Time Series Forecasting of Bajaj Finance using EViews

1. Brief Introduction

Bajaj Finance Ltd. is a leading non-banking financial company in India offering consumer finance, SME finance and wealth products. This project builds a short-term 10-day forecast of Bajaj Finance's price series using ARIMA models in EViews.
Data coverage : Start date: 9/19/2024, End date: 9/19/2025 *250 observations used*.

2. Data & Naming Conventions

- **Original series (raw):** price and pricem (for series with missing data- which interpolated)
- **Interpolated series:** pricenew
- **Log returns:** logprice
- **1st difference series:** dprice

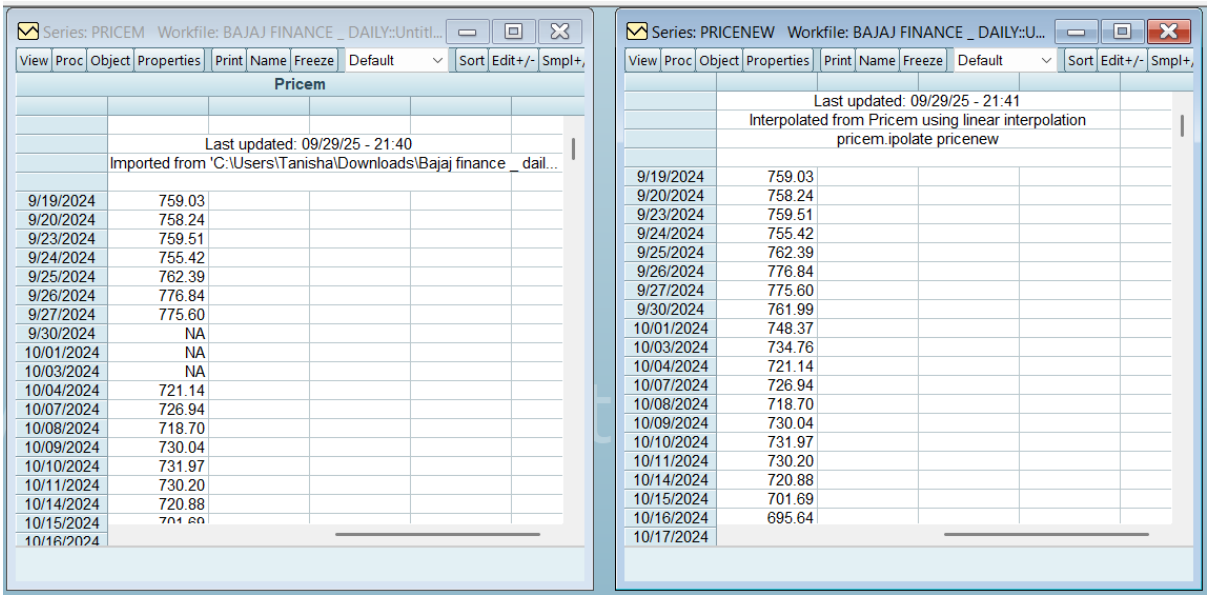
3. Steps followed

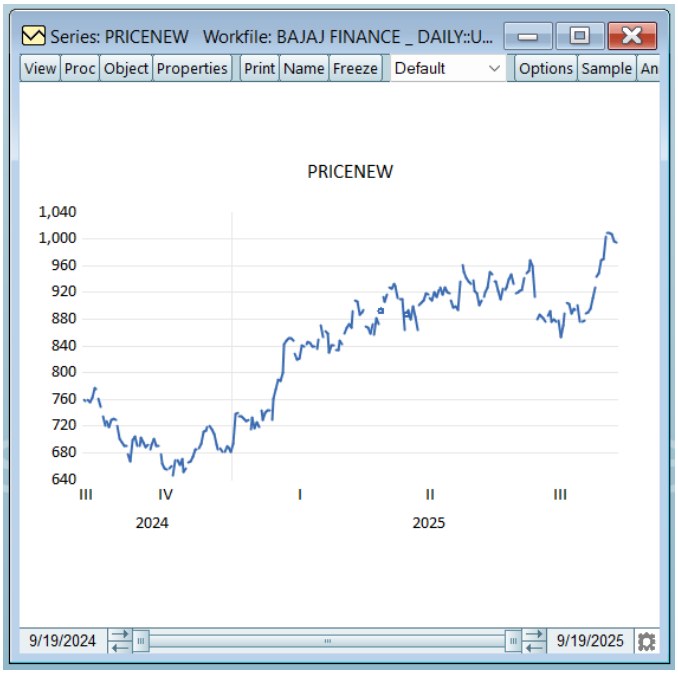
3.1 Import & prepare the data

- Imported historical daily closing prices into EViews

3.2 Interpolate missing values

- Checked for missing observations in pricem series.
- Applied interpolation to fill missing values (method: **proc -> interpolate-> named it as pricenew**).



