

## CHAPTER 3 - METHODOLOGY

### 3.1. Research Design

Research methods are systematic procedures used by researchers to gather and analyze data for the purpose of discovering new information and insights about a particular topic. In the field of social sciences, there are two main paradigms used for research: quantitative and qualitative research. Quantitative research involves the use of statistical and mathematical tools to examine the relationship between variables, whereas qualitative research focuses on understanding and interpreting the meanings and experiences of individuals or groups. Both quantitative and qualitative research methods have their strengths and limitations, and the choice of which to use depends on the nature of the research question and the type of data that needs to be collected. In addition, there are various research designs, sampling techniques, and data collection methods that researchers can choose from, each with its own advantages and disadvantages. In this section, we will provide an overview of the research methods used in this study, including our chosen research design, data collection methods, and analysis techniques, to give readers a better understanding of our approach to investigating our research question.

This study aims to investigate the effect of technical indicators and fundamental metrics on the price movement of stocks in the LQ45 index. The study will use a quantitative research design, and data will be collected from secondary sources. The research will use regression analysis techniques to analyze the data and test the research hypotheses. The data for this study will be collected from secondary sources, including financial databases, company annual reports, and stock market data. The study will focus on the LQ45 index, which represents the top 45 companies listed on the Indonesian Stock Exchange (IDX) based on market capitalization and liquidity. Although the LQ45 Index Stocks comprises 45 of the most liquid and actively traded stocks on the Indonesia Stock Exchange, the study was constrained by the unavailability of data for two of the constituent stocks during the period under examination. Consequently, the analysis is based on data for only 43 stocks, which may limit the generalizability of our findings to some extent. Nonetheless, we believe that the size of our sample remains sufficiently large to provide meaningful insights into the relationship between technical indicators,

fundamental metrics, and stock price movements in the LQ45 Index Stocks. However, the study will cover the period from January 2021 to December 2021. This research will be acquiring the data of 6 independent variables within the timeframe of 3 quarters (Q1, Q2, Q3); ROA (Return on Asset), PBV (Price to Book Value), EPS (Earning per Share), NPM (Net Profit Margin), Volume, and last but not least, Trend. After acquiring those independent variables, the dependent variable will then be the return of each stock within the time frame of 3 quarters will be collected (Q2, Q3, Q4).

### **3.2. Unit of Observation and Unit of Analysis**

This unit of analysis contains the behavior or characteristics studied (W. Gulo., 2005:77). The unit of observation is the unit where information is obtained about the unit of analysis. Thus, the unit of observation is the 45 companies from the Index LQ45.

In this study, the unit of observation is the individual stocks that comprise the LQ45 Index Stocks, which represents 45 of the most liquid and actively traded stocks on the Indonesia Stock Exchange. Each stock represents a distinct entity that can be measured and analyzed in terms of its technical indicators and fundamental metrics, and its price movements over time.

The unit of analysis, on the other hand, is the relationship between the technical indicators, fundamental metrics, and stock price movements of the LQ45 Index Stocks as a whole. By analyzing the data on these individual stocks, we aim to draw inferences and make generalizations about the behavior of the LQ45 Index Stocks as a whole, and to assess the impact of technical indicators and fundamental metrics on the price movements of the index.

Our chosen unit of analysis aligns with the broader goal of the study, which is to investigate the impact of technical indicators and fundamental metrics on the price movements of the LQ45 Index Stocks. By focusing on the index as a whole, we can examine how changes in technical indicators and fundamental metrics impact the collective behavior of the index, rather than just the behavior of individual stocks. This approach can provide a more comprehensive understanding of the factors driving price

movements in the LQ45 Index Stocks, and can inform investment strategies and policy decisions related to the index.

To collect data on our unit of observation, we will obtain historical data on the technical indicators and fundamental metrics of each individual stock in the LQ45 Index Stocks. We will then aggregate this data to compute the relevant indicators and metrics for the index as a whole, and analyze the relationship between these variables and the index's price movements. Our unit of analysis will thus be informed by the aggregate data on the index, rather than the individual data points on each stock.

