

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics



Diploma Thesis

Economic Analysis of Google Inc. Stocks

Daniel Míšek

© 2016 CULS Prague

DIPLOMA THESIS ASSIGNMENT

Daniel Míšek

Economics and Management

Thesis title

Economic Analysis of Google Inc. Stocks

Objectives of thesis

Evaluation of Google Inc. stock performance related to company results with the purpose of finding out intrinsic value of a stock and subsequent recommendation of investment.

Methodology

Fundamental and technical analysis based on literature review is used in practical section also with methods of extraction, synthesis and others.

The proposed extent of the thesis

40-70 pages

Keywords

Google Incorporated, fundamental analysis, technical analysis, investment, intrinsic value, capital market, stock, economy

Recommended information sources

DAMODARAN, A. Damodaran on valuation: security analysis for investment and corporate finance. 2nd ed. Hoboken : Wiley, 2006. xi, 426 s. ISBN 0471751219

DAMODARAN, A. Investment valuation: tools and techniques for determining the value of any asset. 2nd ed. New York : John Wiley & Sons, 2002. xvi, 992 s. ISBN 0-471-41490-5

FOTR, J. Podnikatelský plán a investiční rozhodování. 2. Vyd. Praha : GRADA 1995 . ISBN 80-7169-812-1

GLADIŠ, D. Naučte se investovat. 1. vyd. Praha: Grada Publishing, 2004. ISBN 8024707098

GRAHAM B., DODD D.: Security Analysis: The Classic 1940 Edition. 2nd Edition. The Mcgraw-Hill Companies, Inc., 2002. ISBN 978-0-07-141228-5

MUSÍLEK, P. Trhy cenných papírů. Ekopress, s. r. o., 2002. ISBN 80-86119-55-6

VALACH, J. Investiční rozhodování a dlouhodobé financování. 1. Vyd. Praha: EKOPRESS, 2001. ISBN 80-86119-38-6

Expected date of thesis defence

2015/16 SS – FEM

The Diploma Thesis Supervisor

Ing. Petr Procházka, Ph.D., MSc

Supervising department

Department of Economics

Electronic approval: 6. 10. 2014

prof. Ing. Miroslav Svatoš, CSc.

Head of department

Electronic approval: 6. 10. 2014

Ing. Martin Pelikán, Ph.D.

Dean

Prague on 31. 03. 2016

Declaration

I declare that I have worked on my diploma thesis titled "Economic Analysis of Google Inc. Stocks" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on 30th of March 2016

Daniel Míšek

Acknowledgement

I would like to thank Ing. Petr Procházka, Msc, Ph.D. and my family, for their advice and support during my work on this thesis.

Ekonomická analýza akcií společnosti Google Inc.

Economic Analysis of Google Inc. Stocks

Souhrn: Tato diplomová práce se zabývá tématem ekonomické analýzy společnosti Google Inc. a jejích akcií s důrazem na sledované období let 2013 – 2015 s cílem vyhodnocení investiční příležitosti

V literární rešerši se autor zabývá souhrnem teoretických východisek ekonomické analýzy s důrazem na fundamentální, technickou a psychologickou analýzu.

Další částí práce je praktická část kde autor převádí teoretická východiska z teoretické části do praxe s cílem zjistit zdali investice do společnosti Google Inc. je opodstatněná.

Na základě výsledků praktické části bude provedeno vyhodnocení ve kterém autor doporučí investiční strategii v případě společnosti Google Inc..

Klíčová slova: Google Inc., fundamentální analýza, technická analýza, investice, vnitřní hodnota, kapitálový trh, akcie, ekonomie, trend , finanční výkaz

Summary: This diploma thesis is focused on economic analysis of Google Inc. stock in observed period of 2013-2015 with a goal of determining investment opportunities.

In theoretical part author is summarizing theoretical approaches of economic analysis focused on stock evaluation. Mainly fundamental, technical and psychological analysis.

On basis of theoretical part of this thesis these theoretical concepts are tested on Google Inc. with a goal of determining whether to invest into Google Inc. stock. Results are than summarized and recommendation whether to invest or not is done.

Keywords: Google Inc., fundamental analysis, technical analysis, investment, intrinsic value , capital market, stock, economy, trend, financial statement

Content

1	Introduction.....	11
2	Objectives and Methodology.....	11
3	Literature Review	12
3.1	Analysis of stock.....	12
3.1.1	Financial statements.....	13
3.2	Concepts	14
3.2.1	Random Walk Theory.....	14
3.2.2	Dow Theory.....	15
3.2.3	Elliott Wave Theory	16
3.3	Fundamental Analysis.....	17
3.3.1	Global Analysis	18
3.3.2	Sectorial Analysis	18
3.3.3	Company Fundamental Analysis.....	18
3.3.4	Liquidity Ratios	21
3.3.5	Horizontal and Vertical Analysis.....	23
3.3.6	Dividends.....	24
3.3.7	The Du Pont System	24
3.4	Technical Analysis	26
3.4.1	Basic Assumptions.....	27
3.4.2	Trend Analysis.....	27
3.4.3	Moving Averages Convergence Divergence (MACD).....	36
3.4.4	Indicators and Oscillators	38
3.5	Behavioral Finance	40
4	Practical part.....	42
4.1	Google - Alphabet	43
4.1.1	History	43
4.1.2	Businesses.....	44
4.1.3	Alphabet Inc.	45
4.2	Competitors.....	46
4.3	Fundamental Analysis.....	47
4.3.1	Vertical Analysis	48
4.3.2	Horizontal Analysis	52