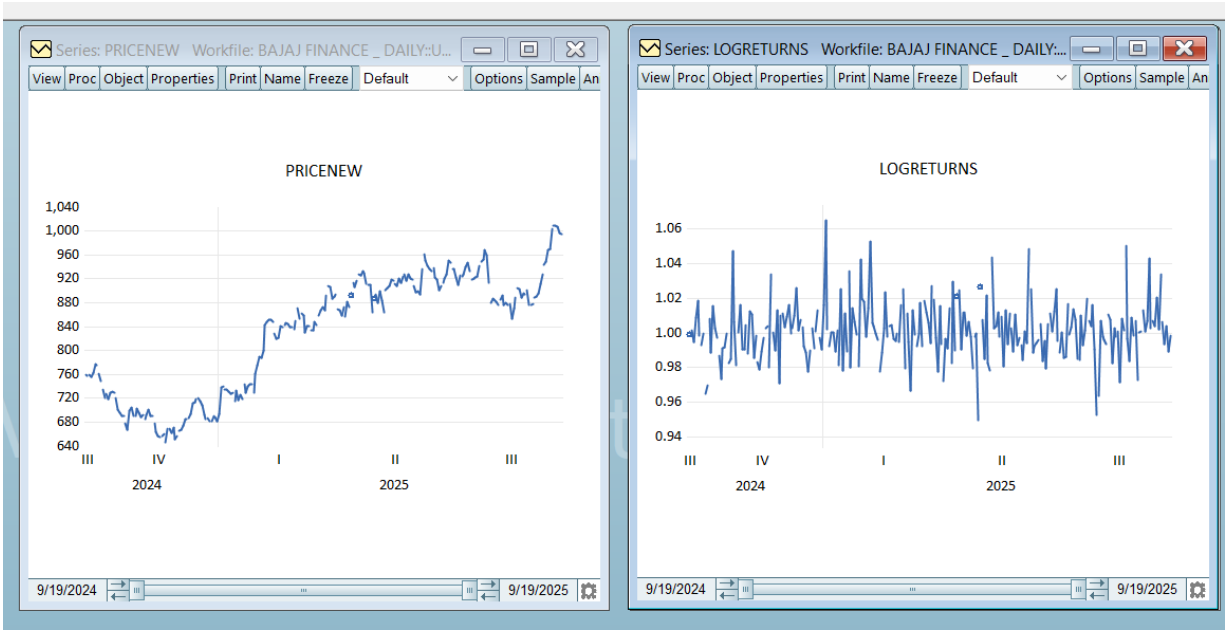


3.3 Generate log returns

- Created log returns to stationarize the series **[genr logprice = price(-1)]**
- Generated 1st difference for the series **[genr dprice = d(price)]**

3.4 Plot series

- Plotted:
    - Original price series — show trend and volatility.
    - Log Returns — show mean reverting behaviour.

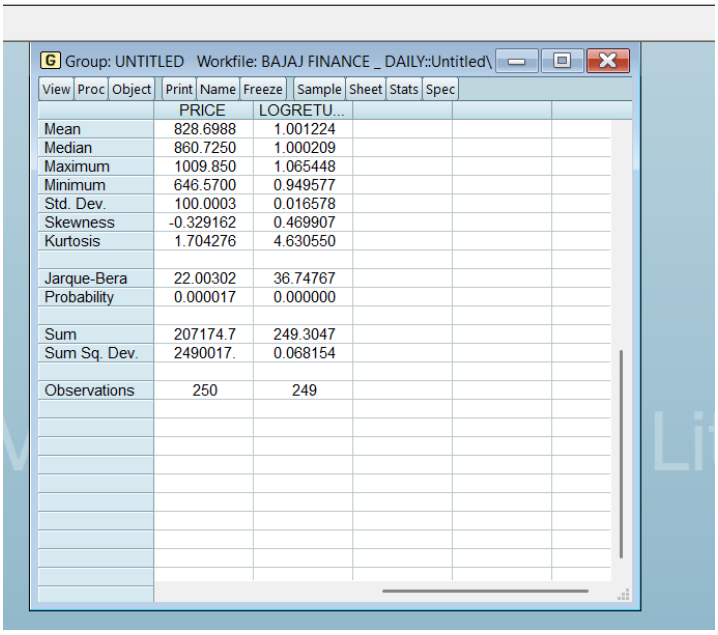


inference:

PriceNew shows a clear trend with episodes of volatility. LogReturns fluctuates around zero with occasional large spikes indicating high volatility episodes. Returns look more stationary to the eye.

3.5 Descriptive statistics

- Generated descriptive stats (mean, median, std. dev, skewness, kurtosis, Jarque–Bera) for both price and LogReturns.