### 3.3. Sampling

The sampling technique used in this research is purposive random sampling. Purposive random sampling is a sampling technique in which samples are selected for further research because they meet the characteristics and certain criterias that the research requires.

This research is conducted to find out the effect of fundamental analysis and technical analysis of one quarter towards the price movements of index LQ45 stocks of the following quarter. The criterias that has to be fulfilled in this sampling process are the ROA, PBV, EPS, NPM, volume, trend, and last but not least, its price movement for the year 2021.

Purposive random sampling is the sampling technique used in this research. The researcher has decided to use 43 out of the 45 stocks, because 2 stocks could not fulfill the required criterias to proceed in this research. For that reason, the samples used in this research are the 43 companies that are listed in *Bursa Efek Indonesia* from the Index LQ45, which are; Ace Hardware Indonesia (ACES), Adaro Energy Indonesia Tbk (ADRO), AKR Corporindo (AKRA), Aneka Tambang Tbk (ANTM), Astra International Tbk (ASII), Bank Central Asia Tbk (BBCA), Bank Negara Indonesia (Persero) Tbk (BBNI), Bank Rakyat Indonesia (Persero) Tbk (BBRI), Bank Tabungan Negara (Persero) Tbk (BBTN), Bank Mandiri (Persero) Tbk (BMRI), Barito Pacific Tbk (BRPT), Bumi Serpong Damai (BSDE), Bukalapak.com (BUKA), Charoen Pokphand Indonesia Tbk (CPIN), Erajaya Swasembada Tbk (ERAA), XL Axiata Tbk

(EXCL), Gudang Garam (GGRM), H.M. Sampoerna Tbk (HMSP), Harum Energy Tbk (HRUM), Indofood CBP Sukses Makmur Tbk (ICBP), Vale Indonesia Tbk (INCO), Indofood Sukses Makmur Tbk (INDF), Indah Kiat Pulp & Paper Tbk (INKP), Indocement Tunggul Prakarsa Tbk (INTP), Indo Tambangraya Megah Tbk (ITMG), Japfa Comfeed Indonesia Tbk (JPFA), Jasa Marga (JSMR), Kalbe Farma Tbk (KLBF), Merdeka Copper Gold Tbk (MDKA), Medco Energi Internasional Tbk (MEDC), Mitra Keluarga Karyasehat Tbk (MIKA), Media Nusantara Citra Tbk (MNCN), Perusahaan Gas Negara Tbk (PGAS), Bukit Asam Tbk (PTBA), PP (Persero) (PTPP), Pakuwon Jati (PWON), Semen Indonesia (SMGR), Tower Bersama Infrastructure Tbk (TBIG), Timah Tbk (TINS), Pabrik Kertas Tjiwi Kimia (TKIM), Telkom Indonesia (Persero) Tbk (TLKM), Sarana Menara Nusantara Tbk (TOWR), Chandra Asri Petrochemical Tbk (TPIA), United Tractors Tbk (UNTR), Unilever Indonesia Tbk (UNVR), and last but not least, Wijaya Karya (Persero) Tbk (WIKA).

No.	Kode	Nama Saham
1	ACES	Ace Hardware Indonesia Tbk.
2	ADRO	Adaro Energy Tbk.
3	AKRA	AKR Corporindo Tbk.
4	ANTM	Aneka Tambang Tbk.
5	ASII	Astra International Tbk.
6	BBCA	Bank Central Asia Tbk.
7	BBNI	Bank Negara Indonesia (Persero) Tbk.
8	BBRI	Bank Rakyat Indonesia (Persero) Tbk.
9	BBTN	Bank Tabungan Negara (Persero) Tbk.
10	BMRI	Bank Mandiri (Persero) Tbk.
11	BRPT	Barito Pacific Tbk.
12	BSDE	Bumi Serpong Damai Tbk.
13	ERAA	Erajaya Swasembada Tbk.
14	EXCL	XL Axiata Tbk.