4.3.3	Ratio Analysis.....	56
4.4	Technical Analysis	61
4.4.1	Alphabet’s Historical Trends	61
4.4.2	Alphabet’s Current Trends.....	62
4.4.3	Elliot Wave Theory.....	63
4.4.4	Moving Averages Convergence Divergence (MACD).....	65
4.4.5	Relative Strength Index (RSI).....	66
4.4.6	Stochastic Oscillator	66
4.4.7	Alphabet vs. Market.....	67
4.5	Psychological Analysis.....	68
5	Evaluation of Results and Discussion.....	70
5.1	Results of Fundamental Analysis	70
5.2	Results of Technical Analysis	71
5.3	Results of Psychological Analysis	71
5.4	Risk Factors and Future of Alphabet Inc.....	72
6	Conclusion	75
7	References.....	76
7.1	Books.....	76
7.2	Online Sources	77
7.3	Appendixes	78

List of Figures

Figure 1 Figure 1 Elliott's Wave and Fractals.....	17
Figure 2 Trendlines	28
Figure 3 Trendlines	29
Figure 4 Support and Resistance.....	30
Figure 5 Bar Chart.....	31
Figure 6 Candlestick Chart	32
Figure 7 Head and Shoulders Pattern.....	34
Figure 8 Cup and Handle Pattern	34
Figure 9 Triangular Patterns	35
Figure 10 Simple Moving Averages	37

List of Charts

Chart 3 Vertical Analysis of Alphabet's Revenues and Cost of Revenues	52
Chart 4 P/E Ratio comparison of Alphabet, Microsoft and Apple	57
Chart 5 Alphabet's Historical Trendlines (2004-2016, monthly).....	62
Chart 6 Alphabet's Current Trends (2013-2015, monthly)	63
Chart 7 Elliott Wave Theory Application 2013-2015.....	64
Chart 8 Elliott Wave Theory Application - short term	64
Chart 9 Alphabet's MACD	65
Chart 10 Alphabet's RSI.....	66
Chart 11 Alphabet's Stochastic Oscillator.....	67
Chart 12 Alphabet vs. Market	68

List of Tables

Table 1 Vertical Analysis of Assets	48
Table 2 Vertical Analysis of Alphabet's Liabilities and Stockholder's Equity	50
Table 3 Vertical Analysis of Alphabet's Income Statement.....	51
Table 4 Alphabet's Net Income	52
Table 5 Alphabet's Horizontal Analysis - Assets.....	53
Table 6 Alphabet's Horizontal Analysis - Liabilities and Stockholders Equity.....	54
Table 7 Alphabet's Horizontal Analysis - Income Statements.....	55

Table 8 Alphabet's P/E ratio	56
Table 9 Alphabet's Price to Book Value Ratios	58
Table 10 Alphabet's Return On Assets	58
Table 11 Alphabet's Price to Sales Ratios.....	59
Table 12 Alphabet's Current Ratio.....	59
Table 13 Alphabet's Acid Ratio	60
Table 14 Alphabet's Return On Equity	60
Table 15 Results Evaluation	74
Appendix 1 Alphabet's Quaterly Consolidated Statement of Income (2013-2015).	78
Appendix 2 Alphabet's Consolidated Balance Sheets Quaterly (2013-2015).....	79
Appendix 3 Alphabet's Quaterly Consolidated Statement of Cash Flows	80

1 Introduction

This thesis is devoted to topic of investment, to invest means to allocate money or some other resource with expectation of future gain. In finance investment usually refers to acquiring asset for a favorable price with expectation that this asset will generate income or appreciate. In authors opinion the fundamental task is decision making. Investment in this sense can be seen all around us e.g. choosing most beneficial route to work to maximize time efficiency, exercise in order to stay healthy or spending time reading this thesis to learn new things.

In case of this diploma thesis will be considered investment into Alphabet Inc. stock using methods of fundamental, technical and psychological analysis to determine if such investment is good or bad investment.

2 Objectives and Methodology

Objective of this thesis is to asses if Alphabet's stocks are able to be profitable investment. In order to find out if Alphabet's stock position is priced correctly methods of fundamental, technical and psychological analysis will be carried out. Fundamental question of this thesis is "*Are Alphabet's stocks nowadays a viable investment?*" This task will be interesting for many reasons, most importantly late transformation of Google Inc. into Alphabet Inc.

In the theoretical part of this thesis author will focus on over viewing of possible approaches to evaluation of stocks using fundamental, technical and psychological analysis and their tools.

Tools reviewed in theoretical part will be used in analytical part to determine if company is valued correctly and whether price of the stock is appropriate.

Methodological approach chosen for this diploma thesis is based on study of available resources – books, articles, news available both online and offline to determine tools suitable for stock analysis. On this basis will be carried out evaluation of qualitative and quantitative information using tools previously mentioned.

Data for analysis will be obtained from publicly available sources such as official company financial statements and other reports combined with industry averages provided by market supervisors and general market data that are available at such pages as Google finance, Yahoo finance, Ycharts, Bloomberg, Investing.com or tradingview.com.

3 Literature Review

3.1 Analysis of stock

Movement of stock prices fascinated investors for decades. Using various analytical tools investors try to explain past movement of stock prices and also to predict its future movement. Main goal of this effort is to make profit by evaluating the real price of stock – therefore determining if the stock is under or overvalued and as a result timing well when to buy or sell. In time three main analytical approaches were created.