	PRICE	LOGRETU...
Mean	828.6988	1.001224
Median	860.7250	1.000209
Maximum	1009.850	1.065448
Minimum	646.5700	0.949577
Std. Dev.	100.0003	0.016578
Skewness	-0.329162	0.469907
Kurtosis	1.704276	4.630550
Jarque-Bera	22.00302	36.74767
Probability	0.000017	0.000000
Sum	207174.7	249.3047
Sum Sq. Dev.	2490017.	0.068154
Observations	250	249

3.6 Unit root tests (ADF, PP, KPSS)

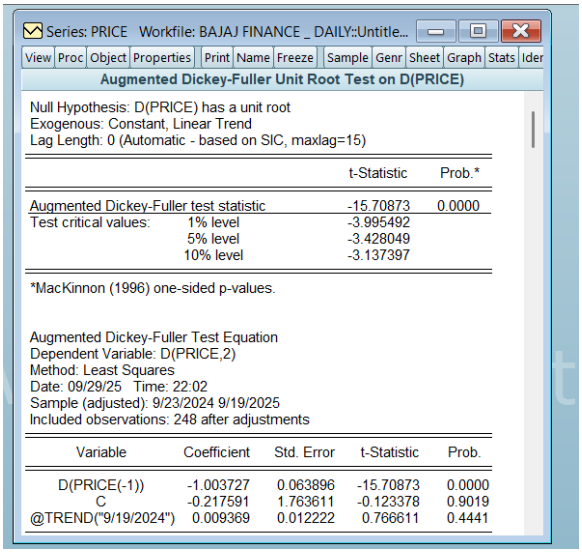
- Performed ADF, Phillips–Perron (PP) and KPSS tests on price series at 1st difference with trend and intercept for all 3.
- ADF & PP – H0: The series has a unit root

  H1: The series has no unit root
- KPSS – H0: The series is stationary around a deterministic trend

  H1: The series has a unit root, indicating it is non-stationary

Key interpretation

- For **1st difference**: for both ADF and PP tests test statistics is < than critical values at 1%, 5% and 10%. Therefore, reject null hypothesis (i.e. series is stationary)



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Augmented Dickey-Fuller Unit Root Test on D(PRICE)

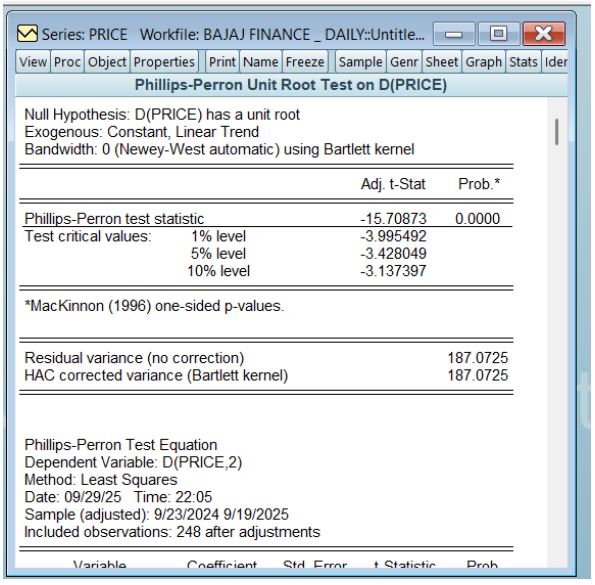
Null Hypothesis: D(PRICE) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=15)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-15.70873	0.0000
Test critical values:	1% level	-3.995492	
	5% level	-3.428049	
	10% level	-3.137397	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PRICE,2)
Method: Least Squares
Date: 09/29/25 Time: 22:02
Sample (adjusted): 9/23/2024 9/19/2025
Included observations: 248 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PRICE(-1))	-1.003727	0.063896	-15.70873	0.0000
C	-0.217591	1.763611	-0.123378	0.9019
@TREND("9/19/2024")	0.009369	0.012222	0.766611	0.4441



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Phillips-Perron Unit Root Test on D(PRICE)

Null Hypothesis: D(PRICE) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-15.70873	0.0000
Test critical values:	1% level	-3.995492	
	5% level	-3.428049	
	10% level	-3.137397	

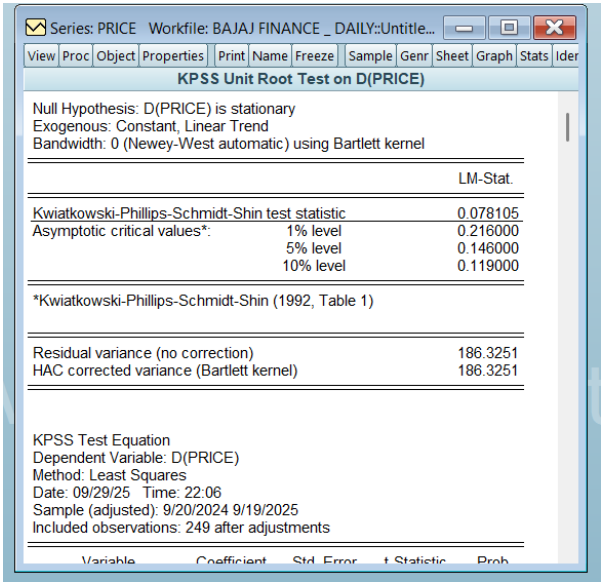
*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	187.0725
HAC corrected variance (Bartlett kernel)	187.0725

