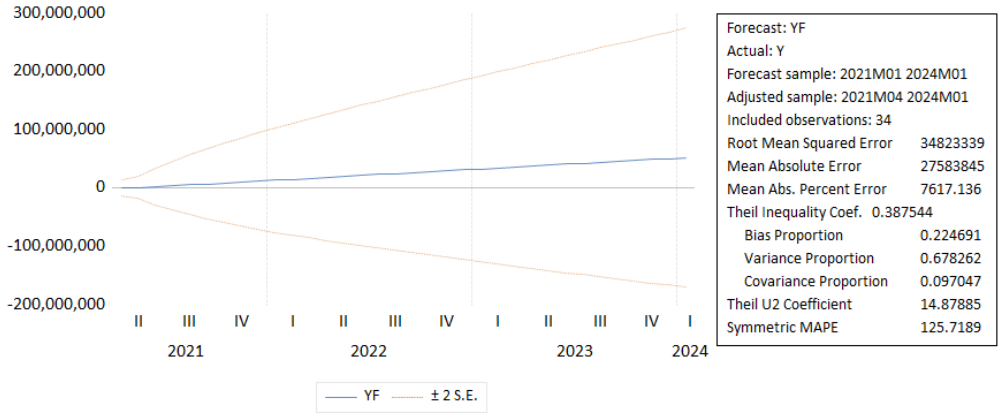


Figure 8. Forecasting Result the Amount of Saving Agen Jatim branch Tuban Period January 2024

The results forecasting the amount of saving Agen Jatim branch Tuban showed that there would be an increase in the amount of saving in January 2024, totally Rp. 52,464,254.00. If the amount of saving Agen Jatim branch Tuban continues to increase every month, this indicates that many Tuban people do transactions using Bank Jatim. This must be maintained by Bank Jatim by providing the best service to customers who make transactions using the branchless banking and accepting criticism and suggestions from customers so that it can become better. The increase in the amount of saving Agen Jatim branch Tuban indicates that Bank Jatim has become a transactional bank in Tuban Regency and chooses to save money in Bank Jatim accounts.

c. NoA (*Number of Amount*)

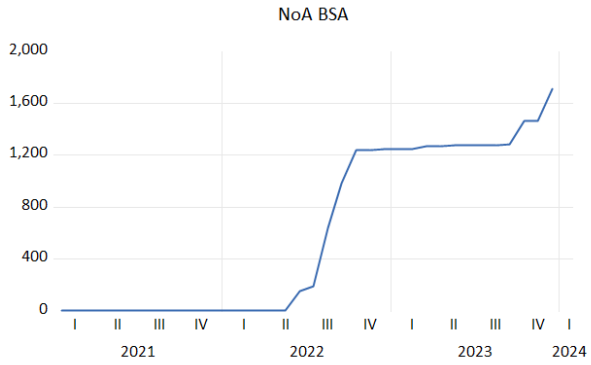


Figure 9. Plot Data Graph of NoA Agen Jatim branch Tuban

Number of Amount (NoA) is the number of accounts in a bank [36]. Figure 9 shows that the graph of NoA Agen Jatim branch Tuban is increase but not consistently. Based on that shows that the data is non-stationary because the graph does not show a constant mean and variance over time [37], so the differencing process test is carried out to make data becomes stationary. The differencing process is used to obtain the value (d) in the ARIMA model (p, d, q), while the values (p and q) are obtained from observing the Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF) plots. The process to find (d) value is by ADF (Augmented Dickey-Fuller) test. Augmented Dickey-Fuller test (ADF) also can identify the series is non-stationary [38].

Null Hypothesis: Y has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.032697	0.9488
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

(a)

Null Hypothesis: D(Y) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.059533	0.0394
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

(b)

Table 9. (a) Unit root test on Level (b) Unit root test on 1st Difference

Table 9(a) shows that the probability of the unit root test at the level is 0.09 > 0.05 so this data non-stationary at the level. Meanwhile, in Table 9(b), the data is stationary at the 1st difference because the value is 0.03 < 0.05, so we get a value of order d = 1.