15	GGRM	Gudang Garam Tbk.
16	HMSP	H.M. Sampoerna Tbk.
17	ICBP	Indofood CBP Sukses Makmur Tbk.
18	INCO	Vale Indonesia Tbk.
19	INDF	Indofood Sukses Makmur Tbk.
20	INKP	Indah Kiat Pulp & Paper Tbk.
21	INTP	Indocement Tunggul Prakarsa Tbk.
22	ITMG	Indo Tambangraya Megah Tbk.
23	JPFA	Japfa Comfeed Indonesia Tbk.
24	JSMR	Jasa Marga (Persero) Tbk.
25	KLBF	Kalbe Farma Tbk.
26	MDKA	Merdeka Copper Gold Tbk.
27	MEDC	Medco Energi Internasional Tbk.
28	MIKA	Mitra Keluarga Karyasehat Tbk.
29	MNCN	Media Nusantara Citra Tbk.
30	PGAS	Perusahaan Gas Negara Tbk.
31	PTBA	Bukit Asam Tbk.
32	PTPP	PP (Persero) Tbk.
33	PWON	Pakuwon Jati Tbk.
34	SMGR	Semen Indonesia (Persero) Tbk.
35	TBIG	Tower Bersama Infrastructure Tbk.
36	TINS	Timah Tbk.
37	TKIM	Pabrik Kertas Tjiwi Kimia Tbk.
38	TLKM	Telkom Indonesia (Persero) Tbk.
39	TOWR	Sarana Menara Nusantara Tbk.
40	TPIA	Chandra Asri Petrochemical Tbk.

41	UNTR	United Tractors Tbk.
42	UNVR	Unilever Indonesia Tbk.
43	WIKA	Wijaya Karya (Persero) Tbk.

*Table 3.1 - Readjusted LQ45 Stocks*

Having the following samples selected, the data of the independent variables (ROA, PBV, EPS, NPM, Volume, Trend) for Q1, Q2, and Q3 will be collected, followed by the data of the dependent variable (Stock Price Change) for Q2, Q3, and Q4.

### **3.4. Variable dan Pengukuran**

The purpose of this study is to investigate the impact of technical indicators and fundamental metrics on the price movement of stocks in the LQ45 index. In order to achieve this, the study will use several variables that will be measured and analyzed.

The dependent variable in this study is the stock price movement of the LQ45 index. The price movement will be measured using quarterly closing prices of the 43 stocks in the LQ45 index. The study will use this variable to analyze the impact of technical indicators and fundamental metrics on price movement in the LQ45 index.

The independent variables in this study are the technical indicators and fundamental metrics. The technical indicators that will be used are volume and trend. The volume will be measured as the total number of shares traded one quarter, and the trend will be measured as the percentage change in price from the opening of one quarter to the closing of that quarter. If the percentage gain is less than 1% or greater than -1%, then it will be classified as sideways. Otherwise, it will be classified as uptrend or downtrend. These technical indicators will be used to analyze the impact of market trends and trading activity on the price movement of stocks in the LQ45 index. The fundamental metrics that will be used are earnings per share (EPS), return on assets (ROA), net profit margin (NPM), and price-to-book value (PBV). EPS will be calculated as the net income of a company divided by the number of outstanding shares of common stock. ROA will be calculated as the net income of a company divided by its total assets. NPM will be calculated as the net income of a company divided by its

revenue. PBV will be calculated as the market price of a company's stock divided by its book value. These fundamental metrics will be used to analyze the impact of company financial performance on the price movement of stocks in the LQ45 index.

### **3.5. Data Analysis Methods**

The data for this study will be analyzed using the regression analysis technique. Regression analysis is a statistical method used to measure the relationship between two or more variables. It is used to determine the extent to which changes in the independent variables (technical indicators and fundamental metrics) affect the dependent variable (stock price movement). The regression analysis technique will be used to test the research hypotheses and determine the significance of the relationship between the variables.

The data analysis process is a crucial part of any research study, especially in the field of finance. In this study, the data analysis process will involve several steps to ensure that the findings are accurate and reliable. The first step in the data analysis process is data cleaning and organization. This step is essential to ensure that the data is suitable for analysis and free from errors or inconsistencies. The second step is descriptive statistics, which involves calculating summary statistics to describe the data and identify any anomalies or outliers. This step is important to gain a better understanding of the data and to identify any potential issues that may affect the analysis. The third step is correlation analysis, which is used to determine the relationship between the variables. This step is critical to identify any significant relationships between the variables and to determine the direction and strength of the relationship. Finally, the fourth step is multiple regression analysis, which is used to test the research hypotheses and determine the significance of the relationship between the variables. This step is important to validate the research findings and to determine the factors that influence the movement of stock prices in the LQ45 index. By following each of these steps in the data analysis process, the research findings will be accurate, reliable, and meaningful.

