

The Forecasting Analysis of Profit on Astra Companies List on Indonesia Stock Exchange (IDX)

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Abstract: This research aims to analyse the profit forecasting using weighted moving average method then compare the pattern between Astra companies list on IDX (Indonesia Stock Exchange). The research method use is quantitative descriptive with secondary data of profit in period 2018-2022 which provide quarterly. This research use weighted moving average method to calculate forecasting of profits by Microsoft Excel data analysis techniques. The result for this research shows highest forecasting of profit on PT Astra International Tbk occur in Third quarter in 2023 with the amount 20.970 and the lowest forecasting occurs in first quarter in 2023 with the amount 9.410. The highest forecasting of profit on PT United Tractors Tbk occur in Third quarter in 2023 with the amount 13.738.446 and the lowest forecasting occurs in first quarter in 2024 with the amount 5.584.042. The highest forecasting of profit on PT Astra Graphia Tbk occur in second quarter in 2023 with the amount 50.707 and the lowest forecasting occurs in third quarter in 2024 with the amount 22.496. This result will be useful for Astra companies to manage risk and make decision about the business plan for anticipate the loss that may arise in the future. The limitation of this research is use secondary data. There is no research conduct profit forecasting, so the results of this research can be contributed for future research by developing the limitation.

Introduction

In the rapid development of the business world, there are more and more problems faced by company leaders or management. So that companies must more carefully read and anticipate market conditions so that they can create quality products, provide quality services that can satisfy consumers so that they can enter the market competition. Therefore, it allows a leader to supervise the entire course of the company's operations directly and continuously. In this case, the company's management can perform its duties that make a company have to compete in improving quality continuously in all fields including to increase company profit.

Profit is the excess income earned by a business entity or individual from the initial capital issued. The function of profit is to finance the company's operations, to prepare the company in the future, and as a premium for the risks taken by the company in running a business. Without profit, the company will not be able to operate or even impossible to exist in the future. In order for the company's goals to be achieved, it is necessary to have a management that can manage everything related to the company's activities in order to better increase the company's profits. One of the factors that can measure the success of a company can be seen from the company's profit (Maryati, 2022). So, predicting profit is needed by company to help managers in making decisions to increase the company profit.

In predicting profits, management needs information from past data. Forecasting is art and science in predicting events in the future, forecasting involves taking historical data and projecting then into the future using mathematic model (Heizer et al.,2015). The Forecasting is a tool that important to make decisions about informed business. Regardless of the size and profile of the company, forecasting helps the organization's management anticipate trends in important business indicators, such as forecasting of profit.

Forecasting of profit is the tools to manage risk and improve the profitability of the company. This is important part or business plan as basic to make decision about business plan in the future. Profit forecasting is useful for speeding up information related to the company's profit or loss. This can help managers to anticipate possible losses in the future. So, the managers can make a strategic business plan to avoid the losses of the company. The forecasting profit important to manage the cash flow of the company, analyze the sales, improve the production management and secure the capital from partner. Without the forecasting profit, the managers It will be difficult to determine the direction of business planning and effective and efficient corporate decisions in the future.

Astra International Tbk was founded in 1957 as a trading company. The company's statutory scope of activities includes general trade, industrial and mining services, transportation, agriculture, development and consulting services. As a go-public company, Astra Group must continue to strive to maximize its profits. This is very useful for companies to increase the value of the company and attract the attention of investors to invest in the company. By forecasting profit this company can improving the profitability and manage the cash flow, sales, production and get capital. This research will be useful for Astra companies to manage risk and make decision about the business plan for anticipate the loss that may arise in the future.

Based on the explanation above, this research aims to analyse the profit forecasting using weighted moving average method then compare the pattern between Astra companies list on IDX (Indonesia Stock Exchange). The research method use is quantitative descriptive with secondary data of profit in period 2017-2022 that provide quarterly. Quantitative data analysis was carried out to predict profit in the next period using Microsoft Excel technic data analysis.