Next, determine the ARIMA model (p, d, q) using the correlogram test

Date: 05/11/24 Time: 19:53
Sample (adjusted): 2021M02 2023M12
Included observations: 35 after adjustments

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.451	0.451	7.7556	0.005
		2	0.388	0.232	13.677	0.001
		3	-0.010	-0.331	13.681	0.003
		4	-0.071	-0.078	13.892	0.008
		5	-0.156	0.040	14.943	0.011
		6	-0.155	-0.075	16.015	0.014
		7	-0.148	-0.066	17.022	0.017
		8	-0.183	-0.113	18.624	0.017
		9	-0.167	-0.066	20.015	0.018
		10	-0.191	-0.079	21.901	0.016
		11	-0.199	-0.139	24.047	0.013
		12	-0.098	0.054	24.584	0.017
		13	-0.061	-0.013	24.804	0.024
		14	0.120	0.093	25.685	0.028
		15	0.022	-0.158	25.717	0.041
		16	0.168	0.088	27.639	0.035

Table 10. Correlogram on 1st difference

Based on Table 10, the Autocorrelation (ACF) and Partial Autocorrelation (PACF) plots have decreased compared to the first row, so the first possibility is p = 1; q = 0 and the second possibility p = 0 ; q = 1. The ARIMA (p,d,q) models that can be formed are ARIMA (1,1,0) or AR(1) and ARIMA (0,1,1) or MA(1)

Next, do the AR(1) and MA(1) estimation test by using estimation equation.

Dependent Variable: D(Y)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 05/11/24 Time: 19:56
Sample: 2021M02 2023M12
Included observations: 35
Convergence achieved after 6 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	52.88232	66.43575	0.795992	0.4319
AR(1)	0.486920	0.199916	2.435620	0.0206
SIGMASQ	9381.888	2258.865	4.153364	0.0002

R-squared	0.226604	Mean dependent var	48.97143
Adjusted R-squared	0.178267	S.D. dependent var	111.7477
S.E. of regression	101.2988	Akaike info criterion	12.16357
Sum squared resid	328366.1	Schwarz criterion	12.29689
Log likelihood	-209.8625	Hannan-Quinn criter.	12.20959
F-statistic	4.687981	Durbin-Watson stat	2.013087
Prob(F-statistic)	0.016384		

Inverted AR Roots	.49

(a)

Dependent Variable: D(Y)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 05/11/24 Time: 20:00
Sample: 2021M02 2023M12
Included observations: 35
Convergence achieved after 11 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	50.57022	50.73668	0.996719	0.3264
MA(1)	0.297405	0.131024	2.269850	0.0301
SIGMASQ	10499.94	3021.396	3.475195	0.0015

R-squared	0.134437	Mean dependent var	48.97143
Adjusted R-squared	0.080340	S.D. dependent var	111.7477
S.E. of regression	107.1649	Akaike info criterion	12.27108
Sum squared resid	367497.9	Schwarz criterion	12.40439
Log likelihood	-211.7438	Hannan-Quinn criter.	12.31710
F-statistic	2.485088	Durbin-Watson stat	1.587263
Prob(F-statistic)	0.099260		

Inverted MA Roots	-.30

(b)

Table 11. (a) Estimate equation AR(1) ; (b) Estimate equation MA(1)

Based on the table above, the results show that Adjusted R-squared AR(1) > MA(1), Sum squared resid AR(1) < MA(1), Akaike info criterion AR(1) < MA(1), and Schwarz criterion AR (1) < MA(1). So it can be concluded that AR(1) or ARIMA model (1,1,0) is better than MA(1) or ARIMA model (0,1,1)

Date: 05/11/24 Time: 19:58
Sample (adjusted): 2021M02 2023M12
Q-statistic probabilities adjusted for 1 ARMA term