To ensure the validity and reliability of the data analysis, the study will use statistical software, known as SPSS. Furthermore, the study will use appropriate statistical tests

to ensure the accuracy and reliability of the results. The results of the data analysis will be presented in tables and graphs, and will be discussed in the results section of the research paper.

No.	Kode	Q1						Y (Q2)
		X1				X2	X2	
		ROA (X1.1)	PBV (X1.2)	EPS (X1.3)	NPM (X1.4)	(Volume)	(Trend)	
1	ACES	0.0895	4.86	9.45	0.0961	23.79	1	1500
2	ADRO	0.0167	0.67	29.59	0.1037	80.1	1	1300
3	AKRA	0.0483	1.40	15.47	0.0597	76.71	1	700
4	ANTM	0.0650	2.73	26.23	0.0684	432.46	5	2290
5	ASII	0.0420	1.33	92.09	0.0721	36.27	1	4650
6	BBCA	0.0267	4.29	57.11	0.3067	56.19	1	6025
7	BBNI	0.0016	0.93	128.01	0.1425	23.47	1	5150
8	BBRI	0.0125	2.82	54.07	0.1806	87.85	5	3830
9	BBTN	0.0052	0.95	59.03	0.0924	37.83	3	1300
10	BMRI	0.0104	1.58	126.92	0.1734	36.68	1	5700
11	BRPT	0.0105	4.38	6.80	0.0623	33.95	1	1120
12	BSDE	0.0099	0.77	28.13	0.3525	21.2	1	890
13	ERAA	0.0718	1.43	17.50	0.0256	77.94	5	655
14	EXCL	-0.0120	1.15	30.08	0.0513	21.3	1	2610
15	GGRM	0.0887	1.15	907.72	0.0587	1.03	1	32800



16	HMSP	0.1437	4.87	22.23	0.2849	35.98	1	1085
17	ICBP	0.0850	3.40	148.93	0.1151	6.55	1	8225
18	INCO	0.0365	1.46	48.00	0.1631	29.79	1	5325
19	INDF	0.0498	1.30	196.90	0.0704	7.55	1	6325
20	INKP	0.0279	0.90	360.47	0.1738	6.96	3	6350
21	INTP	0.0642	2.00	95.43	0.1022	1.65	1	9200
22	ITMG	0.0506	0.97	543.39	0.1480	2.25	1	16175
23	JPFA	0.0474	1.94	73.66	0.0797	21.75	5	1630
24	JSMR	0.0007	1.52	22.30	0.0463	5.55	1	3840
25	KLBF	0.1207	4.02	15.29	0.1191	52.37	5	1260
26	MDKA	0.0157	4.88	-3.04	-0.1070	47.07	1	2630
27	MEDC	-0.0246	0.89	2.83	0.0110	66.82	1	600
28	MIKA	0.1515	7.16	21.74	0.2628	17.5	1	2390
29	MNCN	0.0967	0.84	31.98	0.1866	28.99	1	830
30	PGAS	-0.0303	0.96	35.96	0.0840	120.72	1	1190
31	PTBA	0.0759	1.69	44.75	0.1253	31.65	1	2180
32	PTPP	0.0028	0.79	6.19	0.0135	46.67	1	905
33	PWON	0.0413	1.75	4.91	0.2121	53.1	5	446
34	SMGR	0.0355	1.84	75.93	0.0558	3.44	1	7775
35	TBIG	0.0274	4.83	12.75	0.1870	33.09	5	3070
36	TINS	0.0055	2.38	1.39	0.0044	122.79	5	1525