Phillips-Perron Test Equation
Dependent Variable: D(PRICE,2)
Method: Least Squares
Date: 09/29/25 Time: 22:05
Sample (adjusted): 9/23/2024 9/19/2025
Included observations: 248 after adjustments

Variable Coefficient Std. Error t-Statistic Prob.

- For KPSS test statistics is < than critical values at 1%, 5% and 10%. Therefore, we fail to reject null hypothesis (i.e. series is stationary)



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KPSS Unit Root Test on D(PRICE)

Null Hypothesis: D(PRICE) is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.078105
Asymptotic critical values*:	1% level	0.216000
	5% level	0.146000
	10% level	0.119000

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

Residual variance (no correction)	186.3251
HAC corrected variance (Bartlett kernel)	186.3251

KPSS Test Equation
Dependent Variable: D(PRICE)
Method: Least Squares
Date: 09/29/25 Time: 22:06
Sample (adjusted): 9/20/2024 9/19/2025
Included observations: 249 after adjustments

Variable Coefficient Std. Error t-Statistic Prob.

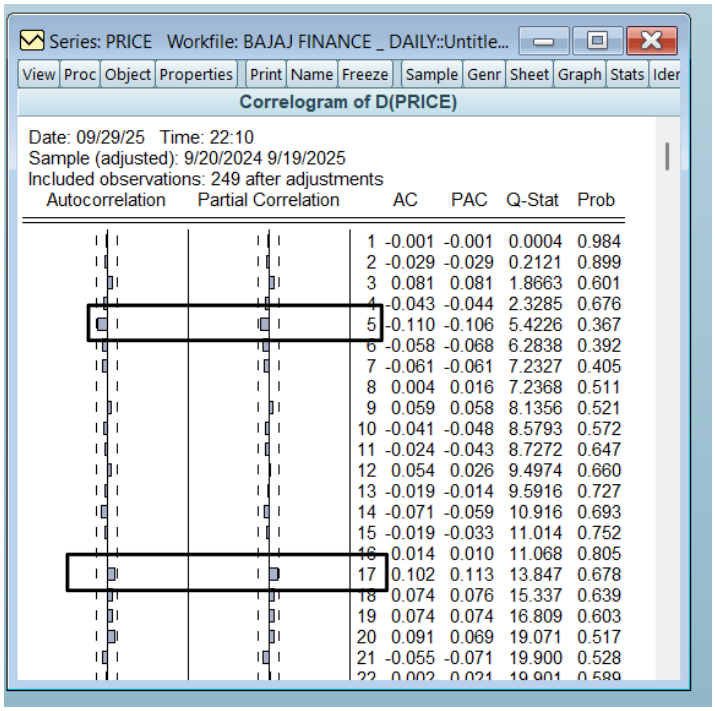
3.7 ACF & PACF

Plotted ACF and PACF of the price series but at 1st difference to identify mean process (ARMA(p,q)). In EViews: open Price series -> View -> Correlogram (select 1st difference).

ACF: significant spike at 5

PACF: significant spike at 17

Therefore, possible models can be ARMA- (5,17) or (5,5) or (17,5) or (17,17)



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Correlogram of D(PRICE)

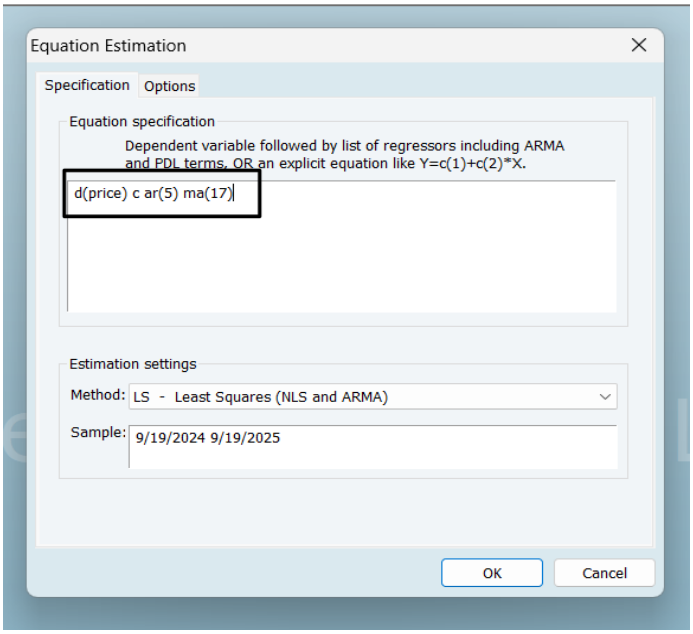
Date: 09/29/25 Time: 22:10
Sample (adjusted): 9/20/2024 9/19/2025
Included observations: 249 after adjustments