- Fundamental Analysis
- Technical Analysis
- Psychological Analysis

All three analytical approaches mentioned above suggest that there exist stocks that are not valued correctly and are trying to determine true value using specific tools and methodology that can be also used to forecast future trends in stock value.

Popularity of above mentioned methods of figuring out real value fluctuate in time. Nowadays the most popular is fundamental analysis which is also the most conservative. On the other hand technical analysis enjoyed its boom around 1970s due to development of information technologies that made data processing much easier. That being said now the technical analysis is on a downtrend. Psychological analysis is the least used and youngest out of the three methods mentioned. It plays supplemental role since its results are highly dependent on analyst. Therefore it can quite easily happen that two analysts of the same stock will reach opposite results.

It is interesting that Czech analysts (Czech Republic – Homeland of the author) tend to use technical analysis more often than Americans or British analysts. This fact

seems to be based on a fact that there is a large difference in effectiveness and history of Czech and American / British markets.

3.1.1 Financial statements

The financial statements are the language of business. They communicate information within the corporation to management who then uses the information to make further decisions. Management of the company then relays the information to stakeholders, such as shareholders so the stakeholders can evaluate the company.^{1 2}

Financial statement is composed of

- Balance sheet
- Income statement
- Statement of cash flows
- Statement of owners equity

Every part of the financial statement plays a different role in providing management with information. Balance sheets give analyst information about firms assets, liabilities and equity at a point in time while income statement sum up operating performance of the company within period of time. Statement of cash flows is providing information on company's operating, investing and financing cash flows over a specified time. Changes of ownership distribution over time are recorded on statement of owners equity.³

It is important to realize that accounting standards vary around the world, since Google Incorporated is based in United States its financial statements are provided in standard "generally accepted accounting principles" also known as GAAP which provides comprehensible overview of company performance.

3.1.1.1 Balance Sheet

As mentioned above balance sheet is a part of financial statement that summarizes assets, liabilities and shareholders equity of the company at a point In time. Balance sheet

¹ MOYER, R, James R MCGUIGAN a Ramesh P RAO. *Fundamentals of contemporary financial management*. P.64

² BODIE, Zvi, Alex KANE a Alan J MARCUS. *Investments*. P.560

³ FRASER, Lyn M a Aileen ORMISTON. *Understanding financial statements*.p.5

offers investor a view into what company owns, owes and how much shareholders invested into company.⁴

It is crucial for the analyst to interpret data from financial statement. In case of balance sheet which represents a situation of a company at a certain moment in time it is important to compare the data with similar companies within the industry, because different industries are specific in their operation and even competitors and strategies they employ can lead to differences in structure.

Ratios that use balance sheet are in general connected to “health” of the company and include e.g. acid-test ratio and debt to equity ratio.

3.1.1.2 *Income statement*⁵

Income statement is a part of a financial statement that displays financial performance of a company over a period of time (typically accounting year/quarter). It shows analyst how company works its revenues and expenses in company’s operation (related to the core business of a company) and also outside it (non-operating items describe activities e.g. renting warehouses to other companies). Analyst can also find out how much of a profit or loss company made in period of time.

3.2 Concepts

3.2.1 Random Walk Theory

The Random walk theory became popular in 1973 when Burton Malkiel published his book “A Random Walk Down Wall Street”. Book is by many considered investment classic it describes random walk theory that states that past movement or direction of the stock price cannot be used to predict future movement and that fluctuations are independent of each other and in general – long term - prices maintain upward trend due to effective market.

What the theory suggests is that fundamental and technical analysis won’t help investors to beat the market and that they are waste of time.

⁴ FRASER, Lyn M a Aileen ORMISTON. *Understanding financial statements*.p.50

⁵ *Income Statement*, Investopedia [online]. [cit. 2016-03-30]. Retrieved from: <http://www.investopedia.com/terms/i/incomestatement.asp>

Malkien suggests that only relevant method of investing is buy and hold strategy in a long term since other methods don't tend to beat market averages.

Now days naysayers argue that book was written 40 years ago and since than access to information especially thanks to internet and information technology is on different level. Of course naysayers are also based on wall street since the theory if 100% correct would render them unemployed.

3.2.2 Dow Theory

The Dow theory is regarded as origin of technical analysis. Even though it was established more than 100 years ago it still is foundation of technical analysis. Dow theory was formulated by a short series of articles in Wall Street Journal by Charles H. Dow published 1900-1902 where Dow explained his beliefs that health and business trends can be predicted based on market.^{6 7}

Dow theory consist of 6 tenets

- **The averages discount everything**

Is similar to main principle of technical analysis and says that averages reflect activity of all investors including those with best information as well as e.g. natural events that are quickly reflected in supply demand on the market.

- **The market has three trends**

Dow defined three types of trend based on their lengths: primary ,medium and short. Primary trend goes through whole market and last usually 1 to “n” years. Medium trend /swing lasts from several days to several months and usually is in opposite direction compared to primary trend. Short trend /swing is as the name suggests shortest and last usually in hours and creates only small changes to the price. Out of three short swing is the least predictable.⁸

- **Major trends have three phases**

First phase is “accumulation phase” where the most informed traders make a move while other participants trade in normal manner until they see the

⁶ CHEN, James. *Essentials of technical analysis for financial markets*.p.14

⁷ VESELÁ, Jitka. *Investování na kapitálových trzích*.p.426

⁸ *Dow Theory* , Investopedia[online]. [cit. 2016-03-29]. Retrieved from: <http://www.investopedia.com/university/dowtheory/>

opportunity. Second phase is “public participation” where the normal traders try to catch-up with the better informed colleagues that set the trend. Final third phase is “distribution phase” where again the best informed traders or those that already bought start to sell with profits while less informed traders are still buying.