The difference this research and the previous research on the same topic by Azizah et al (2021) not use the Mean Absolute Percentage Error (MAPE) to measure the accuracy of the result forecasting calculation of demand and sales manufacturing product. In other research by Dinarjito (2022) using agency theory and signal theory with a case study approach to calculate forecasting financial statement and business valuations. The result of research by Nurlifa (2017) is management information system use case diagram of sales forecasting system. Rahmawati et al (2020) choosing the best forecasting coefficient based on minimum RMSE (Root Mean Square Error), the other difference this research use Holt-Winter exponential smoothing method to calculate forecasting of the arrival of foreign tourists in Indonesia. There is no research conduct profit forecasting in the previous research, so the results of this research can be contributed and used as a reference for future research by developing the limitation.

Theoretical Framework

A. Forecasting

Forecasting is needed because there is a time lag between the awareness that a new policy is needed and the time the policy is implemented. If the time difference is long, then the role of forecasting is so important and very much needed, especially in determining the time when something will happen, so that the actions that need to be prepared can be prepared (Sucipto, 2018). The theory of forecasting is based on the premise that current and past knowledge can be used to make predictions about the future (F. Petropoulos, D. Apiletti, V. Assimakopoulos et al., 2022). Whole according to Rahman (2019), Forecasting is very important in the business world to know the future. In particular for time series, there is the belief that it is possible to identify patterns in the historical values and successfully implement them in the process of predicting future values. According Nurlifa (2017) the formula of Forecasting as follows:

$$\hat{y} = a + bx$$

Note:

\hat{y} = calculated value of the variable to be predicted (dependent variable)

a = y-axis cross

b = change of rate in y for change in x

x = independent variable

B. Profit

Profit is the amount of funds obtained by business actors from the results of sales that run in a certain period. According to Themin (2012) defines profit is an increase in economic benefits during an accounting period (for example, an increase in assets or a decrease in liabilities) that results in an increase in equity, other than that which concerns transactions with shareholders. The amount of profit is the result of gross profit minus the cost of goods sold and other costs. Another well-known term for profit is net profit. Profit can be defined in two ways, the first of which profit in economics is the difference between income and total costs. Implicit costs include opportunity costs that occur when an enterprise chooses to use certain factors of production.

C. Weighted Moving Average Method

Weighted Moving Average is an improved form of Simple Moving Average (Kumila, 2019). In the Weighted Moving Average, higher weights are given in periods that are closer

to the predicted period (Nurlifa, 2017). The weight factor is calculated from the number of days used in time series data, also known as the number of digits (Hansun, 2014). According to Gofur (2013) the Weighted Moving Average has advantages over the simple moving average method or the exponential moving average. The Weighted Moving Average assigns a different weight to all historical data in the past, assuming the last or most recent data will be given greater weight than older historical data, because the most recent data is considered the most appropriate data for making predictions (Mawarni, 2022). Another advantage of using the Weighted Moving Average is that the weighting can be adjusted (Ramadhania, 2018). The formula of Weighted Moving Average as follows:

$$\frac{\sum (\text{weighted in } n \text{ period}) (\text{profit})}{\sum (\text{weight})}$$

Research Method

The quantitative descriptive method in this study aims to describe, describe and explain forecasting analysis on profits using numbers. According to Tanuwijaya (2010) quantitative forecasting can be done if there are 3 (three) conditions, namely: (1) past information is available, (2) this information can be quantified in the form of numerical data, and (3) it can be assumed that some aspects past patterns will continue into the future. The population of this study is Astra Group Companies. The object of this study consisting of PT Astra International Tbk, PT United Tractors Tbk, and PT Astra Graphia Tbk. The reason choosing this company because they didn't loss in the period 2017-2022 and the company report financial statement transparency by uploading in the company website. With a total of 60 data profit collecting by documentation methods. This research using seconder resource data types in each quarter of 2018-2022. Quarterly data was used in this study because finances report of the company provide quarterly.