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.001	-0.001	0.0004	0.984
		2	-0.029	-0.029	0.2121	0.899
		3	0.081	0.081	1.8663	0.601
		4	-0.043	-0.044	2.3285	0.676
		5	-0.110	-0.106	5.4226	0.367
		6	-0.058	-0.068	6.2838	0.392
		7	-0.061	-0.061	7.2327	0.405
		8	0.004	0.016	7.2368	0.511
		9	0.059	0.058	8.1356	0.521
		10	-0.041	-0.048	8.5793	0.572
		11	-0.024	-0.043	8.7272	0.647
		12	0.054	0.026	9.4974	0.660
		13	-0.019	-0.014	9.5916	0.727
		14	-0.071	-0.059	10.916	0.693
		15	-0.019	-0.033	11.014	0.752
		16	0.014	0.010	11.068	0.805
		17	0.102	0.113	13.847	0.678
		18	0.074	0.076	15.337	0.639
		19	0.074	0.074	16.809	0.603
		20	0.091	0.069	19.071	0.517
		21	-0.055	-0.071	19.900	0.528
		22	0.002	0.021	19.901	0.589

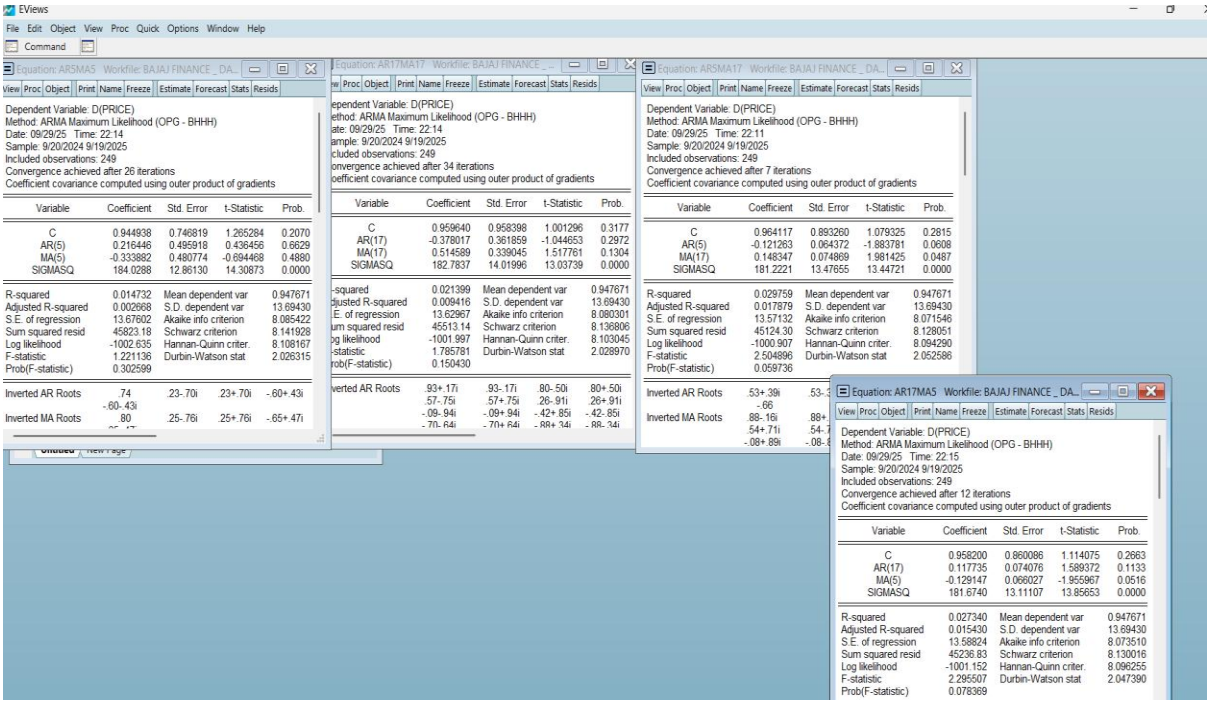
3.8 Choosing the ARIMA model and generating the 10-day forecast

a) Estimate models in EViews

- In EViews: Quick → Estimate Equation → Choose ARIMA and enter d(price) c ar(5) ma(17).



- Do same for rest 3. Save the estimation output for each model.

