

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics



Bachelor Thesis

**Economic analysis of Samsung Electronics Co.,
Ltd. Stock**

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

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Economic Analysis of Samsung Electronics Co. Ltd. stock

Objectives of thesis

Evaluation the position of Samsung Electronics Co., Ltd. stock in the financial market. Comparison with other competitors such as Apple and Google Android . Using analysis methods to deeply understand how good or bad the Samsung stock is to purchasers. With the deep understanding on Samsung stock, give recommendation if Samsung stock is worth to be invested or not. Forecast the potential of development of Samsung stock in the future.

Methodology

Literature review is evaluated by using inductive and deductive method, as well as method of extraction, synthesis and others. Fundamental and technical analysis is done thanks to qualitative and quantitative methods. All the data and research on Samsung stock and related information is taken from CULS library and the internet, specially from the official website of Samsung Electronics.

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Samsung Electronics, stock, fundamental analysis, technical analysis, financial market, investment

Recommended information sources

BERNSTEIN, L A. *Analysis of financial statements.*

BOGLE, J C. *The little book of common sense investing : the only way to guarantee your fair share of stock market returns.* Hoboken, NJ: Wiley, 2017. ISBN 9781119404507.

ENSMINGER, M E. *The stockman's handbook.* Danville, Ill.: Interstate Publishers, 1992. ISBN 0813428955.

HELFERT, E A. *Financial analysis: tools and techniques : a guide for managers.* New York: McGraw-Hill, 2001. ISBN 0-07-137834-0.

HELFERT, E A. *Techniques of financial analysis.* Homewood: Irwin, 1987. ISBN 0-256-03625-

SWENSEN, D F. *Unconventional success : a fundamental approach to personal investment.* New York: Free Press, 2005. ISBN 978-0-7432-2838-1.

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Declaration

I declare that I have worked on my bachelor thesis titled "Economic Analysis of Samsung Co., Ltd. Stock" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break copyrights of any other person.

In Prague on 23rd November, 2020

Nguyen Thi Ngoc Lan

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I would like to thank my supervisor and my family, my friends (specially my boyfriend) who have given me many advices and support to complete this thesis during my last busy acedamic year. They have helped me out of struggle times and given me many ideas that are used in my thesis.

Economic Analysis of Samsung Electronics Co., Ltd. Stock

Abstract

This bachelor thesis is written to analyze Samsung Electronics Co. Ltd. stock. There are two main sections in the thesis: literature review and practical section. In the first part, general information about Samsung company is mentioned, as well as knowledge of stock; and the market in which the company is operating, especially focusing on stock segment.

Second main part of the thesis is practical section. This is where fundamental and technical analysis methods are used, along with, qualitative and quantitative data analysis,... to get a solid understanding about the performance of Samsung Electronics Co. Ltd. stock on stock market.

Accordingly, the results and discussion are show up, then the evaluation of potential of the stock will be given, that helps people to make the right decision, if they wonder to invest on this stock in the future.

Keywords: Samsung Electronics Co. Ltd., stock, stock market, investment, future growth, profit, economic analysis, theoretical analysis, fundamental analysis, technical analysis

Ekonomická Analýza akcií společnosti Samsung Electronics Co., Ltd.

Abstrakt

Tato bakalářská práce je zaměřena na analýzu akcií společnosti Samsung Electronics Co. Ltd. Práce obsahuje dvě hlavní části: přehled literatury a praktická část. V první části jsou uvedeny obecné informace o společnosti Samsung, stejně jako znalost zásob; a na trhu, na kterém společnost působí, zejména se zaměřením na akciový segment.

Druhou hlavní částí práce je praktická část. To je místo, kde se používají základní a technické metody analýzy, spolu s kvalitativní a kvantitativní analýzou dat, ... k získání solidního porozumění o výkonnosti akcií společnosti Samsung Electronics Co. Ltd. na akciovém trhu.

V souladu s tím jsou ukázány výsledky a diskuse, poté bude provedeno vyhodnocení potenciálu akcií, které lidem pomohou učinit správné rozhodnutí, pokud se zajímají o investování do této akcie v budoucnu.

Klíčová slova: Samsung Electronics Co. Ltd., akcie, akciový trh, investice, budoucí růst, zisk, ekonomická analýza, teoretická analýza, fundamentální analýza, technická analýza

Table of Contents

1	INTRODUCTION	10
2	OBJECTIVES AND METHODOLOGY	11
2.1	Objectives	11
2.2	Methodology	11
3	LITERATURE REVIEW	12
3.1	Samsung Electronics Co., Ltd.	12
3.2	About Stock	14
3.3	Financial Ratios	18
4	PRACTICAL SECTION	20
4.1	Fundamental analysis	20
4.2	Technical Analysis	22
5	RESULTS AND DISCUSSION	26
5.1	Results from fundamental calculation and analysis	26
5.2	Forecast short-term and long-term trend of stock price based on technical analysis 27	
6	CONCLUSION	30
7	REFERENCES	31
8	APPENDIX	33

List of figures

Figure 1: Stock Price in relation with Supply and Demand

Figure 2: Example of EMAs on Samsung Stock

Figure 3: Example of MACD on Samsung Stock

Figure 4: Samsung stock and MACD- short-term prediction

Figure 5: Samsung stock with RSI and OBV- short-term prediction

Figure 6: Samsung stock and EMA(200)- long-term prediction

List of table

Table: Key ratios of Samsung's profitability through years

1 INTRODUCTION

Nowadays, smartphones and electronic products are very popular and widely used by people all around the world. One of the most famous brand named on those product is Samsung. Samsung is a long-standing electronic brand, always creating product lines with many advantages, suitable for consumers in many different segments. Up to now, the company has been continuously developing and creating products and services to satisfy customers' needs.

With that leading position, Samsung has been attracting a lot of investors to buy their shares. But economically, is Samsung's stock worth our investment? Will Samsung continue to grow in the future and make its stock more and more valuable?

This thesis is a key for those questions that are mentioned above. You will find in this thesis:

- General understanding about Samsung Electronics company
- General understanding about Stock and Stock Valuation
- Financial analysis about current company's stock
- Concrete evidence of current growth
- Predictions about the company's future growth

I - the author of this thesis, do hope that with my research, analysis and synthesis, you'll find the right answer for your choice of investments.

2 OBJECTIVES AND METHODOLOGY

2.1 Objectives

Evaluation the position of Samsung Electronics Co., Ltd. stock in the financial market. Using analysis methods to deeply understand how good or bad the Samsung stock is to purchasers. With the deep understanding on Samsung stock, give recommendation if Samsung stock is worth to be invested or not. Forecast the potential of development of Samsung stock in the future.