The mechanism of this research starts from collecting data for research, processing data, calculating forecasting of profit, analyzing and comparing the research results of each company then making conclusions. The calculation forecasting of profit in this study uses the weighted moving average method. This method is used because its forecasting level is close to what will happen from the actual data of the enterprise. The formula of the calculation weighted moving average method as follows:

Weighted Moving Average formula:

$$\frac{\sum (\text{weighted in } n \text{ period}) (\text{profit})}{\sum \text{weight}}$$

Forecasting formula (Nurlifa, 2017):

$$\hat{y} = a + bx$$

Note:

\hat{y} = calculated value of the variable to be predicted (dependent variable)

a = y-axis cross

b = change of rate in y for change in x

x = independent variable

After the forecasting calculation, However, it must be noted that predictions always have errors, so what must be considered is efforts to minimize the prediction error (Sari, 2018). The Mean Absolute Percentage Error (MAPE) calculation will be carried out to measure the accuracy of the forecasting calculation. MAPE is the average error percentage absolutely (absolutely). MAPE is a measure of relative error and produces a percentage error result in

forecasting against actual demand during a certain period which then produces a low or high percentage error value. MAPE is formulated as follows:

$$MAPE = \sum_{t=1}^n \left| \frac{\hat{y}_t - \hat{y}}{\hat{y}_t} \right| \times 100\%$$

Note:

MAPE = Mean Absolute Percentage Error

n = amount of data

\hat{y}_t = actual value

\hat{y} = forecasting result

Data Analysis Techniques

Data analysis is to explain a data so that it is easier to understand before make a conclusion. Quantitative data analysis is used to predict future profits using a forecasting approach. Data obtained in 2018-2022 will be processed with Microsoft Excel. The forecasting approach in this study is calculated by the weighted moving average method on company profits.

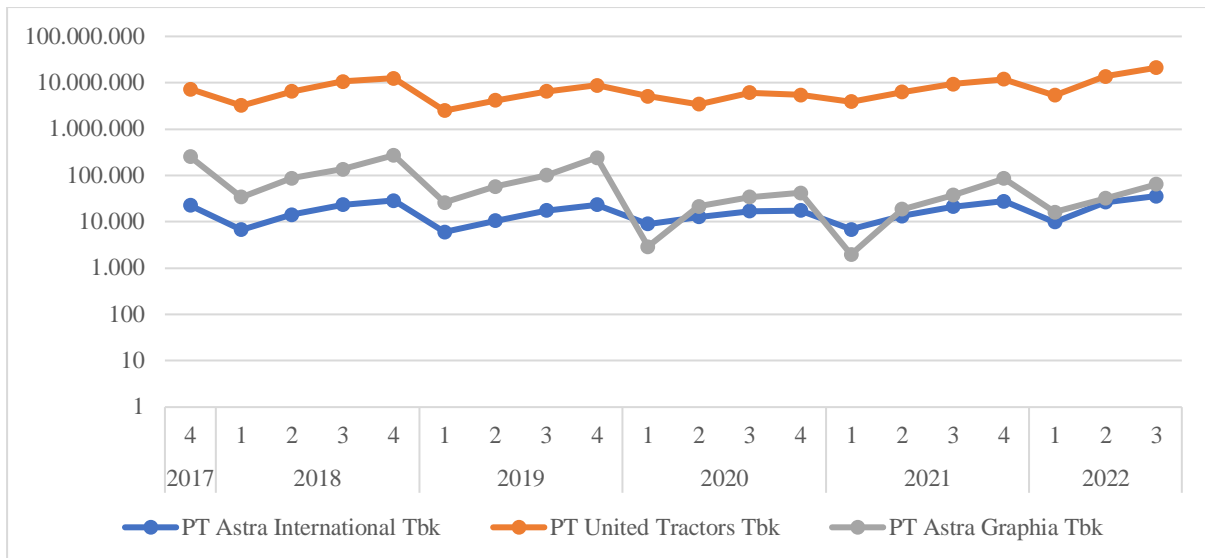
Results And Discussion

The first step in this study is to collect profit data for 2017-2022 using excel software on the object of study. Profit data that will be used to perform forecasting analysis as follows.

Table 1. Profit Data for 2017-2022

Year	Q	PT Astra International Tbk	PT United Tractors Tbk	PT Astra Graphia Tbk
2017	4	18.847	7.299.634	254.684
2018	1	4.980	3.233.922	34.047
	2	10.384	6.498.367	86.973
	3	17.073	10.674.632	137.258
	4	21.673	12.539.901	272.298
2019	1	5.219	2.498.321	26.167
	2	9.803	4.179.345	57.368
	3	15.868	6.550.193	100.512
	4	21.707	8.750.856	242.938
2020	1	4.810	5.119.441	2.917
	2	11.378	3.456.722	21.446
	3	14.039	6.058.982	34.181
	4	16.164	5.417.963	42.298
2021	1	3.728	3.896.826	1.970
	2	8.831	6.341.661	18.621
	3	14.977	9.423.274	37.566
	4	20.196	11.952.260	86.455
2022	1	6.859	5.355.647	16.187
	2	18.174	13.828.539	31.796
	3	23.330	21.099.216	64.693