- **The averages must confirm each other**

In this tenant Dow suggests that main three averages that are industrial, utilities and transportation must confirm new primary trend by at least one changing direction in a direction of new primary trend. In original Dow theory average that changes first is transportation since it precedes others.

- **Volume must confirm the trend**

In essence this tenant suggests that volume should expand in direction of leading trend.

- **A trend is Assumed to be in effect until it gives definite signals it has reversed**

This tenant suggests that changes in averages will indicate reversal of a trend (as mentioned in tenant 4) but some short term contractions will not influence overall trend. Therefore it is important to look for further confirmations of trend reversal.

As it was mentioned above Dow theory is over 100 years old and does not fit current markets well since it takes too long to catch the signals. Dow theory was after all designed to catch primary trend that drives the whole market. Nowadays more sophisticated methods are being used as will be described in following chapters.⁹

3.2.3 Elliott Wave Theory

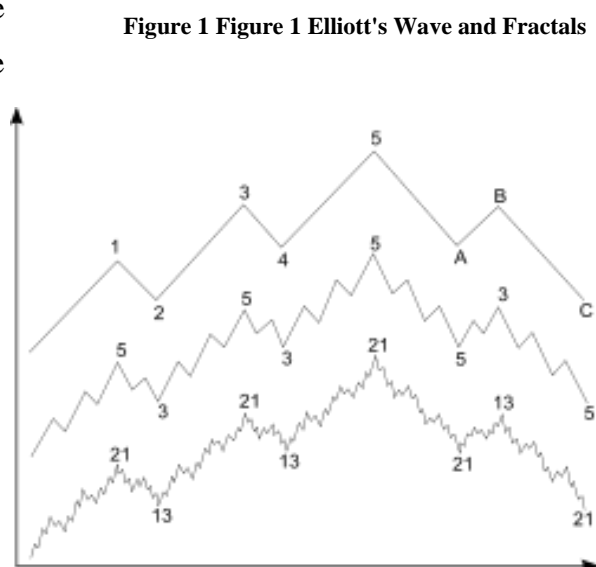
In 1920s Ralph Nelson Elliott was observing stock market and found out that what was believed to be chaotic manner of movement was in fact repetitive cycle. He discovered that market cycles are result of investor reactions to their environment and therefore psychology of masses. Elliott figured out that psychology of masses moved in repetitive patterns – waves.¹⁰

⁹ *Dow Theory* , Investopedia[online]. [cit. 2016-03-29]. Retrieved from: <http://www.investopedia.com/university/dowtheory/>

¹⁰ CHEN, James. *Essentials of technical analysis for financial markets*. P.161

In a way this theory is similar to Dows since both assume wave like nature. The difference is that Elliott was able to find a fractal (fractal is a mathematical term used for repeating patterns at every scale) and analyze waves in more of a detail since fractal can be applied at any scale, in this case, time span.¹¹

Elliott found out that patterns are composed of impulsive wave that has direction of main trend and consists of 5 smaller waves and corrective wave which is made of 3 smaller waves. This impulse and correction shape is known as 5-3 pattern and as was mentioned above can be scaled to any degree.



Source:
en.wikipedia.org/wiki/Elliott_wave_principle

This theory almost sounds too reliable to be real. The problem it faces is that for inexperienced analyst to correctly identify the pattern in highly volatile market is difficult and whole theory is prone to subjectivity since real Elliott waves resemble the illustration distantly. In following chapters charts will be analyzed in more detail.

3.3 Fundamental Analysis

The fundamental stock analysis is the most complex and most used analytical approach used to determine movement of stock prices. It focuses on evaluation of economic, political, social demographical and other factors and events that determine stock prices. Fundamental analysis is indeed very broad and therefore is divided into three basic levels¹²

- Global Fundamental Analysis
- Sector Fundamental Analysis
- Company Fundamental Analysis

¹¹ *Elliott Wave Theory*, Investopedia [online]. [cit. 2016-03-29]. Retrieved from: <http://www.investopedia.com/articles/technical/111401.asp>

¹² VESELÁ, Jitka. *Investování na kapitálových trzích*. P.95

Main goal of fundamental analysis is to determine as accurately as possible if the stock is undervalued or overvalued. Also it can answer why price of stock low or high is and what trend will follow.

Fundamental analysis is using mainly financial statements and statistical data and their prognosis related to analyzed company, sector and economy. This data set is widely available to general public. Other two types of analysis are using narrower data set. Specifics of data set e.g. frequency in which financial statements are reported or how often state reports performance of economy, result in fundamental analysis being used mainly in medium and long term investment horizon.¹³

3.3.1 Global Analysis

Aim of global fundamental analysis is to explore the influence of economies and markets on stock value. As such indicators are mainly perceived gross domestic product , inflation, exchange rates and shocks in both politics and economy. By analyzing such data we can divide indicators into three categories¹⁴

- Leading Indicators – Stock prices
- Coincident Indicators –Industrial production
- Lagging indicators – Average duration of unemployment

3.3.2 Sectorial Analysis

The Sectorial analysis focuses on identification of factors that are specific for industry in which company operates. In this analysis the analyst is exploring specific factors for industry and the effect on stock value. Such factors can be e.g. life cycle of company, structure of industry or influence of regulation by state.

3.3.3 Company Fundamental Analysis

Third level of fundamental analysis of stock is company fundamental analysis that focuses on analysis of important company characteristics and factors that create inner value. Especially it focuses on quantification of inner value of stock using various analytical methods to determine if stock value on the market is correct or not.