2.2 Methodology

Literature review is evaluated by using inductive and deductive method, as well as method of extraction, synthesis and others. Fundamental and technical analysis is done thanks to qualitative and quantitative methods. All the data and research on Samsung stock and related information is taken from CULS library and the internet, specially from the official website of Samsung Electronics.

3 LITERATURE REVIEW

3.1 Samsung Electronics Co., Ltd.

Samsung is a familiar name in today's smartphones market, standing among other brands like Apples, HTC, Huawei, Google, Lenovo,... But not only smartphones and tablets, other products of Samsung such as televisions, refrigerators, washing machines,... has been used by millions of people long time ago. With a long-life history and a rapid development and transformation, Samsung is asserting their leading position in every fields they have entered.

“Our promise to perform responsibly as a leading, global company.”¹

a) History in brief

Samsung is a South Korean trading company that is first founded on March 1st, 1938 by Mr. Lee Byung-Chull. Interestingly, although nowadays Samsung is very famous for their undefeatable position in the market of Android products, electronics and technologies, before 1969, Samsung had survived through Korean war and political coup by producing and trading groceries, textiles and paper products.

Samsung Electronics Co., Ltd was officially established in 1969, marked their presence in Electronics industry. Their first products were low-price black-and-white TVs and consumer electronics. During 1980s, Samsung started to export their own electrical products. Not only electronics, Samsung kept on developing in technological innovation and was leading the world in chip production in 1990. Many new different types of technologies were used in producing television, such as flat-screen TVs or digital TVs. The first car of Samsung Motors was also represented during this time (1990s).²

In the 2000s, the world welcome the series of Samsung Galaxy smart-products. In 2006, Samsung became number 1 in global TV market share.³ Till now, Samsung has become the king in every price and quality ranges of Android market.

b) Organizational structure and Bussiness Areas

Organizational structure

Samsung Electronics Co., Ltd. today is a “giant” in the world of consumer electronics and technologies innovation, with 325,677 employees working in 80 countries all over the world and combination of over 200 subsidiaries (Sustainability Report, 2016).⁴

¹ Samsung's philosophy. [online] Available at: <https://www.samsung.com/us/aboutsamsung/vision/philosophy/philosophy-goals/> [Accessed 16 Nov 2020]

² Diana Stickler, 2013. Samsung: A short history. [online] Available at: <https://www.mercurynews.com/2013/04/08/samsung-a-short-history/> [Accessed 16 Nov 2020]

³ Samsung's history. [online] Available at: <https://www.samsung.com/us/aboutsamsung/company/history/> [Accessed 16 Nov 2020]

⁴ Samsung Group-the company report(Octocer 2017). [online] Available at: <https://research-methodology.net/samsung-electronics-report-3/> [Accessed 16 Nov 2020]

In 2013, the company has built up “15 regional headquarters, 54 global sales offices, 38 global production facilities and 34 global R&D centers”.⁵ There are reasons for this huge extension in global area. Samsung doesn't want to run its business as a holding company, because as such a big company, they have to face the risk of divestments of all stakes from the company and also from their affiliates. In a such competitive environment, this may affect share price of Samsung. Moreover, Samsung has ambitions of being the leader in all segments of the markets that their product are sold in. It is explained why Samsung's organizational structure is optimal stuctrue - divisional based on product types.⁶

Business Areas

In Samsung Electronics, they have 3 seperated business areas:

- Consumer Electronics⁷: 19.4% total revenue
 - ✓ TVs with high-quality visual display (Serif TVs, UHD TVs, curved TVs, QLED TVs, smart TV);
 - ✓ Home Appliance: Premium and innovative products (such as FamilyHub refrigerator, WindFree air conditioner, FlexWash washing machine,...)
 - ✓ Health & Medical Equipment: products with accuracy, efficiency and full access
- IT and Mobile Communications⁸: 46.6% total revenue
 - ✓ Mobile Communications Business: Samsung has produced smartphones at full price-range that suitable for everybody. They also develop artificial intelligence and smart services for the B2B.
 - ✓ Networks Business: New LET(4G) networks and services in 2016 is a well jump that show the power of Samsung in developing solutions for next-generation network infrastructure.
- Device Solutions: 41.5% total revenue
 - ✓ Memory Business: Samsung maintained their leading position in global memory semiconductor market since 1993⁹
 - ✓ System LSI Business: Innovation is the key performance of products of this segment
 - ✓ Foundry Business: Samsung has started to produce lines of mobile SoC under the technology of 10nm FinFET process in 2016

⁵ [Facts] Understanding the Current State of Samsung Electronics. [online] Available at: <https://news.samsung.com/global/facts-understanding-the-current-state-of-samsung-electronics> [Accessed 16 Nov 2020]

⁶ Samsung Electronics Completes Review of Optimal Corporate Structure (2017) Samsung Newsroom, [online] Available at: <https://news.samsung.com/global/samsung-electronics-completes-review-of-optimal-corporate-structure> [Accessed 16 Nov 2020]

⁷ Consumer Electronics. [online] Available at: <https://www.samsung.com/us/aboutsamsung/business-area/consumer-electronics/> [Accessed 16 Nov 2020]

⁸ IT & Mobile Communications. . [online] Available at: <https://www.samsung.com/us/aboutsamsung/business-area/it-and-mobile-communications/> [Accessed 16 Nov 2020]

⁹ Device solution. [online] Available at: <https://www.samsung.com/us/aboutsamsung/business-area/device-solution/> [Accessed 16 Nov 2020]

3.2 About Stock

a) *What is Stock?*

“A stock is a form of security that indicates the holder has proportionate ownership in the issuing corporation.”¹⁰ People who own stocks of a corporation are called shareholders. In other words, stock ownership makes shareholders the owners of the company.

Why does a corporation issue stock?

A company needs a lot of money to raise funds to start projects and keep things going on. One of the general ways to raise equity for the company, is to issue shares. Common shareholders hold stocks, and then come to a vote to create a board of directors. The more shares you are holding in your hand, the greater your voting power will be. You can indirectly control the direction of the business by appointing a board of directors. Stock is a kind of investment that allows you to own a part of the company and become a shareholder. While board of directors - the head of the company will hire CEO and managers to use the capital and assets in order to run the company and make profits. Part of the profits will be partly reinvested to the company or will be divided into dividends and returned to shareholders.

Where and how to buy stock?

When a company successfully passes Initial Public Offering(IPO) process, it has the right to be listed in stock exchange list. People can buy and sell stocks of any of those companies they find in stock exchange. Some major stock exchanges are New York Stock Exchange (NYSE), NASDAQ, London stock exchange, Japan Exchange Group (JPX) and Shanghai stock exchange (SSE). But it is important to know deeply about the company that you want to invest, or else you will lose money on purchasing low-valued shares.