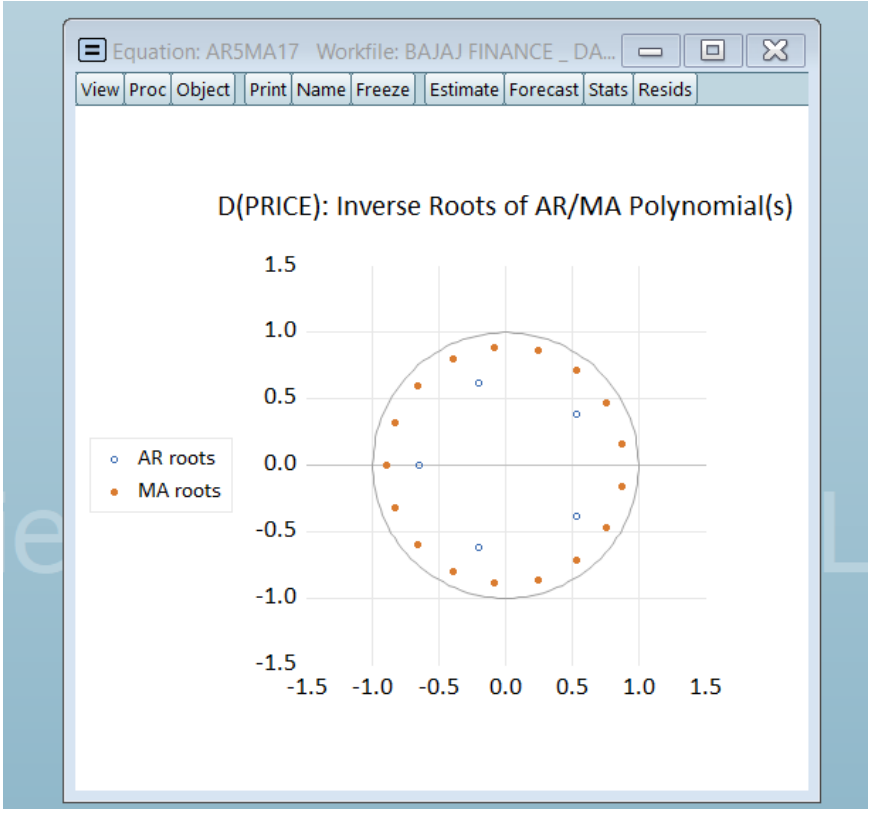


b) Compare the models

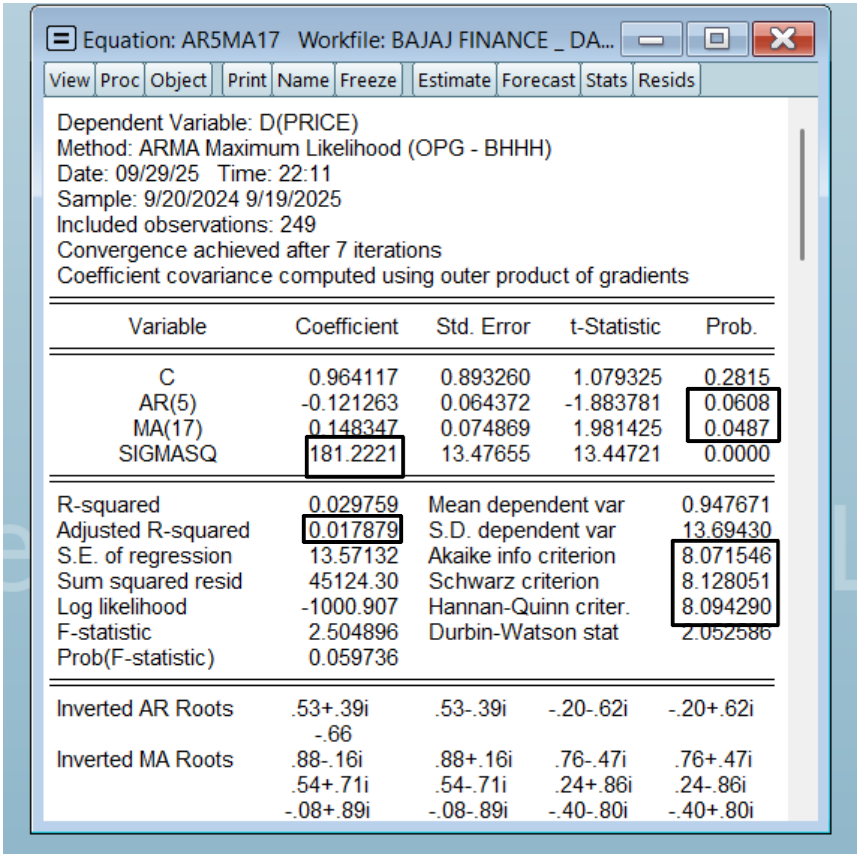
- AR & MA prob vales should be significant
- AIC, SIC and HQ criteria should be the smallest among all
- Volatility should be lowest
- Highest adj.R squared

c) Final model & diagnostics

Stability condition: check inverse roots of AR polynomial lie inside unit circle.