¹³ VESELÁ, Jitka. *Investování na kapitálových trzích*.P. 278

¹⁴ VESELÁ, Jitka. *Investování na kapitálových trzích*..288

3.3.3.1 Profitability Ratios

The Profitability ratios are one of the methods to find out intrinsic value of stock. This method respects time value of money and as the name suggests operates mainly with net profit that is adjusted in various ways. Most know is Price / Earnings (P/E) ratio but also Price / Book Value (P/BV) ratio and Price / Savings (P/S) ratio are being widely used. The main ratio used is P/E ratio thanks to its simplicity.^{15 16 17}

3.3.3.1.1 P/E Profit to Earnings ratio¹⁸

The Price to Earnings ratio (P/E ratio or simply PE) is one of the most quoted and desired evaluation methods in financial analysis. In general long term investors seek companies with lower PE ratio and aggressive investors seek companies with higher PE ratio. It is essential for investor to understand and be able to calculate this ratio.^{19 20}

For purposes of this thesis it is planned to use Trailing Twelve Month (TTM) P/E. As the name suggests the numerator is Price – P of the stock and denominator – Earnings Per Share (EPS). EPS itself is a ratio that represents net income divided into per share amount.

$$\frac{\text{net income} - \text{preferred dividends}}{\text{weighted average number of outstanding shares}} = EPS$$

In simple words price of the stock divided by EPS equals to P/E which gives investor information on how much investors are willing to pay per dollar of company's earnings. To make situation a bit easier companies are required to report EPS quarterly in their 10-Q and annually in their 10-K form.

3.3.3.1.2 PEG ratio

Above it has been described what a PE ratio is and what role it plays in investors decision making process. However as theory suggests there are more factors that are

¹⁵ FRASER, Lyn M a Aileen ORMISTON. *Understanding financial statements*.p.169

¹⁶ MOYER, R, James R MCGUIGAN a Ramesh P RAO. *Fundamentals of contemporary financial management*. P.113

¹⁷ VESELÁ, Jitka. *Investování na kapitálových trzích*. P.338

¹⁸ *What You Need To Know About Google's P/E Ratio* , Investopedia[online]. [cit. 2016-03-29]. Retrieved from: <http://www.investopedia.com/articles/investing/040215/what-you-need-know-about-googles-pe-ratio.asp>

²⁰ JOHN ALLEN PAULOS. *A mathematician plays the market*. P.85

important for the company such as human capital, position the market or company's brand. To improve PE ratios ability to describe situation accurately. Price to Earnings to Growth ratio is used. Essentially it is PE ratio divided by EPS growth (predicted or based on historical data). Formula is:

$$\frac{\frac{\text{net income} - \text{preferred dividends}}{\text{weighted average number of outstanding shares}}}{\text{Earnings Per Share growth Rate}} = PEG$$

3.3.3.1.3 P/BV

The Price to Book Value (P/BV) ratio is the second most used ratio. It is ratio of price of a stock and book value of the company. As such it describes how much market values one USD of equity of a firm in price of a stock of a firm that emitted the stock. P/BV ratio reflects expectations of investors. One of the reasons it is so popular is the fact that there is no need for extensive input of data. Biggest benefit for this thesis is the fact that it can be easily calculated even if company does not pay any form of dividend.²¹

It is calculated using following formula

$$V_0 = P_0 = \frac{D_1}{k - g} = \frac{E_1 * p}{k - g} = \frac{BV_1 * ROE * p}{k - g}$$

Where: BV_1 is expected book value per stock

ROE is Return On Equity

k is desired profit margin

g is amount of growth of profit

E_1 is expected profit in next year

P_0 is price of correctly priced stock

V_0 is normal intrinsic value of the stock

3.3.3.1.4 P/S

Despite the fact that P/E and P/BV ratios are more commonly used than Price / Sales (P/S) ratio , it is becoming more and more popular. It gives information on how much investor values dollar of sales of a company. Benefit of P/S ratio is the fact that it

²¹ BODIE, Zvi, Alex KANE a Alan J MARCUS. *Investments*.p.521

gives accurate information even in situations when company is suffering losses or minimal profits. Also it is not dependent on accounting methods.²²

It is calculated using following formula

$$V_0 = P_0 = \frac{D_1}{k - g} = \frac{E_1 * p}{k - g} = \frac{S_1 * M_1 * p}{k - g}$$

Where: S_1 is representing expected sales in next year

M_1 is expected profit margin in next year

others – as in previous equation

3.3.3.1.5 Return On Assets ratio

The Return On Assets (ROA) ratio is an indicator of how profitable company is relative to its total assets. In general it gives comprehensive idea of how well management employs assets of the company to generate earnings – net income. ROA is also sometimes referred to as return on investment. Formula for calculation is straight forward. (displayed below)

$$\text{Return On Assets (ROA)} = \frac{\text{Net income}}{\text{Total Assets}}$$

It is important to remember that when analyst is evaluating results of ROA – comparison with companies in the same industry is essential. This is due to different asset requirements for each industry e.g. while automotive industry requires huge assets modeling agency in service industry uses virtually no assets compared to automotive industry.