Stock of Samsung Electronics Co., Ltd. (SECL, KRX:005930) is listed legally on:¹¹

- the Korea Stock Exchange (KRX) with the original stocks.
- London Stock Exchange (LSE) for the Global depository receipts (GDRs).
- Luxembourg Stock Exchange (LuxSE), also for the GDRs.

b) *Types of stock*

There are two main types of stock:

- Common stock
- Preferred stock

¹⁰ ADAM HAYES (2020). Stock. [online] Available at: <https://www.investopedia.com/terms/s/stock.asp> [Accessed 16 Nov 2020]

¹¹ How to Buy Stock. [online] Available at: <https://www.samsung.com/global/ir/stock-information/how-to-buy-sec-stocks/> [Accessed 16 Nov 2020]

Common stock

“Common stock is the purest and most basic form of corporate ownership.”¹²

Common stock shows the basic equity ownership between common shareholders to their corporation. We can find in the balance sheet of a company, common stock is listed on the side of stockholder’s equity. In the term of liquidation, the dividends are paid to common shareholders just only after when the company has already paid all their debt, to their creditors and bondholders, and then after preferred shareholders.

According to dividends policy in many company, a company is not obligated to offer dividends to common stockholders. Instead of partly extracting dividends from profits to payout common shareholders, the company reinvest themselves and have more chances to improve company’s performance, which can indirectly raise the company’s share price in the market.

Of course, dividends are attractive to every investors, but it’s not the most important kind of profit that a big part of investors are expecting to earn. Increasing share price is like an alternative payment that a company can offer to their “boss” – those common stockholders, as a thank for their long-term investments.

Preferred stock

As we mentioned above, preferred stock is also the securities equity that connects shareholders with corporations in a relationship of owning. The difference that is easy to recognize between preferred stock and common stock is the order of priority for dividends payment. Preferred stockholders are always paid dividends before common stockholders, after the company pays to all their creditors and bondholders. It sounds good to investors, but there are still some disadvantages coming along with the advantages.

Preferred dividends are fixed and low volatility. This is safe, but it’s also mean when the company’s performance’s improving, common share price can be soaring with it, while preferreds increase just a few point. Moreover, preferred shareholders do not have the right of electing company’s board of directors. Generally, preferred shareholders do not involve much in company’s operation. This leads to a thought that they are like dead stock to issuers. As we can see in stock market nowadays, many companies don’t issue preferred stock. Some of big name can be mentioned are Apple Inc.(AAPL) and Microsoft Corp.(MSFT)¹³.

However, for some reasons, preferred stock still can be a choice of issuing, when a company need stability and attract more investors in the future. This can explained by debt-to-equity ratio: Preferred stock is an equity, and preferred dividends are paid after tax and debt. If a company meets some debit problems, preferreds can be

¹² Lawrence J.Gitman (2005). THE ROLE AND ENVIRONMENT OF MANAGERIAL FINANCE. In: Lawrence J.Gitman (2005), *Principles of Managerial Finance*, 11th ed. Addison Wesley, U.S., pp.2-39

¹³ GREG MCFARLANE (2019). What You Need To Know About Preferred Stock. [online] Available at: <https://www.investopedia.com/articles/active-trading/101614/what-you-need-know-about-preferred-stock.asp> [Accessed 16 Nov 2020]

suspended or withheld by agreements of Board of directors. While preferreds still exist that leads to lower debt-to-equity (D/E) ratio according to this formula:

$$\text{Debt/Equity} = \frac{\text{Total Shareholders' Equity}}{\text{Total Liabilities}}$$

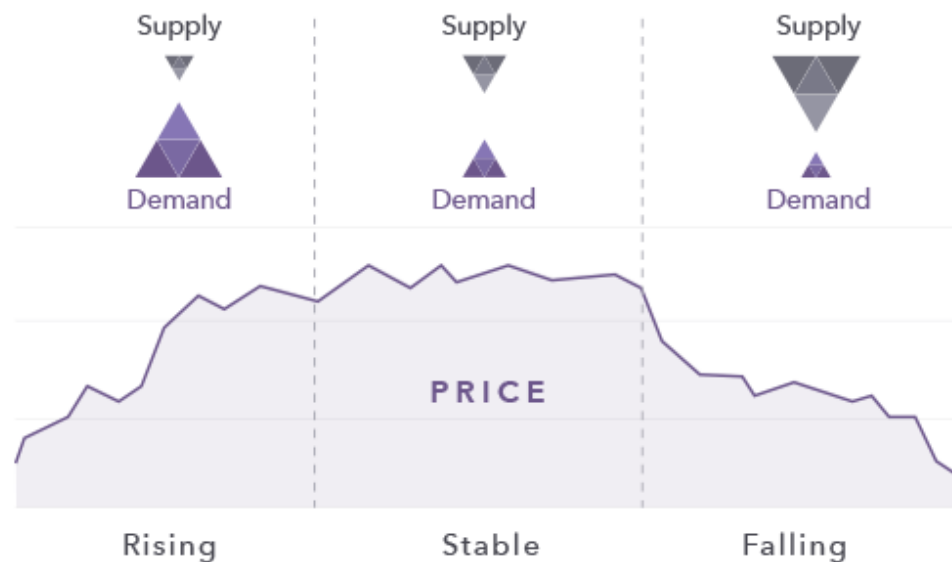
This ratio is one of the most basic metrics for investors to evaluate the risk of a stock and help them to decide to invest in a stock for long-term or not. Because the lower D/E ratio is, the less riskier to shareholders a stock is. Low D/E ratio also promises a future growth of a company, when equity still remains and debt can be paid soon.

c) What can affect share price?

As concerned above, what a shareholder cares about is not only how many dividends they may earn, but also how much is the share price of stocks they are or will be owning. This is very important for investors to make a decision of investment.¹⁴

- A share price fluctuation depends on supply and demand in the market.

Figure 1: Stock Price in relation with Supply and Demand (source: own processing, ig.com. What causes share prices to change?)



As we can see, according to the law of supply and demand of the market, price is rising up when the amount of supply is less than the amount of demand. And vice versa, price is falling down when supply exceeds demand. But price is not rising or

¹⁴ DAVID R. HARPER (2019). Forces That Move Stock Prices. [online] Available at: <https://www.investopedia.com/articles/basics/04/100804.asp> [Accessed 17 Nov 2020]

falling rapidly forever. Till a time, when supply and demand are equal, the price become stable. This is called Equilibrium market.