Source: Data processed (2022)



Source: Data processed (2022)

Figure 1. Profit Data for 2018-2022

PT Astra International Tbk is one of the largest public companies in Indonesia, consisting of 245 subsidiaries, joint ventures and associated entities, supported by approximately 200,000 employees. The profit earned by the company comes from a diversified business channel creating synergies and opportunities across industry sectors including Automotive, Financial Services, Heavy Equipment, Mining, Construction & Energy, Agribusiness, Infrastructure and Logistics, Information Technology, and Property. PT Astra International Tbk intends to contribute to strengthening Indonesia's economic resilience that supports an inclusive and prosperous society.

PT Astra International Tbk profit fluctuated every quarter with a percentage fluctuation of 84.02%. The highest profit was earned by the company in 2022 in the third quarter in amount 23.330. According to President Director Djony Bunarto Tjondro said “The Group's performance throughout the first nine months of 2022 was quite good, mainly supported by the economic recovery and higher commodity prices. Business performance for the rest of the year is expected to remain good”. This was due to car sales increasing by 20%, while motorcycle sales decreased by 8% and higher commodity prices drove good performance from heavy equipment sales and mining business. The increase reflects the better performance of almost all business divisions, notably the Group's heavy equipment and mining, automotive and financial services divisions and is supported by economic recovery and higher commodity prices. Meanwhile, the lowest profit occurred in 2021 in the first quarter in the amount 3.728. This is due to the decline in car sales by 24%, motorcycle sales by 17%, sales of palm oil and its derivative products are lower as a result of the uncertainty caused by the ongoing pandemic.

PT United Tractors Tbk is a subsidiary of PT Astra International Tbk, one of the largest and leading business groups in Indonesia with a service network reaching various industries and sectors. The company has 20 branch office locations. The company's profit is obtained from the business of various domestic sectors and industries, namely construction machinery focuses on the sale of heavy equipment and transportation equipment, mining contractors through PT Pama Persada Nusantara (PAMA), mining focuses on coal mining activities by acquiring PT Prima Multi Mineral (PMM), construction industry through the acquisition of PT

Acset Indonusa Tbk (ACSET), and energy with establishing the New and Renewable Energy (EBT) business as one of the corporate transition strategies in the energy sector.

Profit of PT United Tractors Tbk fluctuated with a percentage of 88.16% per quarter. The highest profit occurred in the third quarter of 2022 in the amount 21.099.216. To the company's consolidated net revenue, mining contracting contributed 36%, followed by 30% from construction machinery, 27% from coal mining, 6% from gold mining, and 1% from construction industry. The Construction Machinery segment recorded an increase in Komatsu sales volume by 107%. Coal Mining segment recorded a 138% increase in net revenue due to higher average coal selling price. Gold mining segment recorded net revenue decreased by 11%. The Construction Industry segment is represented by PT Acset Indonusa Tbk recorded a net loss due to the slowdown of several ongoing projects and reduced new construction project opportunities. The Company business line development strategy in environmentally friendly energy sector, and determined the renewable energy business as transition strategies. Meanwhile, the lowest profit occurred in 2019 in the first quarter. This is due caused the pandemic covid-19.

PT Astra Graphia Tbk is a public company established in 1975 and listed its shares on the Indonesia Stock Exchange since 1989 that is a subsidiary of PT Astra International Tbk. The company's profit is obtained from the business scope of PT Astra Graphia Tbk in the field of printing and digital services. PT Astra Graphia Tbk has a Document Solution business portfolio with exclusive partner Fuji Xerox, presenting end-to-end solutions ranging from personal print needs, offices, Graphic Art to managed print services. PT Astra Graphia Tbk has a subsidiary, PT Astra Graphia Information Technology which serves the needs of information technology solutions, especially digital services through collaboration with world-class strategic partners as well as its own solutions that include hardware, software, services and PT Astra Graphia Xprins Indonesia which provides solutions for all office needs through B2B and B2G ecommerce services.