37	TKIM	0.0195	1.41	341.07	0.2811	5.28	3	6400
38	TLKM	0.0834	3.12	60.71	0.1772	81.7	5	3400
39	TOWR	0.0897	5.05	15.82	0.4034	58.58	5	1320
40	TPIA	0.0413	7.22	15.19	0.1410	8.14	5	2130
41	UNTR	0.0549	1.29	500.46	0.1043	2.29	1	19750
42	UNVR	0.3241	38.23	44.51	0.1651	10.17	1	5030
43	WIKA	0.0027	1.05	8.71	0.0199	36.76	1	940

Table 3.2 - Sample Data 1

No.	Kode	Q2						Y (Q3)
		X1				X2	X2	
		ROA (X1.1)	PBV (X1.2)	EPS (X1.3)	NPM (X1.4)	(Volume)	(Trend)	
1	ACES	0.0895	4.34	6.73	0.0673	9.66	3	1425
2	ADRO	0.0238	0.70	44.17	0.1128	41.82	3	1760
3	AKRA	0.0537	1.38	12.42	0.0438	17.42	1	930
4	ANTM	0.0714	2.79	22.06	0.0657	80.1	3	2400
5	ASII	0.0390	1.23	126.05	0.0916	26.78	1	6000
6	BBCA	0.0279	3.96	60.16	0.3389	52.38	1	7525
7	BBNI	0.0044	0.74	141.81	0.1505	15.48	1	7350
8	BBRI	0.0148	2.45	44.73	0.1506	88.47	1	4290
9	BBTN	0.0050	0.73	27.85	0.0437	26.38	1	1755

10	BMRI	0.0131	1.46	141.17	0.2001	25.58	1	7175
11	BRPT	0.0189	3.87	7.77	0.0606	26.7	1	965
12	BSDE	0.0176	0.66	4.39	0.0579	10.25	1	1045
13	ERAA	0.1029	1.93	17.58	0.0267	74.38	5	670
14	EXCL	-0.0096	1.46	37.07	0.0588	19.6	5	3040
15	GGRM	0.0780	1.40	315.45	0.0197	0.99	5	33500
16	HMSP	0.1808	5.45	13.31	0.1345	22.12	1	1040
17	ICBP	0.0850	2.90	127.29	0.1133	3.01	1	8850
18	INCO	0.0386	1.54	36.40	0.1204	12.35	3	4800
19	INDF	0.0517	1.18	194.10	0.0750	4.16	1	6525
20	INKP	0.0444	0.62	377.65	0.1739	4.58	1	8625
21	INTP	0.0707	1.67	63.91	0.0729	0.52	1	12675
22	ITMG	0.0996	1.17	991.09	0.1927	1.61	5	22275
23	JPFA	0.0795	1.73	58.79	0.0603	15.19	1	1740
24	JSMR	0.0122	1.28	95.59	0.2047	2.05	1	4280
25	KLBF	0.1250	3.67	16.66	0.1229	17.12	1	1470
26	MDKA	0.0040	6.40	6.60	0.1221	50.77	5	3620
27	MEDC	-0.0156	1.04	23.74	0.1008	32.09	5	480
28	MIKA	0.1809	7.17	21.03	0.2526	19.58	5	2230
29	MNCN	0.1033	0.77	59.97	0.2913	24.95	1	985
30	PGAS	-0.0098	0.69	80.13	0.1845	80.73	1	1480

31	PTBA	0.1067	1.29	114.28	0.2030	12.74	1	2740
32	PTPP	0.0036	0.53	7.72	0.0132	16.28	1	1205
33	PWON	0.0328	1.40	4.73	0.1697	28.69	1	560
34	SMGR	0.0388	1.66	57.95	0.0422	2.34	1	9450
35	TBIG	0.0306	7.90	18.37	0.2565	44.26	5	3080
36	TINS	0.0204	2.11	34.87	0.0758	31.69	1	1585
37	TKIM	0.0570	1.03	200.55	0.1687	3.07	1	7675
38	TLKM	0.0866	3.17	64.98	0.1811	52.06	1	3800
39	TOWR	0.0938	5.84	18.08	0.4468	33.25	5	1190
40	TPIA	0.0714	6.49	14.65	0.1206	6.6	1	1900
41	UNTR	0.0612	1.17	710.14	0.1364	1.99	1	23000
42	UNVR	0.3166	47.05	35.33	0.1362	11.14	1	5000
43	WIKA	0.0003	0.67	0.59	0.0018	13.7	1	1105