There are basic indices that help investors assess the changes of stock prices in financial market. They are:

- Earning per share (EPS), Dividends and Price to earning ratio (P/E)¹⁵

Earning per share represents company's net profit that each outstanding shareholder can earn from company's operation after paying all debts, taxes and preferred dividends. An amount or the retained earning can be paid out for shareholders as dividends.

$$EPS = \frac{\text{Net income} - \text{Preferred dividends}}{\text{Total number of common stockholders}}$$

The higher EPS is, the more confident purchaser is. This may cause a raise of demand, therefore a raise of stock price. Price-to-earnings ratio(P/E) shows the relationship between Market price and EPS.

$$\frac{P}{E} = \frac{\text{Market price per share}}{EPS}$$

- Return on Equity (ROE)

Return on Equity ratio shows how effectively the company's operation turns their equity into profits. Generally the higher of ROE, the higher demand of investing to a well-performing company, leading to higher share price of that company's stock.

$$ROE = \frac{\text{Net income}}{\text{Equity}}$$

Otherwise, using historical data and trend, specially charts and tables, we can predict the direction of share price fluctuation.

Market sentiment is also can affect stock price. It's mainly psychological feeling of traders and investors about company's operation. That can lead to behavioral finance decision to buy stock.

¹⁵ What causes share prices to change?. . [online] Available at: <https://www.ig.com/en/trading-strategies/what-causes-share-prices-to-change--190128> [Accessed 17 Nov 2020]

3.3 Financial Ratios

a) *Liquidity ratios*

Current ratio

Current ratio represents how well the company is doing on using assets to pay back their liability in short-term obligation. This ratio has to be greater than 1, to make sure that the company is solid enough in short-term operation.

$$\text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Quick ratio

Similar to current ratio, quick ratio also compute the ability of a company to pay liabilities in short term. It's called quick ratio because it doesn't count inventory. A low quick ratio (often less than 1) means company is in trouble on paying liabilities.

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}}$$

b) *Stability Ratio*

Debt Ratio

If company has more debt than it's assets, this is an alert. Debt ratio shows how much the company's debt exceeds their assets. This also is a measurement of the company's leverage. The company which has this ratio less than 1 is a safe company, because they can use their total assets to pay debts and still have capital for operating.

$$\text{Debt Ratio} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

Debt to Equity Ratio

This ratio is one of the most basic metrics for investors to evaluate the risk of a stock and help them to decide to invest in a stock for long-term or not.

$$\text{Debt to Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Total Shareholders' Equity}}$$

Interest coverage Ratio

The ratio tells us about the ability of company to pay their interest from earnings. The higher Interest coverage Ratio, the better company's performance.

$$\text{Interest coverage Ratio} = \frac{\text{Earnings before Interest and Tax (EBIT)}}{\text{Interest}}$$

c) ***Profitability ratios***

This section attracts much of investors' attention. Compare how much profitable the company is will help us to make the right decision of investment to that company.

Earning per Share

Earning per share represents company's net profit that each outstanding shareholder can earn from company's operation after paying all debts, taxes and preferred dividends

$$EPS = \frac{\text{Earnings to Common Stockholders}}{\text{Number of shares}}$$

Return on Assets

Return on Asset ratio shows how effectively the company's operation turns their total assets into earnings. Higher ROA ratio tells us that company has more efficient assets

$$ROA = \frac{\text{Earnings to Common Stockholders}}{\text{Total Assets}}$$

Return on Equity

Return on Equity ratio shows how effectively the company's operation turns their equity into profits. Higher ROE could mean that company's performance is better because of their high net income.

$$ROE = \frac{\text{Net Income}}{\text{Average shareholders' Equity}}$$

But it's also possible, it can tell company is at risk because their equity is low or they have too much liability to pay. So we have to also look at Balance Sheet and Income Statement and compare their peer group to have the right evaluation of this ratio.

4 PRACTICAL SECTION

4.1 Fundamental analysis

In this section, I am doing the calculations of basic financial ratios and interpret each of them to get fully understanding of those numbers.

**Notice:* all numbers are taken from original annual financial statements of Samsung Co.Ltd., in the end of 2019, represented at section 7. Appendix

a) *Current ratio*

$$\text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{181,385,260}{63,782,764} = 2.84$$

Interpretation: Samsung company has current assets 2.84 times greater than its current liabilities. In other words, Samsung has 2.84 KRW of current assets to pay for every 1KRW of current liabilities.

b) *Quick Ratio*

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}} = \frac{181,385,260 - 26,766,464}{63,782,764} = 2.42$$

Interpretation: Samsung company has current assets 2.42 times greater than its current liabilities. Similarly, Samsung has 2.42 KRW of quick assets to pay for every 1KRW of current liabilities.

c) *Debt Ratio*

$$\text{Debt Ratio} = \frac{\text{Total Liabilities}}{\text{Total Assets}} = \frac{89,684,076}{352,564,497} * 100\% = 25.44\%$$

Interpretation: Samsung's total liabilities occupy only 25.44% of its total assets.

d) *Debt to Equity Ratio*

$$\text{Debt to Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Total Shareholders' Equity}} = \frac{89,684,076}{262,880,421} = 0.34$$

Interpretation: Total liabilities of Samsung is approximately 1/3 its total equity, this means the company depends on stockholders' equity more than on the assets of creditors and loans.

e) Interest coverage Ratio

$$\begin{aligned} \text{Interest coverage Ratio} &= \frac{\text{Earnings before Interest and Tax (EBIT)}}{\text{Interest Expense}} \\ &= \frac{30,432,189 - 8,274,871}{8,274,871} = 2.68 \end{aligned}$$

Interpretation: For each 1KRW of interest that Smasung has to pay, the company has 2.68KRW of earnings to afford it. This means that the company is in good condition and can satisfy their creditors by the ability of paying full interests.

f) Return on Equity

$$ROE = \frac{\text{Net Income}}{\text{Average shareholders' Equity}} = \frac{21,738,865}{(262,880,421 + 247,753,177)/2} * 100\% = 8.51\%$$

**Notice: Average shareholders' Equity of the year 2019 = (total Equity at the beginning of 2019 + total Equity at the end of 2019)/2*

Interpretation: 8,51% of shareholders' equity is turned into net profit under the using of Samsung company by the end of the year 2019

g) Return on Assets

$$ROA = \frac{\text{Net Income}}{\text{Average Total Assets}} = \frac{21,738,865}{(339,357,244 + 352,564,497)/2} * 100\% = 6.28\%$$

**Notice: Average total Assets of the year 2019 = (total assets at the beginning of 2019 + total assets at the end of 2019)/2*

Interpretation: Samsung company utilizes the assets they have to make 6.28% of the total assets as the net profits.

h) Earnings per share

$$EPS = \frac{\text{Annual net income}}{\text{Weighted average of outstanding common shares - treasury shares on shares}} = 3166 \text{ (KRW)}$$

Interpretation : For each shares of common stock of Samsung, stockholders may earn 3166 KRW as profits.

Further understandings will be displayed in the section 5. Result and Conclusion.