PT Astra Graphia Tbk profit fluctuated every quarter with a percentage fluctuation of 99,28%. The highest profit occurred in the last quarter of 2018 in the amount 272.298. This profit was contributed by an increase in the profit of the document solutions and information technology solutions business units which grew by 9% and 19%, respectively. Meanwhile, the lowest profit occurred in 2021 in the first quarter. This is due to the decrease in net income contributed from the document solution business unit and office solutions. The decline in net revenue in the office solutions business unit was mostly sourced from the B2G e-commerce segment, this was mainly due to the umbrella contract as an electronic catalog provider of the Government Procurement Policy Institute (LKPP).

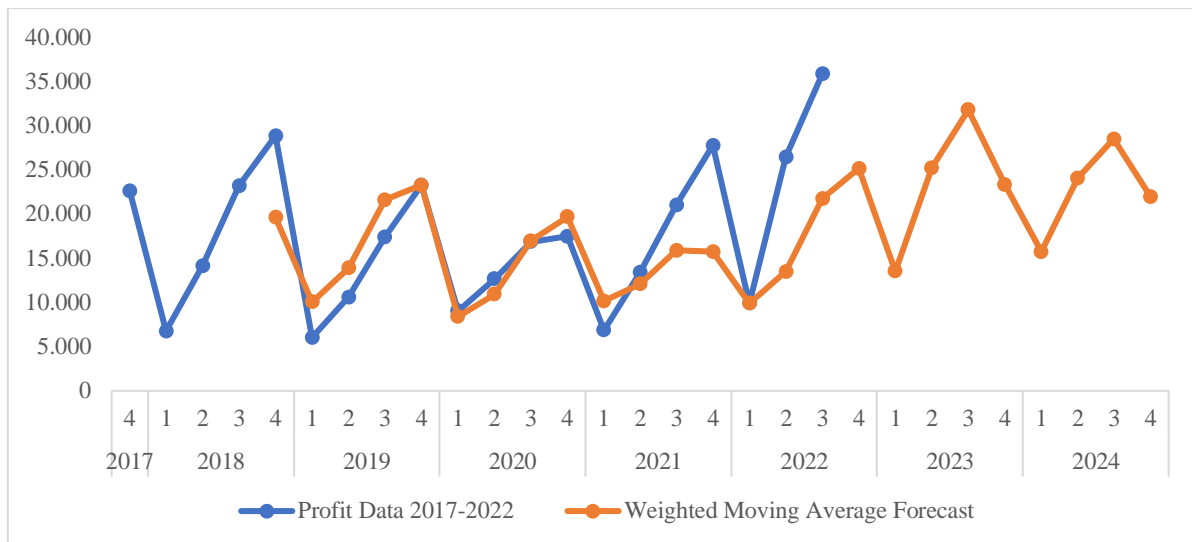
Analyse Forecasting of Profit

The forecasting profit result provide 9 quarter in the future on PT Astra International Tbk, PT United Tractors Tbk, PT Astra Graphia Tbk, which begin from the last quarter of 2022 until 2024. The result of profit forecasting can be seen at Table 2.