Table 3.3 - Sample Data 2

No.	Kode	Q3						Y (Q4)
		X1				X2.1 (Volume)	X2.2 (Trend)	
		ROA (X1.1)	PBV (X1.2)	EPS (X1.3)	NPM (X1.4)			
1	ACES	0.0759	4.37	2.68	0.0354	9.79	5	1025
2	ADRO	0.0664	0.97	112.84	0.2494	58.43	5	3040
3	AKRA	0.0533	1.91	12.49	0.0377	27.86	5	830

4	ANTM	0.0630	2.71	22.89	0.0657	67.48	3	2390
5	ASII	0.0486	1.34	151.81	0.1024	23.3	5	5800
6	BBCA	0.0279	4.36	70.92	0.4204	44.58	5	7775
7	BBNI	0.0073	0.84	145.99	0.1607	14.32	5	7125
8	BBRI	0.0155	2.09	52.48	0.1726	103.9	3	4210
9	BBTN	0.0055	0.73	56.22	0.0896	19.37	3	1685
10	BMRI	0.0147	1.46	144.28	0.2028	21.72	5	7650
11	BRPT	0.0152	3.46	0.72	0.0061	31.24	5	900
12	BSDE	0.0123	0.67	11.99	0.1311	15.5	5	1020
13	ERAA	0.0991	1.64	10.11	0.0163	58.02	1	540
14	EXCL	-0.0100	1.64	28.16	0.0440	15.29	5	2880
15	GGRM	0.0771	1.09	947.98	-0.0579	0.88	1	31600
16	HMSP	0.1544	4.37	12.21	0.3138	18.12	1	930
17	ICBP	0.0725	3.05	149.91	0.1212	3.01	5	7350
18	INCO	0.0541	1.51	92.86	0.2363	8.77	3	5100
19	INDF	0.0486	1.23	225.09	0.0775	4.83	3	5950
20	INKP	0.0462	0.71	283.62	0.1227	5.96	5	7950
21	INTP	0.0722	1.79	168.88	0.1577	0.78	3	10975
22	ITMG	0.1985	1.52	2020	0.2378	2.26	5	23975
23	JPFA	0.0768	1.96	-3.06	-0.0033	11.43	5	1575
24	JSMR	0.0105	1.42	-14.63	-0.0283	2.58	5	3610

25	KLBF	0.1282	3.61	16.86	0.1175	17.58	3	1610
26	MDKA	0.0002	5.44	9.26	0.1209	31.33	1	3760
27	MEDC	-0.0011	0.90	5.46	0.0312	47.31	1	625
28	MIKA	0.1906	6.32	18.84	0.2625	16.64	1	2220
29	MNCN	0.1066	0.68	37.05	0.2218	35.56	1	980
30	PGAS	-0.0042	0.80	53.19	0.1136	72.03	5	1385
31	PTBA	0.1914	1.53	266.9	0.3288	18.02	5	3620
32	PTPP	0.0042	0.63	7.01	0.0091	23.44	5	1090
33	PWON	3.8400	1.52	5.34	0.1929	29.08	5	478
34	SMGR	0.0336	1.41	100.07	0.0651	3.08	1	7075
35	TBIG	0.0354	7.04	19.31	0.2626	30.36	1	2910
36	TINS	0.0348	2.01	45.91	0.0893	22.42	3	1610
37	TKIM	0.0486	1.03	264.35	0.2598	2.96	3	6950
38	TLKM	0.0951	3.49	64.82	0.1756	55.43	5	4710
39	TOWR	0.0821	5.77	17.87	0.4247	45.46	5	1015
40	TPIA	0.0592	3.71	0.18	0.0017	8.49	1	2260
41	UNTR	0.0788	1.47	885.1	0.1610	2.68	5	24900
42	UNVR	0.2957	28.29	34.94	0.1353	15.69	1	3980
43	WIKA	0.0037	0.84	2.4	0.0044	31.91	5	1070

Table 3.4 - Sample Data 3