4.2 Technical Analysis

In this section, I mention some of common stock indicators that is very useful on technical analysis of any stocks nowadays.

a) Volume indicator: OBV

As mentioned above, stock price is greatly influenced by the amount of supply and demand. Thus, many investors and traders are using On-balance Volume (OBV) to indicate the connection between the stocks they are tracking and the volume of trading those stocks.

On-balance Volume (OBV) is a volume indicator measuring buying and selling forces in the market from day to day, depending on Volume's changes and closed price volatility compared to the previous day. We can see the connection clearly by looking at the calculation of OBV on a trading day:

- When today's closed price is greater than the closed price yesterday:
 $OBV \text{ today} = OBV \text{ yesterday} + \text{Volume today}$
- When today's closed price is smaller than the closed price yesterday:
 $OBV \text{ today} = OBV \text{ yesterday} - \text{Volume today}$
- When today's closed price is equal to the closed price yesterday:
 $OBV \text{ today} = OBV \text{ yesterday}$

Price and Volume are always closely related to each other, and the shifting movement of Volume can forecast the movement of Price, because it is based on crowd sentiment. Buying and selling forces often anticipate price changes, so we can use OBV as a trading indicator. Normally, the OBV line and the line of closing price fluctuate together. So, looking at the OBV, we can see whether the price is going up or down. In some cases, there are signs of divergence indicating that the OBV is moving not in the same direction as the price line. It is a sign of a price reversal in the near future.

b) Moving average lines: SMA, EMA

Moving average lines are very popular among investors because of their usefulness in predicting market prices in both the long and short term. MA makes price looks smooth, that helps investors and traders to see it clearer while tracking price movements.

The long-term MA typically has greater latency and has less grip on the price line than the short-term MA. This is how to recognize a buy or sell signal with MAs:

- When there is an intersection between short-term MA and long-term MA, it is the signal of a reversal
- When short-term MA is moving up above long-term MA, the Price is moving upwards, investors and traders should prepare for selling stock
- And vice versa, when short-term MA is moving down under long-term MA, it indicates that the Price is moving downwards, investors and traders should buy this stock at the right moment to get a good price of purchasing.

Simple Moving Average (SMA) is created by calculating the average closing price over a specified period and moving towards the present. For example, to have a SMA(50) point, we need the closing prices of the first 50 consecutive days, add them up and divide by 50. The SMA(50) of the 51st day will be the average price of the 50 consecutive days with the 51st day being the last day of that 50-day series. Some of the more commonly used SMA are:

- Short term SMA: period 9, 14, 20 days
- Long term SMA: period 50, 100, 200 days

The SMA shows quite fully and reliably the price movements over a long period of time. But because of the large latency and slow response, it is not of much used in the short term. Instead, people often use an other type of MA, it is EMA.

Exponential Moving Average (EMA) is a technical indicator using moving averages' theory. EMA is like simple moving average but it puts more weight on recent price data. EMA is good for short-term investors and traders to detect price fluctuations in recent time period. But sometimes, it can produce false signals because it reacts too quickly to price movements. Therefore, we need to use more than one stock indicator, to get the best judgment for the upcoming price trend. EMA is calculated by this formula:

$$EMA_{today} = Price_{closing\ today} * m + EMA_{yesterday} * (1 - m) \quad \text{With } m = 2 / (1 + \text{period of EMA})$$

Example:

Here is the graph of EMAs on Samsung stock. We have EMAs for period of 9 days, 14 days and 20 days. You can see the smaller the period is, the better the EMA sticks to real time price. EMA(9) show clearly how better it is on tracking price than EMA(20). On the 8th of September, 2020, when the price is shifting from falling to rasing, these three lines are crossover and reverse their order: EMA(9) is from the bottom, after the crossover it is moving above 2 other EMA lines, and EMA(9) is always the closest line of three EMAs to the price line. Although the crossover happens after the price's shifting, it is still useful. Because it happens very near the real-time movement, the signal tells us to quickly react and make the right decision.

Figure 2: Example of EMAs on Samsung Stock (source: own processing, tradingview.com)



c) *Momentum oscillator: MACD, RSI*

Moving Average Convergence Divergence (MACD) is a technical stock indicator, indicating stock's momentum by the convergences and divergences of moving average lines. MACD consists of 3 EMAs and a histogram:

- Exponential moving average lines in period 12 days and 26 days:
EMA (12) and EMA(26)
- Signal line: EMA(9)
- Histogram:
The chart represents the line MACD with $MACD = EMA(26) - EMA(12)$

Figure 3: Example of MACD on Samsung Stock

(source: own processing, tradingview.com)



As we can see, MACD not only informs us the buying or selling signals, but also represents the strength of the signals with a bar chart. This gives analysts a more intuitive view of the magnitude of price fluctuations.

Price is going to raise when EMA(12) cuts EMA(26) under or above zero line and both of them move upwards. When there is a crossover and both lines move downwards, price tends to decrease. After each crossover, we have a reversal of price.

Then what are the signals of sell and buy?. We sell when we see the signal of price's decreasing, and we buy at the point that price has signal to raise up. We also can see the changes of bars in the histogram to seek a better price for purchase or sell. But seeing crossover is more clearly and less risky.

Relative Strength Index (RSI) was firstly represented in the book “New Concepts in Technical Trading Systems” (1978) by J.Welles Wilder. This technical indicator measure sell force and buy force on a stock over times. In other word, RSI evaluates stock’s popularity among buyers and sellers on a scale from 0 to 100 On that scale, there are 2 main areas that we need to pay attention to:

- From 0 to 30: This is called oversold area. When RSI is moving to this area, it can be conclude that stock is oversold. This also means that price of stock is going downwards because there are too many people want to sell it at the same time.
- From 70 to 100: This is overbought area, where stock is on demands so much. It leads the share price go high, according to the rule of supply and demand in the market.
When stock is in the situation of being overbought for a long period, the overbought threshold can be raised up to 80.

When stock is in overbought or oversold area, it tends to decrease or increase accordingly to achieve the most appropriate value that satisfies both the seller and the buyer. Not only when RSI is moving to those 2 areas above, we can predict the price trend by RSI even when it is in safety area(from 30 to 70). We can set the 50-line as a “signal line”. Price is on uptrend when RSI drives upwards and cross signal line, and vice versa.

After all, my recommendation is combine all these technical indicators above to analyze the trend of stock in the most efficient way and make profit by your wise decisions.

5 RESULTS AND DISCUSSION

Is Samsung Electronics Co. Ltd. a worthy company to invest? Let's find out the answer.

5.1 Results from fundamental calculation and analysis

In fundamental analysis part, I have made some calculations of important ratios in detailed, because it is necessary to know what elements can affect the ratio, not only the final meaning of that ratio.