Table 2. Result of Profit Forecasting

Year	Q	PT Astra International Tbk	Result of WMA Forecasting	PT United Tractors Tbk	Result of WMA Forecasting	PT Astra Graphia Tbk	Result of WMA Forecasting
2017	4	18.847	-	7.299.634	-	254.684	-
2018	1	4.980	-	3.233.922	-	34.047	-
	2	10.384	-	6.498.367	-	86.973	-
	3	17.073	-	10.674.632	-	137.258	-
	4	21.673	16.004	12.539.901	6.603.052	272.298	51.285
2019	1	5.219	7.438	2.498.321	4.850.999	26.167	115.341
	2	9.803	10.303	4.179.345	4.179.343	57.368	101.314
	3	15.868	16.202	6.550.193	6.872.401	100.512	202.082
	4	21.707	17.902	8.750.856	8.447.550	242.938	38.419
2020	1	4.810	7.531	5.119.441	3.516.113	2.917	88.745
	2	11.378	9.679	3.456.722	3.548.026	21.446	70.942
	3	14.039	15.533	6.058.982	4.438.104	34.181	174.346
	4	16.164	17.661	5.417.963	6.267.371	42.298	8.878
2021	1	3.728	6.823	3.896.826	4.126.692	1.970	23.472
	2	8.831	10.421	6.341.661	2.853.319	18.621	24.321
	3	14.977	13.184	9.423.274	4.869.742	37.566	33.333
	4	20.196	13.689	11.952.260	5.272.020	86.455	8.892
2022	1	6.859	6.168	5.355.647	5.068.039	16.187	30.326
	2	18.174	9.102	13.828.539	4.791.309	31.796	29.534
	3	23.330	15.472	21.099.216	8.553.559	64.693	66.878
	4	-	17.934	-	11.699.178	-	24.270
2023	1	-	9.410	-	5.818.351	-	27.111
	2	-	17.165	-	9.012.984	-	50.707
	3	-	20.970	-	13.738.446	-	27.130
	4	-	16.410	-	9.758.353	-	24.404
2024	1	-	10.907	-	5.584.042	-	40.376
	2	-	16.298	-	6.313.457	-	27.066
	3	-	18.988	-	9.059.451	-	22.496
	4	-	15.308	-	7.553.026	-	32.762

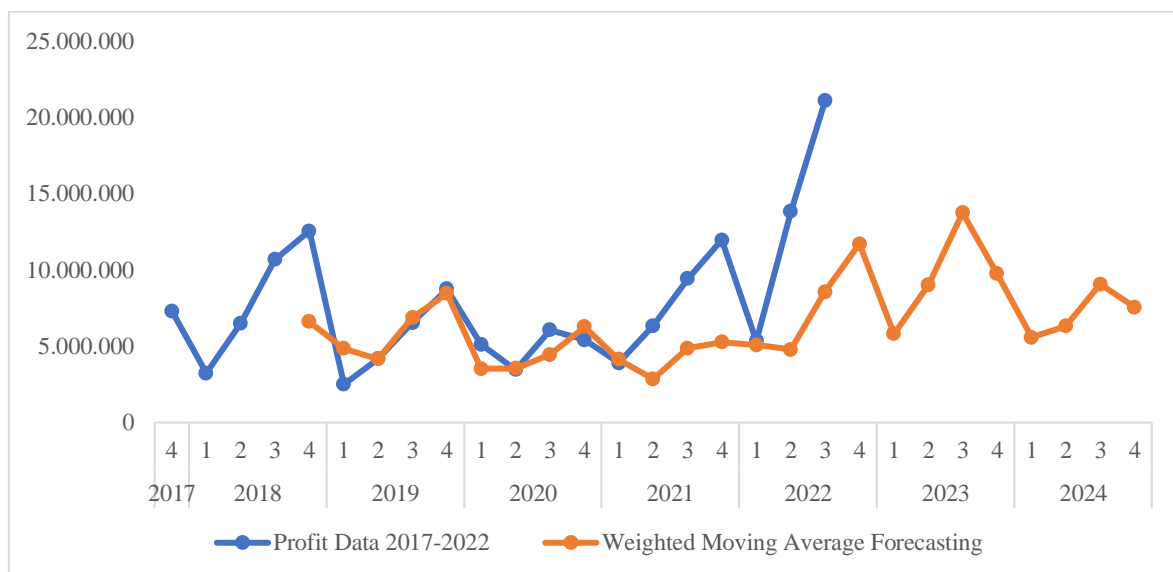
Source: Data processed (2022)



Source: Data processed (2022)