We can see that ARMA(5,17) is the best fit model as it checks all the above parameters.



Equation: AR5MA17 Workfile: BAJAJ FINANCE _ DA...

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Dependent Variable: D(PRICE)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 09/29/25 Time: 22:11
Sample: 9/20/2024 9/19/2025
Included observations: 249
Convergence achieved after 7 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.964117	0.893260	1.079325	0.2815
AR(5)	-0.121263	0.064372	-1.883781	0.0608
MA(17)	0.148347	0.074869	1.981425	0.0487
SIGMASQ	181.2221	13.47655	13.44721	0.0000

R-squared	0.029759	Mean dependent var	0.947671
Adjusted R-squared	0.017879	S.D. dependent var	13.69430
S.E. of regression	13.57132	Akaike info criterion	8.071546
Sum squared resid	45124.30	Schwarz criterion	8.128051
Log likelihood	-1000.907	Hannan-Quinn criter.	8.094290
F-statistic	2.504896	Durbin-Watson stat	2.052586
Prob(F-statistic)	0.059736		

Inverted AR Roots	.53+.39i	.53-.39i	-.20-.62i	-.20+.62i
	-.66			
Inverted MA Roots	.88-.16i	.88+.16i	.76-.47i	.76+.47i
	.54+.71i	.54-.71i	.24+.86i	.24-.86i
	-.08+.89i	-.08-.89i	-.40-.80i	-.40+.80i

- **Forecasting for next 10 days**: extend your workfile range to include **10 future business days** (Workfile → Edit Range → extend the end date by 10 observations). The series will show 10 blank (NA) entries at the end.
- **Generate forecast**: after estimating the final ARMA model, use **Forecast** button, set the forecast sample to include the new 10 future dates. Save the forecasted series (pricef) and forecast standard errors. The previous 10 NAs will be filled by the forecast results.