About liquidity

As the current ratio(2.84) and quick ratio(2.42) are all much higher than 1, we can say that Samsung is full of liquidity. With the current asset double cover the current liabilities, Samsung can afford all the current obligations with no fears at all. Investors can be assured with the current activities that the company is conducting.

About Stability

Samsung has debt ratio only for 25.44%. This means that if Samsung has to pay all their debts, they still have 74.56% of total assets for paying shareholders and operating of the company in the next year. Samsung owns the amount of assets that is probably stable for solving up-coming financial issues without making their creditors and lenders concerned. Stability and reliability always go hand in hand.

About Profitability

Return on Equity ratio (8.51%) and Return on Assets ratio (6.28%) in the end of 2019 are considered to be low in the market (they should be 15-20%). Compare to one of the biggest Samsung's competitor – Apple with 87.9% ROE, it is a big difference. Let's take a look at these ratios over the past 5 years till now (2015 to Second quarterly 2020)

Key Ratios		2015	2016	2017	2018	2019	2020 1Q	2020 2Q
ROA	%	5.5	11.2	17.4	10.6	6.3	5.5	6.3
ROE	%	7.4	15.2	24.1	14.6	8.5	7.4	8.3

*Table: Key ratios of Samsung's profitability through years
(source: author's own calculation based on data at Samsung.com)*

Even we said that „the higher of ROE is, the better the company's performance is“ previously, but this situation seems weird. Apple has a huge rate of ROE, but they also have a high rate of debt to equity with 172,1%. Their operations can run normally based on a big part of their liability. While the debt to equity ratio of Samsung is only 34%. So we can conclude that Samsung with a low ROE is still a healthy and profitable company.

5.2 Forecast short-term and long-term trend of stock price based on technical analysis

- a) In **short-term prediction** of Samsung stock price, I use some technical indicators as I mentioned above to work with.

This is the price trend forecasted by Moving Average Convergence/Divergence (MACD) indicator.

Figure 4: Samsung stock and MACD- short-term prediction

(source: own processing, tradingview.com)



As we can see, there was a crossover of blue line and red line (EMA periods 12 days and 26 days) in the nearly beginning of November. They also cross the signal line, reverse their previous orders and moving upwards above zero line. But they are nearly touch with the decreasing heights of those last bars in Histogram.

With these signals, we can forecast a slightly rising of price in a very short-term. And then the price line will fall.

To make my predictions clearer, I continue use RSI and OBV indicators, to consider the buy and sell forces in affecting Samsung price.

Figure 5 is what I got when I put those indicators into the price chart. About OBV, in my experiences of watching Samsung's stock chart, Samsung is the stock that has the OBV line going with the same direction of price, respectively. It means when price goes up, OBV goes up, and vice versa. OBV is on its trend moving upwards, so maybe the price is also rise.

About RSI, the current RSI value is 71.03, which is on the overbought area. The gradient of those top points in this area is slope down, so we can predict a moving down trend of price in near future.

In sum, my prediction about short-term trend of Samsung's stock price starting from today(27/11/2020) is slightly moving up then fall down. But this is only prediction, nothing can be sure. If I am a short-term investor/trader who owns some amount of Samsung's stock, I will wait for a few more days to see a clear signal, such as the crossover of MACD. Then I will decide to sell my stocks before the price reversal.

Figure 5: Samsung stock with RSI and OBV indicator - short-term prediction

(source: own processing, tradingview.com)



- b) In long-term prediction, I use EMA(200) - exponential moving average in period of 200 days.

Figure 6: Samsung stock and EMA(200) - long-term prediction

(source: own processing, tradingview.com)



Price is above the EMA(200) and is having an upwards trend. But if there is not any big change in the company's operation, or in the market, I think the price is going downtrend soon and fluctuates around the rising EMA (200).

Even calculating a large period, EMA is still a Weighted Moving Average, with the sensitivity on changes of recent data, rather than historical data. To predict long-term trend stock price of a big corporation like Samsung, we have to use more than some technical indicators.

6 CONCLUSION

Samsung is a big corporation standing on the leading position in information, technological and semiconductor industry. This is a healthy and balanced company with a reliable financial performance, and specially it has been growing through years with low debts using on operating.

Samsung stock price was raising years over years, after ten year it raise from 15500 KRW (2010) to 68000 KRW (now-2020). It is stable with the signals and it is predictable. It changes gradually instead of jumping up or down unexpectedly.

With the development of Samsung in the future and how well it has performed by now, I recommend people to make investment into this stock, because it its worthy and potential.

With the analysis and information I have represented in this thesis, I hope there is something helpful here for you in your future investments, not only on Samsung's stock, but also many others in the market nowadays.

Thank you for your readings!

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8 APPENDIX

Income statement of Samsung, end of 2019

Samsung Electronics Co., Ltd. and its subsidiaries

CONSOLIDATED STATEMENTS OF PROFIT OR LOSS

(In millions of Korean won, in thousands of US dollars (Note 2.28))

	Notes	For the year ended December 31,			
		2019 KRW	2018 KRW	2019 USD	2018 USD
Revenue	31	230,400,881	243,771,415	197,690,938	209,163,262
Cost of sales	23	147,239,549	132,394,411	126,335,995	113,598,417
Gross profit		83,161,332	111,377,004	71,354,943	95,564,845
Selling and administrative expenses	23, 24	55,392,823	52,490,335	47,528,721	45,038,298
Operating profit		27,768,509	58,886,669	23,826,222	50,526,547
Other non-operating income	25	1,778,666	1,485,037	1,526,149	1,274,207
Other non-operating expense	25	1,414,707	1,142,018	1,213,861	979,886
Share of net profit of associates and joint ventures	11	412,960	539,845	354,332	463,203
Financial income	26	10,161,632	9,999,321	8,718,988	8,579,720
Financial expense	26	8,274,871	8,608,896	7,100,090	7,386,694
Profit before income tax		30,432,189	61,159,958	26,111,740	52,477,097
Income tax expense	27	8,693,324	16,815,101	7,459,135	14,427,866
Profit for the year		21,738,865	44,344,857	18,652,605	38,049,231
Profit attributable to owners of the parent company		21,505,054	43,890,877	18,451,988	37,659,703
Profit attributable to non-controlling interests		233,811	453,980	200,617	389,528
Earnings per share (in Korean Won, in US dollars)	28				
- Basic		3,166	6,461	2.72	5.54
- Diluted		3,166	6,461	2.72	5.54

Balance Sheet of Samsung, end of 2019

Samsung Electronics Co., Ltd. and its subsidiaries

CONSOLIDATED STATEMENTS OF FINANCIAL POSITION

(In millions of Korean won, in thousands of US dollars (Note 2.28))