Figure 2. Forecasting Result of Profit PT Astra International Tbk

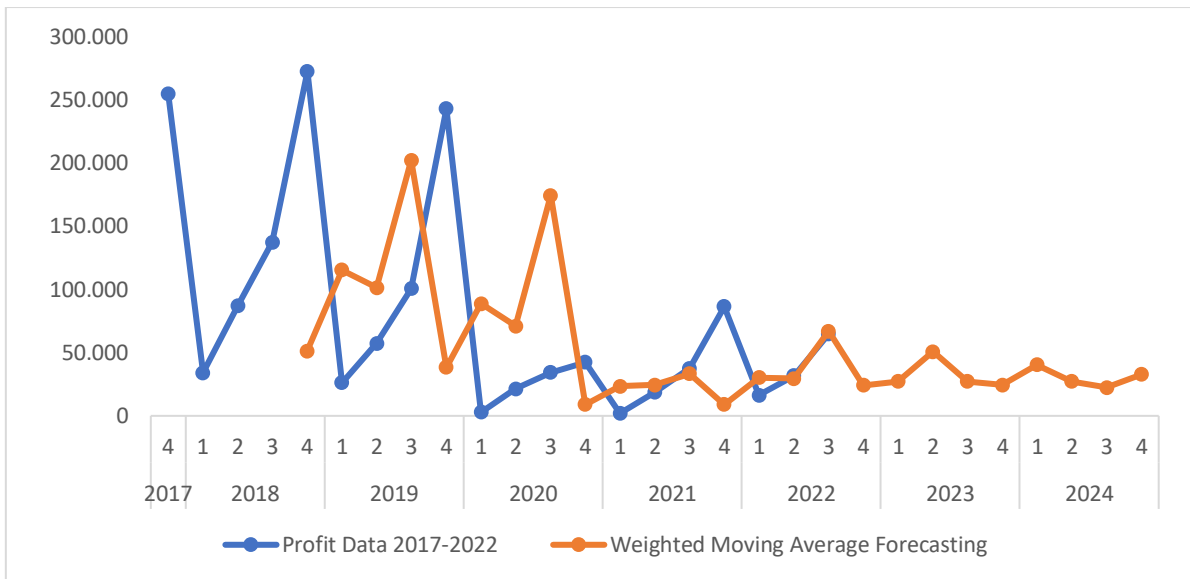
Based on the table and figure 2 about the result forecasting of profit on PT Astra International Tbk fluctuates considerably every quarter. The percentage of MAPE for the calculating forecasting of profit is 26%. The highest forecasting of profit on PT Astra International Tbk occur in Third quarter in 2023 with the amount 20.970. While the lowest forecasting occurs in first quarter in 2023 with the amount 9.410.



Source: Data processed (2022)

Figure 3. Result of Profit Forecasting PT United Tractors Tbk

The result forecasting of profit on PT United Tractors Tbk fluctuates considerably every quarter. The percentage of MAPE for the calculating forecasting of profit is 33%. The highest forecasting of profit on PT United Tractors Tbk occur in Third quarter in 2023 with the amount 13.738.446. While the lowest forecasting occurs in first quarter in 2024 with the amount 5.584.042.



Source: Data processed (2022)

Figure 4. Forecasting Result of Profit PT Astra Graphia Tbk

PT United Tractors Tbk have forecasting of profit fluctuates considerably every quarter that shows in Figure 4. The percentage of MAPE for the calculating forecasting of profit is 60%. The highest forecasting of profit on PT United Tractors Tbk occur in second quarter in 2023 with the amount 50.707. While the lowest forecasting occurs in third quarter in 2024 with the amount 22.496.

Conclusion

From the results of the forecasting carried out, it can be seen that the highest forecasting of profit on PT Astra International Tbk occur in Third quarter in 2023 with the amount 20.970. While the lowest forecasting occurs in first quarter in 2023 with the amount 9.410. The highest forecasting of profit on PT United Tractors Tbk occur in Third quarter in 2023 with the amount 13.738.446. While the lowest forecasting occurs in first quarter in 2024 with the amount 5.584.042. The highest forecasting of profit on PT Astra Graphia Tbk occur in second quarter in 2023 with the amount 50.707. While the lowest forecasting occurs in third quarter in 2024 with the amount 22.496.

As for suggestions for companies, the right forecasting method can be achieved by looking at data patterns, forecasting accuracy, and forecasting errors. A poor forecasting method that ignores high forecasting errors becomes a profit rate error. Therefore, the use of this forecasting technique will help companies to anticipate losses that may arise in the future. The limitation of this study is only use secondary data, preferably for subsequent studies to use primary data related to the explanation of profit fluctuation. And also developed methods used in forecasting techniques.