Group: UNTITLED Workfile: BAJAJ FINANCE _ DAILY::Untitled\

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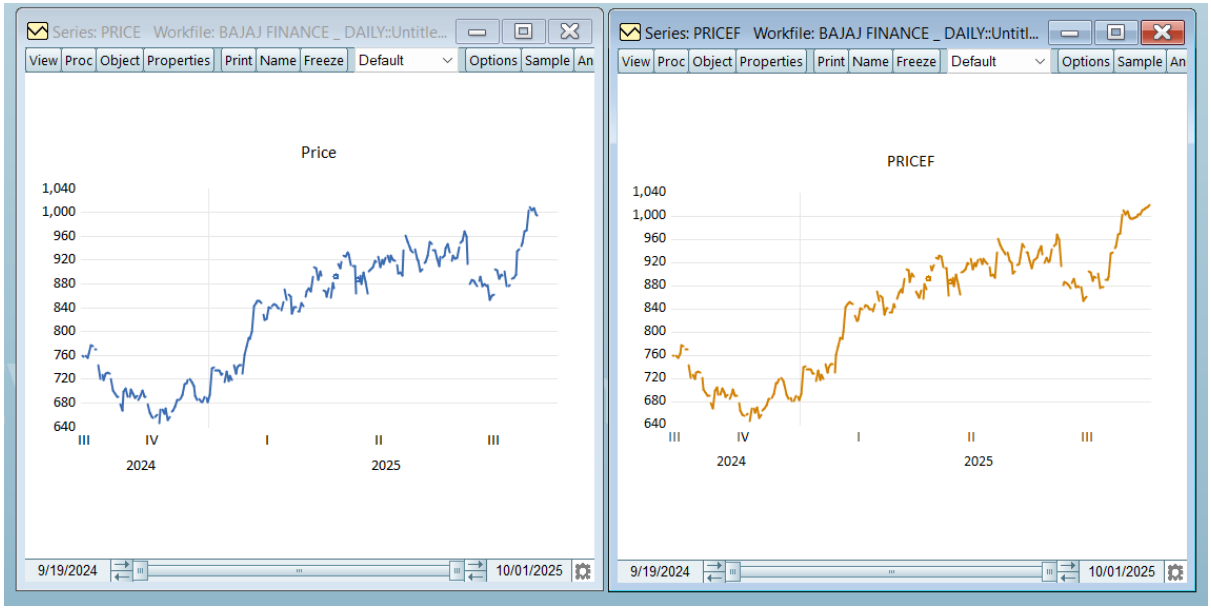
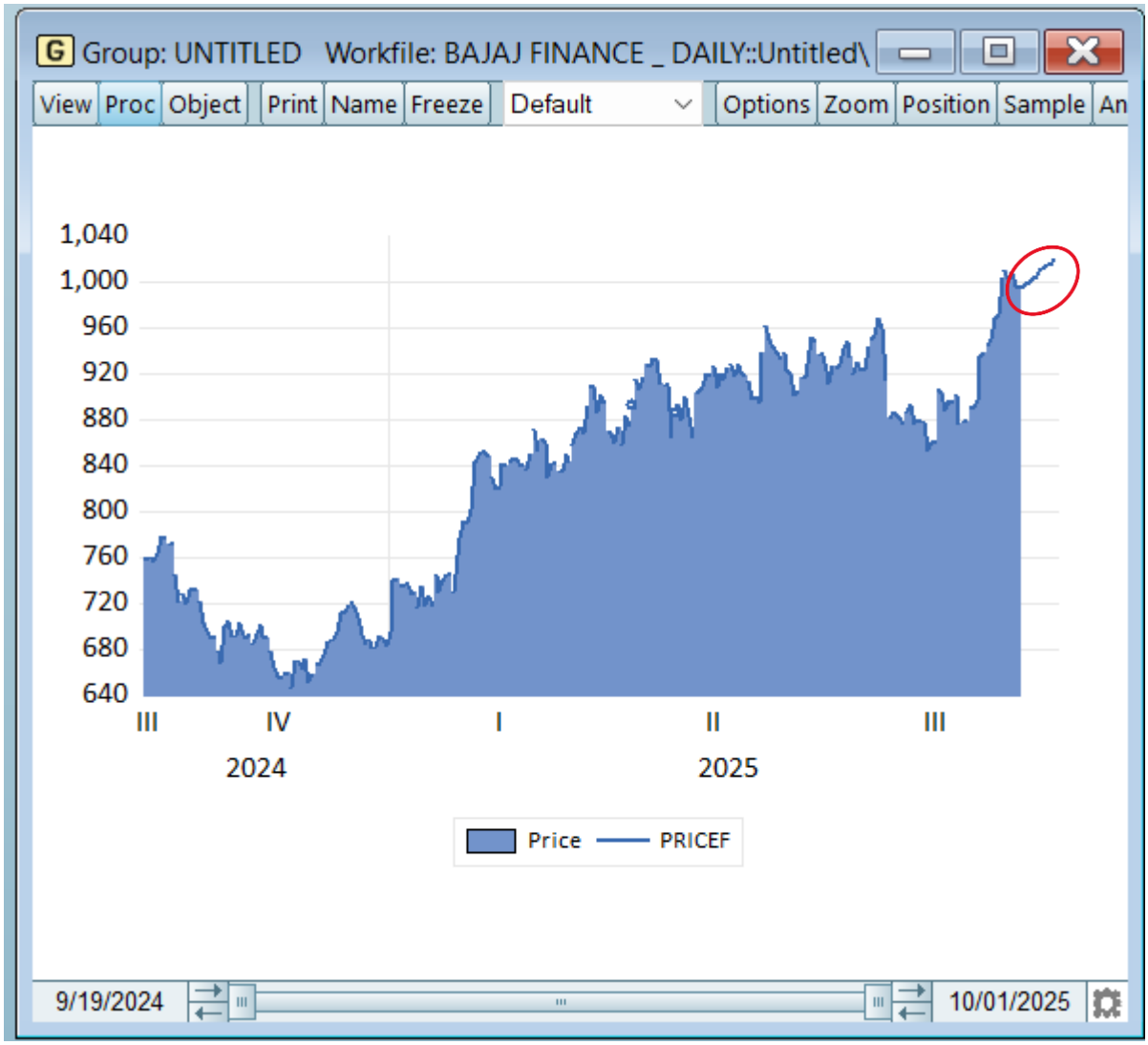
	PRICE	PRICEF
9/04/2025	934.75	934.7500
9/05/2025	937.60	937.6000
9/08/2025	944.30	944.3000
9/09/2025	948.40	948.4000
9/10/2025	967.95	967.9500
9/11/2025	970.25	970.2500
9/12/2025	1003.25	1003.250
9/15/2025	1009.85	1009.850
9/16/2025	1003.25	1003.250
9/17/2025	1007.50	1007.500
9/18/2025	996.50	996.5000
9/19/2025	995.00	995.0000
9/20/2025	NA	995.2459
9/22/2025	NA	997.1780
9/23/2025	NA	999.0918
9/24/2025	NA	1001.892
9/25/2025	NA	1003.480
9/26/2025	NA	1010.142
9/27/2025	NA	1011.258
9/29/2025	NA	1013.746
9/30/2025	NA	1014.860
10/01/2025	NA	1018.601

Graph the original price series and pricef series to compare



Result: the graph shows the predicted price movement for the next 10 days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