	Notes	December 31, 2019 KRW	December 31, 2018 KRW	December 31, 2019 USD	December 31, 2018 USD
Assets					
Current assets					
Cash and cash equivalents	4, 6, 30	26,885,999	30,340,505	23,069,002	26,033,073
Short-term financial instruments	5, 6, 30	76,252,052	65,893,797	65,426,571	56,538,875
Short-term financial assets at amortized cost	6, 30	3,914,216	2,703,693	3,358,516	2,319,851
Short-term financial assets at fair value through profit or loss	6, 8, 30	1,727,436	2,001,948	1,482,192	1,717,732
Trade receivables	6, 7, 9, 30	35,131,343	33,867,733	30,143,757	29,059,541
Non-trade receivables	6, 9	4,179,120	3,080,733	3,585,812	2,643,362
Advance payments		1,426,833	1,361,807	1,224,266	1,168,472
Prepaid expenses		2,406,220	4,136,167	2,064,610	3,548,957
Inventories	10	26,766,464	28,984,704	22,966,437	24,869,754
Other current assets	6	2,695,577	2,326,337	2,312,887	1,996,067
Total current assets		181,385,260	174,697,424	155,634,050	149,895,684
Non-current assets					
Financial assets at amortized cost	6, 30	-	238,309	-	204,476
Financial assets at fair value through other comprehensive income	6, 8, 30	8,920,712	7,301,351	7,654,241	6,264,780
Financial assets at fair value through profit or loss	6, 8, 30	1,049,004	775,427	900,077	665,340
Investment in associates and joint ventures	11	7,591,612	7,313,206	6,513,833	6,274,952
Property, plant and equipment	12	119,825,474	115,416,724	102,813,888	99,031,047
Intangible assets	13	20,703,504	14,891,598	17,764,234	12,777,442
Net defined benefit assets	16	589,832	562,356	506,094	482,518
Deferred income tax assets	27	4,505,049	5,468,002	3,865,469	4,691,711
Other non-current assets	5, 6	7,994,050	12,692,847	6,859,137	10,890,850
Total assets		352,564,497	339,357,244	302,511,023	291,178,800

Samsung Electronics Co., Ltd. and its subsidiaries
CONSOLIDATED STATEMENTS OF FINANCIAL POSITION

(In millions of Korean won, in thousands of US dollars (Note 2.28))

	Notes	December 31,	December 31,	December 31,	December 31,
		2019	2018	2019	2018
		KRW	KRW	USD	USD
Liabilities and Equity					
Current liabilities					
Trade payables	6, 30	8,718,222	8,479,916	7,480,499	7,276,025
Short-term borrowings	6, 7, 14, 30	14,393,468	13,586,660	12,350,032	11,657,766
Other payables	6, 30	12,002,513	10,711,536	10,298,520	9,190,823
Advances received	19	1,072,062	820,265	919,862	703,812
Withholdings	6	897,355	951,254	769,958	816,205
Accrued expenses	6, 19	19,359,624	20,339,687	16,611,144	17,452,068
Current income tax liabilities		1,387,773	8,720,050	1,190,751	7,482,067
Current portion of long-term liabilities	6, 14, 15, 30	846,090	33,386	725,971	28,646
Provisions	17	4,068,627	4,384,038	3,491,005	3,761,637
Other current liabilities	6, 19	1,037,030	1,054,718	889,802	904,980
Total current liabilities		63,782,764	69,081,510	54,727,544	59,274,029
Non-current liabilities					
Debentures	6, 15, 30	975,298	961,972	836,835	825,401
Long-term borrowings	6, 14, 30	2,197,181	85,085	1,885,248	73,006
Long-term other payables	6, 30	2,184,249	3,194,043	1,874,152	2,740,586
Net defined benefit liabilities	16	470,780	504,064	403,944	432,502
Deferred income tax liabilities	27	17,053,808	15,162,523	14,632,684	13,009,904
Long-term provisions	17	611,100	663,619	524,342	569,405
Other non-current liabilities	6, 19	2,408,896	1,951,251	2,066,906	1,674,233
Total liabilities		89,684,076	91,604,067	76,951,655	78,599,066

Samsung Electronics Co., Ltd. and its subsidiaries
CONSOLIDATED STATEMENTS OF FINANCIAL POSITION

(In millions of Korean won, in thousands of US dollars (Note 2.28))

	Notes	December 31,	December 31,	December 31,	December 31,
		2019	2018	2019	2018
		KRW	KRW	USD	USD
Equity attributable to owners of the parent company					
Preference shares	20	119,467	119,467	102,506	102,506
Ordinary shares	20	778,047	778,047	667,588	667,588
Share premium		4,403,893	4,403,893	3,778,674	3,778,674
Retained earnings	21	254,582,894	242,698,956	218,439,838	208,243,059
Other components of equity	22	(4,968,829)	(7,931,370)	(4,263,406)	(6,805,356)
		254,915,472	240,068,993	218,725,200	205,986,471
Non-controlling interests		7,964,949	7,684,184	6,834,168	6,593,263
Total equity		262,880,421	247,753,177	225,559,368	212,579,734
Total liabilities and equity		352,564,497	339,357,244	302,511,023	291,178,800

Statement of Cash Flows

Samsung Electronics Co., Ltd. and its subsidiaries

CONSOLIDATED STATEMENTS OF CASH FLOWS

(In millions of Korean won, in thousands of US dollars (Note 2.28))

	Notes	For the year ended December 31,			
		2019 KRW	2018 KRW	2019 USD	2018 USD
Cash flows from operating activities					
Profit for the year		21,738,865	44,344,857	18,652,605	38,049,231
Adjustments	29	37,442,682	43,604,573	32,126,956	37,414,045
Changes in assets and liabilities arising from operating activities	29	(2,545,756)	(9,924,366)	(2,184,336)	(8,515,406)
Cash generated from operations		56,635,791	78,025,064	48,595,225	66,947,870
Interest received		2,306,401	1,788,520	1,978,962	1,534,604
Interest paid		(579,979)	(548,272)	(497,640)	(470,434)
Dividends received		241,801	215,992	207,473	185,328
Income tax paid		(13,221,099)	(12,449,441)	(11,344,104)	(10,681,998)
Net cash inflow from operating activities		45,382,915	67,031,863	38,939,916	57,515,370
Cash flows from investing activities					
Net increase in short-term financial instruments		(2,030,913)	(12,368,298)	(1,742,585)	(10,612,375)
Net increase in short-term financial assets at amortized cost		(818,089)	(1,436,844)	(701,945)	(1,232,856)
Net decrease (increase) in short-term financial assets at fair value through profit or loss		374,982	(139,668)	321,746	(119,839)
Disposal of long-term financial instruments		4,586,610	255,850	3,935,450	219,527
Acquisition of long-term financial instruments		(12,725,465)	(7,678,654)	(10,918,835)	(6,588,518)
Disposal of financial assets at amortized cost		694,584	-	595,974	-
Acquisition of financial assets at amortized cost		(825,027)	(158,716)	(707,898)	(136,183)
Disposal of financial assets at fair value through other comprehensive income		1,575	16,211	1,351	13,910
Acquisition of financial assets at fair value through other comprehensive income		(63,773)	(456,134)	(54,719)	(391,377)
Disposal of financial assets at fair value through profit or loss		64,321	80,138	55,189	68,761
Acquisition of financial assets at fair value through profit or loss		(135,826)	(193,848)	(116,543)	(166,327)
Disposal of investment in associates and joint ventures		12,149	148	10,424	127
Acquisition of investment in associates and joint ventures		(12,778)	(51,226)	(10,964)	(43,953)
Disposal of property, plant and equipment		513,265	556,973	440,397	477,900
Acquisition of property, plant and equipment		(25,367,756)	(29,556,406)	(21,766,303)	(25,360,292)
Disposal of intangible assets		7,241	11,935	6,213	10,241
Acquisition of intangible assets		(3,249,914)	(1,020,517)	(2,788,525)	(875,635)
Cash outflow from business combinations		(1,019,405)	(99,108)	(874,680)	(85,038)
Cash inflow (outflow) from other investing activities		46,048	(2,289)	39,512	(1,965)
Net cash outflow from investing activities		(39,948,171)	(52,240,453)	(34,276,741)	(44,823,892)