References

Alfian Nurlifa, S. K. (2017). Sistem Peramalan Jumlah Penjualan Menggunakan Metode Moving Average Pada Rumah Jilbab Zaky. *Jurnal Inovtek Polbeng*, 1-8. <https://doi.org/10.35314/isi.v2i1.112>

Andi Nur Rahman, G. S. (2019). Analisis Peramalan Penjualan Produk Suplemen Pt. Green World Global pada E-Marketplace. *Jurnal Statistika dan Matematika*, 1-20. <http://dx.doi.org/10.32493/sm.v1i2.2949>

- Azizah, N. e. (2021). Analyzing the Pandemic Effect on Time series Prediction of Demand and Sales Manufacturing Product . Proceedings of 2nd Annual Management, Business and Economic Conference (AMBEC 2020) (pp. 258-262). Indonesia: Atlantis Press International B.V. <https://dx.doi.org/10.2991/aebmr.k.210717.052>
- C. Heizer, J. Render, and B. Munson. (2015). Eleven Edition Operations Management. Dinarjito, Agung. (2022). Penyusunan Forecasting Laporan Keuangan Menggunakan Weighted Moving Average Dan Penilaian Penyertaan Modal Negara Pada Bumh Konstruksi: Studi Kasus PT Waskita Karya (Persero). Jurnal Pajak dan Keuangan Negara, 4(1), (147-165).
- F. Petropoulos, D. Apiletti, V. Assimakopoulos et al. (2022). Forecasting: theory and practice. International Journal of Forecasting 38, 705-871. <https://doi.org/10.1016/j.ijforecast.2021.11.001>
- F.I. Rahmawati, N. Eltivia, and K.D.S. Susilowati (2020). Peramalan Kedatangan Wisatawan Mancanegara Indonesia. Metode Holt's Winter Exponential Smoothing. Media Mahardika, 18(2), 1-9. <https://doi.org/10.29062/mahardika.v18i2.152>
- Gofur, A. A. dan Widiyanti, U. D. (2013). Sistem Peramalan Untuk Pengadaan Material Unit Injeksi di PT . XYZ. Jurnal Ilmiah Komputer dan Informatika, 2(2), 1-6. <https://doi.org/10.34010/komputa.v2i2.86>
- Hansun, Seng. (2014). Sebuah Penelitian Baru tentang Metode Rata-Rata Bergerak Baru dalam Analisis Deret Waktu. International Journal of New Media Technology, 1(1), 22-26. <https://doi.org/10.31764/jtam.v3i1.764>
- Kumila, Ais., Sholihah, Baqiyatus., Evizia et al. (2019). Perbandingan Metode Moving Averagedan Metode Naïve Dalam Peramalan Data Kemiskinan. Jurnal Teori dan Aplikasi Matematika (JTAM), 3(1), 1-9. <https://doi.org/10.31764/jtam.v3i1.764>
- Maryati, E., Siswanti, T. (2022). Pengaruh Debt To Equity Ratio Dan Ukuran Perusahaan Terhadap Pertumbuhan Laba (Perusahaan Sub Sektor Property dan Real Estate Yang Terdaftar di Bursa Efek Indonesia Tahun 2015-2019). Jurnal Ilmiah Mahasiswa Akuntansi, (2)1, (1-10)
- Mawarni, Ega., Lubis, A. P., dan Sapta, Andy. (2022). Peramalan Stok Semen Di Gudang PT. Cemindo Gemilang Kuala Tanjung Dengan Metode WMA. Jurnal Teknik Informatika dan Sistem Informasi, 9(3), 1-12.
- Ramadhania, R. (2018). Peramalan Harga Beras Bulanan di Tingkat Penggilingan Dengan Metode Weighted Moving Average. Buletin Ilmiah Math. Stat. dan Terapannya, 7(4), 329–334. <http://dx.doi.org/10.26418/bbimst.v7i4.28402>
- Yolanda, S., dan Fufita, N. (2018). Peramalan Penerimaan Bea Cukai Indonesia. Jurnal of Economics and Business, 2(1). 137–154.
- Sucipto, L., Syaharuddin, S. (2018). Konstruksi Sistem Peramalan Multi-Model untuk pemodelan matematika pada peramalan Indeks Pembangunan Manusia Provinsi Nusa Tenggara Barat. Jurnal Ilmiah Teknologi Sistem Informasi, 4(2), 114-123. <http://doi.org/10.26594/register.v4i2.1263>
- T. Deitiana, Manajemen Operasional Strategi Dan Analisa (Service Dan Manufactur), 2011
- Themis. (2012). Akuntansi Keuangan. Jakarta: Erlangga