3.3.4 Liquidity Ratios

3.3.4.1 Current ratio²³

The current ratio or sometimes called working capital ratio is a ratio measuring liquidity. Liquidity is measuring ability of a company to pay its short / long term obligations by dividing total assets by total liabilities. Formula is therefore following:

²² BULKOWSKI, Thomas N. *Fundamental analysis and position trading: evolution of a trader.*

²³ BULKOWSKI, Thomas N. *Fundamental analysis and position trading: evolution of a trader.*

$$\text{Current ratio} = \frac{\text{Current assets (cash, inventory, receivables)}}{\text{Current liabilities (Debt, other payables)}}$$

As it was mentioned above the current ratio deals with company's ability to deal with debt using company's assets. Higher the ratio is the less of a problem company is having paying its debts using current assets. Appropriate current ratio depends mainly on type of business company is in since different types of businesses use their assets differently. In general retail stores have lower score than IT/Tech companies that usually score highest. It is important to realize also the reasons for such scores. High score can indicate assets not being used effectively and low score depending on a business model does not mean that company will go bankrupt soon, however it raises a red flag and initiates further investigation.

3.3.4.2 Acid / Quick Test ratio²⁴

The Acid test ratio also known as quick ratio is the most used indicators of company's current financial situation. It is measuring if the company has enough short term assets to cover its immediate liabilities.

One may ask why would someone call it "Acid test" ratio since acid in general has no meaning in common world of finance. The term originated from testing purity of gold – which at the time of gold rush was quickest and most reliable by putting acid onto the gold. The gold's resistance to effects of acid is indicator of gold purity. The more stable gold is – the purer gold is. This term was then adopted by the finance world for its similarity since it offers quite reliable indication when correctly interpreted whether the business is "gold" or rubbish (i.e. financial difficulties).

Basic formula for Acid Test Ratio is:

$$\text{Acid Test Ratio} = \frac{(\text{Cash} + \text{Accounts receivable} + \text{Short term investments})}{\text{Current liabilities}}$$

The general idea of acid test ratio is to evaluate whether the company is able to pay its liabilities with their short term assets – therefore equilibrium is score of 1 while below 1 is insufficient assets and over 1 is good but can indicate lower effectiveness. Also if acid test ratio is compared to current ratio and acid test ratio is noticeably lower it is indicator

²⁴ BULKOWSKI, Thomas N. *Fundamental analysis and position trading: evolution of a trader*.

that company assets are dependent on inventory which is not taken into consideration in acid test ratio.²⁵

For the analyst it is important to realize that acid test ratio is highly dependent on sector and business analyzed company operates in e.g. retail businesses tend to have acid ratios below 0.5 while IT companies can have numbers 5+ since they accumulate cash.

3.3.5 Horizontal and Vertical Analysis

When analyzing e.g. financial statements one has to focus on relevant data and the key action is to transform data into information. Such a thing can be done two basic ways. Both methods rely on comparison with other numbers. Horizontal analysis (also known as trend analysis) is comparing data in time. On the other hand vertical analysis is comparing data across components of balance sheet.

3.3.5.1 Horizontal Analysis

Horizontal analysis (often referred to as trend analysis) is a method used for analyzing financial statements by comparing changes in values of financial statement values in time. Most used time periods depend on the characteristics of the analysis but most common are years / quarters / months. Changes can be described by absolute numbers or relative. Both ways have some positive and negative sides. In general absolute number favors large companies and relative smaller ones. However it is more comprehensible to use relative percentages since they are easier to imagine. General idea being that for calculation of a change is used previous year (or in some cases base year) and then by analyzing the changes analyst can determine trend on which forecast or decision can be made.

3.3.5.2 Vertical Analysis

As mentioned above – vertical analysis is very similar to horizontal analysis. The main difference is timeframe – where in horizontal data in time horizon are compared, in vertical analysis data from the same time period are compared. For example: percentage of profit to total assets. This number can be then compared with other companies / industry average or to identify imbalances within the company.

²⁵ FRASER, Lyn M a Aileen ORMISTON. *Understanding financial statements*.p.162

3.3.6 Dividends

Dividends offer a share of a net profit of the company. They come in various ways but most of the time in form of money; other methods might include stock dividends when shareholders receive more stocks of the company etc. But what happens if company is not paying dividend? Simple logic would suggest that such money can be used for further growth of company thanks to no pressure of paying dividends therefore increases value of a stock as a result and thus investor is getting his money when selling the stock. One of reasons why companies are not paying dividends is obligation to tax profit that would be than paid to the shareholder.

As a result it can be said that stock that is not paying dividends is more risk averse and longer term investment – since the investor is getting money only if the stock is sold. Other effect of risk aversion is lower yield in general of stocks that pay no dividends.²⁶

3.3.7 The Du Pont System²⁷

The Du Pont analysis is a method of performance measurement that has its roots in 1920s DuPont Corporation. This method was revolutionary by measuring gross book value opposed to net book value in order to create higher return on equity (ROE). DuPont analysis relies on a assumption that if gross book value is used it removes incentive to avoid investing in new assets which might occur if higher depreciation methods produce lower ROE. The basis of DuPont analysis is that ROE is determined by three factors^{28 29}

- Operating efficiency – measured by profit margin that indicated operating efficiency
- Asset use efficiency – measured by total asset turnover that indicates asset use efficiency
- Financial leverage – measure by equity multiplier that indicated financial leverage used by the company

²⁶ Wiley Trading: Fundamental analysis and position trading p.53

²⁷ <http://www.investopedia.com/terms/d/duPontanalysis.asp>

²⁸ Understanding fin st p.170

²⁹ BREALEY, Richard A, Stewart C MYERS a Franklin ALLEN. *Teorie a praxe firemních financí*. p.844