The above consolidated statements of cash flows should be read in conjunction with the accompanying notes.

Samsung Electronics Co., Ltd. and its subsidiaries

CONSOLIDATED STATEMENTS OF CASH FLOWS

(In millions of Korean won, in thousands of US dollars (Note 2.28))

	Notes	For the year ended December 31,			
		2019 KRW	2018 KRW	2019 USD	2018 USD
Cash flows from financing activities					
Net increase (decrease) in short-term borrowings	29	865,792	(2,046,470)	742,876	(1,755,933)
Acquisition of treasury shares		-	(875,111)	-	(750,872)
Proceeds from long-term borrowings	29	-	3,580	-	3,072
Repayment of debentures and long-term borrowings	29	(709,400)	(1,986,597)	(608,687)	(1,704,560)
Dividends paid		(9,639,202)	(10,193,695)	(8,270,727)	(8,746,499)
Net increase (decrease) in non-controlling interests		(1,700)	8,071	(1,459)	6,924
Net cash outflow from financing activities		(9,484,510)	(15,090,222)	(8,137,997)	(12,947,868)
Effect of exchange rate changes on cash and cash equivalents		595,260	94,187	510,751	80,816
Net decrease in cash and cash equivalents		(3,454,506)	(204,625)	(2,964,071)	(175,574)
Cash and cash equivalents					
Beginning of the year		30,340,505	30,545,130	26,033,073	26,208,647
End of the year		26,885,999	30,340,505	23,069,002	26,033,073

Samsung Electronics Co., Ltd. Over 5 years till now(1)								
Income Statement		2015	2016	2017	2018	2019	2020 1Q	2020 2Q
Revenue	KRW trillion	53.3	53.3	66.0	59.3	59.9	55.3	53.0
Gross profit	KRW trillion	19.4	22.4	30.2	25.2	21.3	20.5	21.1
Operating profit	KRW trillion	6.1	9.2	15.1	10.8	7.2	6.4	8.1
Profit before income tax	KRW trillion	4.7	9.5	16.7	11.6	7.7	6.8	7.8
Net profit	KRW trillion	3.2	7.1	12.3	8.5	5.2	4.9	5.6
<p>1. Information is on a consolidated basis in accordance with K-IFRS.</p> <p>2. Revenue by Segment : Sales for each business unit includes intersegment sales.</p>								

Samsung Electronics Co., Ltd. Over 5 years till now(2)								
Financial Position		2015	2016	2017	2018	2019	2020 1Q	2020 2Q
Total Assets	KRW trillion	242.2	262.2	301.8	339.4	352.6	357.5	358.0
Current Assets	KRW trillion	124.8	141.4	147.0	174.7	181.4	186.7	186.1
Non-Current Assets	KRW trillion	117.4	120.7	154.8	164.7	171.2	170.7	171.8
Current Liabilities	KRW trillion	50.5	54.7	67.2	69.1	63.8	64.8	61.9
Total Shareholder Equity	KRW trillion	179.1	193.0	214.5	247.8	262.9	266.4	269.8
Assets								
Cash	KRW trillion	71.5	88.2	83.6	104.2	112.2	113.2	113.4
Trade & Other Receivables	KRW trillion	25.2	24.3	27.7	33.9	35.1	36.4	33.0
Inventories	KRW trillion	18.8	18.4	25.0	29.0	26.8	28.5	29.6
PP & E	KRW trillion	86.5	91.5	111.7	115.4	119.8	121.7	124.3
Liabilities								
Trade & Other Payables	KRW trillion	6.2	6.5	9.1	8.5	8.7	10.7	9.5
Account Payables & Others	KRW trillion	20.5	24.1	27.9	31.1	31.4	31.4	27.9
Total Borrowings	KRW trillion	12.9	15.3	18.8	14.7	18.4	15.7	16.7
<p>1. Information is on a consolidated basis in accordance with K-IFRS.</p> <p>2. Assets : Cash : Cash & cash equivalents + Short-term financial instruments + Short-term financial assets at amortized cost + Long-term time deposits, etc.</p> <p>3. Liabilities : Total Borrowings : Short-term borrowings + Current portion of long-term borrowings + Debentures + Long-term borrowings</p>								

Samsung Electronics Co., Ltd. Over 5 years till now(3)								
Cash Flows		2015	2016	2017	2018	2019	2020 1Q	2020 2Q
Cash flow from operations	KRW trillion	12.4	11.0	21.7	22.4	19.7	11.8	14.8
Cash flow from investing activities	KRW trillion	-6.3	-9.0	-9.0	-6.1	-10.7	-9.4	-10.2
Cash flow from finance activities	KRW trillion	-3.6	1.6	-2.1	-9.4	-0.4	-3.0	-3.9
Net increase/decrease in cash	KRW trillion	1.8	5.2	7.5	6.4	7.2	1.0	0.2
Cash at end of the period	KRW trillion	71.5	88.2	83.6	104.2	112.2	113.2	113.4
Net cash at end of the period	KRW trillion	58.7	72.9	64.8	89.5	93.7	97.5	96.7
<p><i>1. Net cash at end of the period : Cash – Total borrowings</i></p> <p><i>2. Cash : Cash & cash equivalents + Short-term financial instruments + Short-term financial assets at amortized cost + Long-term time deposits, etc.</i></p> <p><i>3. Total borrowings : Short-term borrowings + Current portion of long-term borrowings + Debentures + Long-term borrowings</i></p>								