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Unilever N.V. (UN)

Forecasting Unilever Stock Price for December 31st, 2020

Below, the table summarizes all the models, datasets (since Unilever adjusted stock was used for all models, I didn't include it under datasets), model performance, confidence level, forecasted prediction for December 31st,2020

Assumptions, Observations, Notes

-Calculated Linear Interpolation for GDP and Private Consumption since data was only quarterly. Used Private Consumption with GDP since it accounts for the largest portion of GDP + drives economic growth – can see a decline in consumption with a downturn in the economy

-For external drivers, I used TS Compare to see which model- ETS or ARIMA performed better and then forecasted for Dec 31st,2020 .Then plugged in values into the linear regression model using beta coefficients

-For scenarios without linear regression, I still used TS Compare and then used the model with the lower MAPE to either forecast 11 periods into the future (if I had January 2020 data) or 1 period into the future (if I had December-ending data)

-For all models, the more conservative value was taken (lower bound of the CI). For scenarios 5-7, I deducted the final value by 2% given that Coronavirus is affecting all stocks including Unilever. I calculated % change since the spike and found an average % difference of ~2). This way I'm allowing my final prediction to be conservative to account for this Pandemic and Economic Crisis.

Scenario	Dataset(s) + Variables	Predictive Models	Model Performance	Confidence Level	Prediction
1	Unilever Stock (used open, high, low, close, volume as predictor variables)	Linear Regression + ETS	R2= 0.96	[45%]	50.8
2	CPI (YoY – Monthly) Timeseries	ARIMA	MAPE= 7.43	95 CI Low [50-60%]	54.29
3	GDP Real (Annual – Dec) CPI (Annual- Dec)	ETS	RMSE= 3.55	80 CI Low [30- 40%]	52.49
4	GDP (Annual – Dec) CPI (Annual- Dec) Retail Sales (Annual –Dec)	ETS	MAPE = 18.28	[35-45%]	57.78
5	PG Retail Sales	ETS + Linear Regression	MAPE= 5.84	80 CI Low [65-70%]	42.9
6	Imports Exports	ARIMA + Linear Regression	MAPE = 7.43 R2= 0.82	[55-65%]	[39.20 –LR] 55.03
7	GDP Real (YoY – Monthly) Private Consumption (YoY – Monthly)	ETS + Linear Regression	RMSE= 1.2	[60-70%]	53.07

Consensus Forecast:

Adj Close Price 3/13/2020: **\$48.47**

Forecasted Adj Close Price 12/31/2020: **\$51.49**

\$ Change : \$3.02

% Change : 6.23% ↑

(from 3/13 to 12/31)

Confidence: 65% - 74%

Ensemble Model

Scenario	Predicted Value	Weight	Score
2	54.29	0.1	5.429
5	42.9	0.35	15.015
6	39.2	0.1	3.92
6.1	55.03	0.3	16.509
7	53.07	0.2	10.614
Total : 51.49			

- 2 & 6 given same weight since same MAPE
- 5 - highest since lowest MAPE
- 6 - 2nd highest since good R2 and decent MAPE
- 7- 3rd highest since low RMSE