Formula of return on equity (ROE) is

$$ROE = Profit\ Margin \left(\frac{Profit}{Sales} \right) * Total\ Asset\ Turnover \left(\frac{Sales}{Assets} \right) \\ * Equity\ Multiplier \left(\frac{Assets}{Equity} \right)$$

Above formula is also called DuPont three-step calculation since it uses three ratios for its computation. But as mentioned above, analyst have to be aware that ROE has to be analyzed piece by piece. E.g. if the ROE of the company will stay the same and net profit with asset turnover decreases, it indicates that leverage was the reason why ROE remained the same.³⁰

Five-step DuPont

It is also possible to improve three-step calculation to effect of borrowing costs that can mute positive effect of leverage.

$$ROE = \left[\frac{EBIT}{Sales} * \frac{Sales}{Assets} - \frac{Interest\ expense}{Assets} \right] * \frac{Assets}{Equity} * (1 - Tax\ rate)$$

Properly adjusted you get

$$ROE = [(Operating\ profit\ margin) * (Asset\ turnover) \\ - (Interest\ expense\ rate)] * (Equity\ multiplier) \\ * (Tax\ retention\ rate)$$

Three step method and five step method only highlight the fact that it is important to find the cause behind the effect. Comparison both vertical and horizontal should be done to be sure that ROE is representative. DuPont analysis helps analyst significantly to determine how company is rising or dumping its ROE.

³⁰ BODIE, Zvi, Alex KANE a Alan J MARCUS. *Investments*.p.568

3.4 Technical Analysis

In the first part of literature review it was mentioned that there is not only fundamental analysis but also other methods. This chapter will review technical analysis and its methods for purposes of further analysis.

It is important to realize purpose of fundamental analysis is to find out intrinsic value of the stock. Technical analysis takes completely different approach by not measuring any intrinsic value but focusing on price and its movements that are generated by supply and demand in the market. Understanding technical analysis can be leveraged while also using fundamental and other types of analysis to achieve best results.³¹

Other important difference between fundamental and technical analyst is time horizon in which they operate. Fundamental analysis works with financial statements that are reported annually or in a better case quarterly or even monthly whereas technical analysis can work with any sort of data from years to seconds or even below seconds since the real time data can be obtained. With these facts on mind it is obvious that traders and investors tend to use different tools since their investments work with different time spans. Investors that plan long time investments tend to go with fundamental analysis while traders that have to pinpoint exact time when to invest tend to go with technical analysis which enables them to use real time data^{32 33}

Described above are mostly positives of technical analysis but is it really the one theory that can “answer it all” ? Of course there is also criticism and the major one is the efficient market theory (EMT) which states that market price is always correct and any past trading information is already included in the market price of the stock and therefore any form of further analysis to determine if stock is over or under valued is useless. However truth is that market is not fully efficient and technical analysis in experienced hands can provide edge over other investors that base their decisions purely on fundamental analysis. For more understanding of market inefficiency behavioral economics offers some answers latter in this thesis.^{34 35}

³¹ CHEN, James. *Essentials of technical analysis for financial markets*. P.2

³² A mathematicina p. 37

³³ VESELÁ, Jitka. *Investování na kapitálových trzích*.p.102

³⁴³⁴ WÄRNERYD, Karl. *Stock-market psychology: how people value and trade stocks*. P.14

3.4.1 Basic Assumptions

The whole idea of technical analysis is based on three basic assumptions

- **The market discounts everything**
- **Prices moves in trends**
- **History tends to repeat itself**

The market Discounts Everything

As already mentioned the technical analyst considers only price movements while he ignores the fundamental indicators. The idea is that price reflects every possible detail in real time (in fact slightly lagging) including fundamental factors and others e.g. market psychology therefore rendering them unimportant.

Prices Moves in Trends

Technical analysis assumes that prices move in trends which mean that once trend is established the upcoming price changes are to be in the same direction as the trend. On this assumption are based most of the trading strategies – as it will be explained latter – major exceptions occur.

History Tend to Repeat Itself

As was said many times in history class: "history tends to repeat itself". It is believed that nature of this fact is embedded in market psychology since humans as investors and traders react in similar manner to the development on the market. In technical analysis chart patterns are used to determine future trends.

3.4.2 Trend Analysis

Trend analysis is one of the basic concepts when referring to technical analysis. But what is a trend? In general it is a direction in which market price is heading. Some trends are easy to catch with an eye but for further reading it is important to understand trend in a more detailed way.

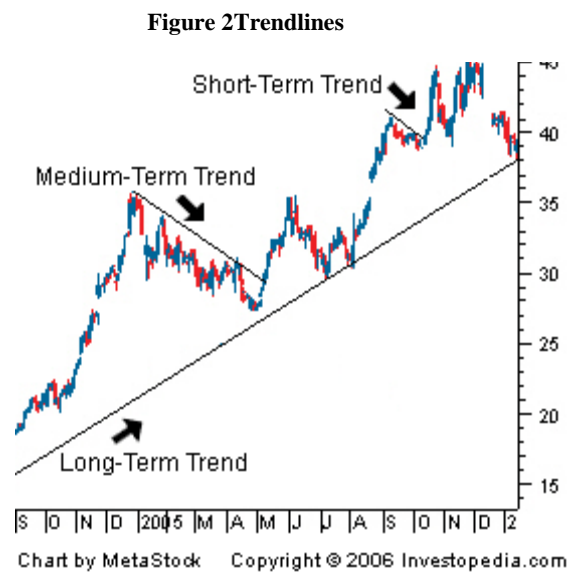
³⁵ BODIE, Zvi, Alex KANE a Alan J MARCUS. *Investments*.p.338

3.4.2.1 Defining Trend³⁶

Indeed not all trends can be just caught with an untrained eye. When analyzed in detail the chart is not always straight and does not go in one direction only. Contrary is true. Chart is made of highs and lows and those highs and lows put together a trend.