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.085	-0.085	0.2754	
		2	0.309	0.303	4.0109	0.045
		3	-0.169	-0.139	5.1670	0.076
		4	-0.016	-0.138	5.1775	0.159
		5	-0.116	-0.032	5.7553	0.218
		6	-0.066	-0.055	5.9496	0.311
		7	-0.032	-0.016	5.9967	0.424
		8	-0.103	-0.104	6.5028	0.482
		9	-0.046	-0.084	6.6064	0.580
		10	-0.079	-0.050	6.9272	0.645
		11	-0.147	-0.187	8.0940	0.620
		12	-0.004	-0.031	8.0949	0.705
		13	-0.123	-0.095	8.9840	0.704
		14	0.167	0.091	10.703	0.636
		15	-0.135	-0.141	11.879	0.616
		16	0.334	0.202	19.471	0.193

Table 12. Correlogram Q-statistic AR(1) or ARIMA (1,1,0) Model

According to the research [39], if the data has an average probability that is not significant, it is greater than the real level of 5% or 0.05, then the model is the best model. This is commensurate with the results of this research, that the probability value is greater than 0.05 so that the NoA of Agen Jatim branch Tuban can be forecasted to see the predicted NoA in January 2024.

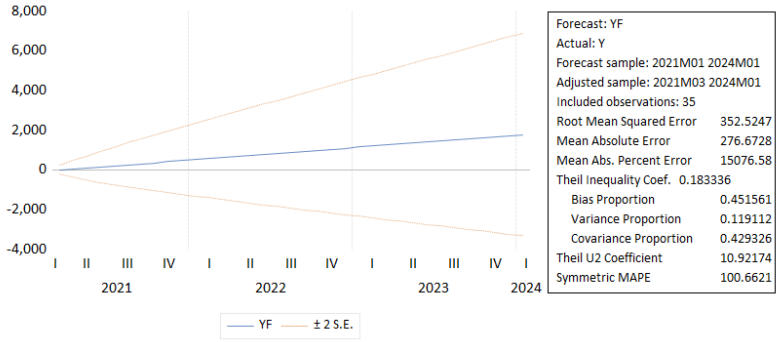


Figure 10. Forecasting NoA of Agen Jatim branch Tuban Period January 2024

Based on the figure above, the result shows that forecasting of NoA (Number of Amount) Agen Jatim branch Tuban will be increase in January 2024, totally 1801.69. If the NoA of Agen Jatim branch Tuban continues to increase every month, this indicates that many Tuban people are making transactions with branchless banking. This must be maintained by Bank Jatim by providing the best service for customers who make transactions using the branchless banking and accepting criticism and suggestions from customers so that it can be better.

IV. CONCLUSION

Based on the research and testing data results of the number of agents, amount of saving, and NoA of Agen Jatim branch Tuban shows that the best forecasting model for the number of agent is ARIMA (0,1,1) model, the best forecasting model for the amount of saving is ARIMA (2,1,2) model, and the best forecasting model for NoA is ARIMA (1,1,0) model. The number of agents, amount of saving, and NoA of Agen Jatim branch Tuban in January 2024 will increase, so the role of Agen Jatim branch Tuban is very important and has received a positive response from the Tuban people in terms of transactions using branchless banking. With the existence of the Agen Jatim, many people will get information about branchless banking, so they can make transactions using Bank Jatim. This means that more Agen Jatim there, more Tuban people will make transactions using the branchless banking. This research can be useful for Bank Jatim, with this research Bank Jatim can find out if Agen Jatim can make amount of saving and number of amount (NoA) increase.

The suggestion that expected for further research is needs to be developed further in terms of short term or long term forecasting. Research that can be developed using other models is expected to produce smaller prediction error values and better forecasting. Research is expected to use other models for the long term, because the ARIMA method is not good when applied for long term forecasting..

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