There are three types of trend: uptrend and sideways horizontal movement. Downtrend and as the name suggests if there are peaks in succession and troughs are higher it is uptrend. If the peaks and troughs are getting lower we call this trend a downtrend. In a situation that there are ups and downs and the troughs remain the same it is called sideways or horizontal trend.³⁷

Since the charts are two dimensional where one dimension is market price and the second one is time. Trends can be also analyzed time wise based on length of trend. Simple classification is that there are long term trends lasting one year or more while intermediate is 1-3 months and near term is less than a month. It is most common that a long term trend is composed of several intermediate and near term trends as displayed on a picture.



Source: www.investopedia.com

When looking for a trend it is important to plot appropriate chart with relevant data and time span. Idea being that trends with longer duration are superior in their significance compared to short term trends. Of course keeping in mind e.g. planned holding period etc.

3.4.2.2 Trendlines

Already was described what a trend is, now to apply that concept: trendline is a line that follows a general trend and is used to detect any change e.g. reversal of trend. Trendline of a upward trend is defined by supports (lows) on a chart as is shown below.

³⁶ CHEN, James. *Essentials of technical analysis for financial markets*.

³⁷ CHEN, James. *Essentials of technical analysis for financial markets*.

Similarly the downtrend is defined by resistances (peaks) of the chart. Trendline in general helps investors and traders predict possible reversal of trend.³⁸

Figure 3 Trendlines



Source: <http://www.tradersedgeindia.com/images/trendline1.gif>

If one trend line connecting peaks and one connecting lows are plotted into one chart they will create channel that is setting boundaries in which area the stock will be traded and when there is a significant breakthrough through trendline. Based on this information trader can expect further growth in a direction of a breakthrough.

3.4.2.3 Support and Resistance

In previous paragraphs was explained what a trend and trendline are but careful reader noticed two words that were not explained yet. In previous chapter we mentioned that channel is created using trendline defined by peaks and trendline defined by lows. Further on peaks will be referred to as resistance and lows as support. Resistance and support are values that are seldomly broken by prices.³⁹

But why is it so? Resistance and support levels are important mainly in terms of psychology of supply and demand. Based on experience traders will sell when price is reaching resistance and buy when reaching support since they expect that hitting resistance

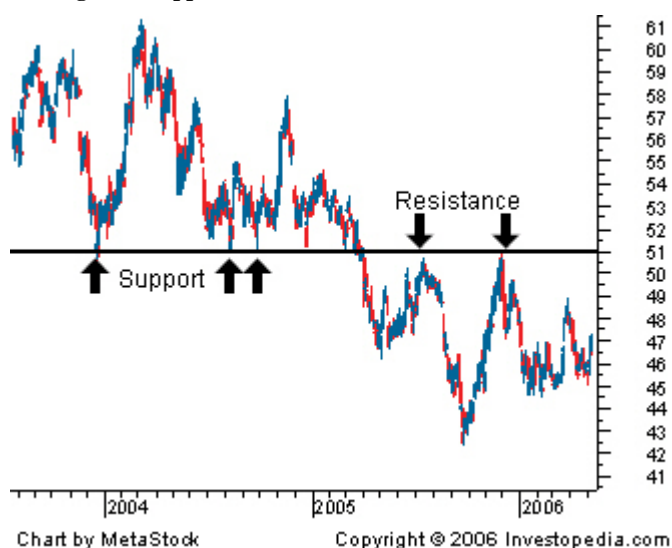
³⁸ CHEN, James. *Essentials of technical analysis for financial markets*. P. 41

³⁹ JOHN ALLEN PAULOS. *A mathematician plays the market*.p.45

is a sign of upcoming decline in price while nearing support is a sign of nearing uptrend. Support and Resistance has also lot to do with e.g. round numbers since they create psychological barriers e.g. once price hits 100 steep increase just based on this fact can be expected.⁴⁰

There is one more important effect that is related to supports and resistance – the role reversal. It has been mentioned a little on previous page but reversal of resistance and support is a major component of trading. Once prices significantly break through resistance – the by then resistance level becomes support and resistance moves to next level. This

Figure 4 Support and Resistance



Source: www.investopedia.com

pattern can be seen on and on through chart analysis.

The main idea of support and resistance is therefore prediction of a trend change. Based on the logic behind the theory of resistance and support it is not recommended to place orders at the exact level of a channel since trends usually reverse before reaching limit set by trendline – rather it is recommended to put

orders few units bellow resistance or few above support level. In general zones around support and resistance are marked by a lot of volatility.

While a level of importance has been described it is important to keep on mind also other factors that might come into play while reading diagrams. Volume is one of such factors since it is used e.g. to confirm assumptions since it is precursor of a trend change. For example if there is a upward trend and volume of stock traded is lowering it is indicator of reversal of a trend (change from uptrend to downtrend or horizontal). Behavior that was just mentioned is called divergence – meaning two contradicting indicators. In

⁴⁰ CHEN, James. *Essentials of technical analysis for financial markets*. p.57

following chapters divergence uses will be explained in more detail. It is important to use volume as a confirming indicator and keep in mind that volume precedes price.⁴¹

3.4.2.4 Charting

In previous chapters various details about specifics of chart trendlines were described, but it is important to explain some more information that charts and different styles of their visualization can offer.

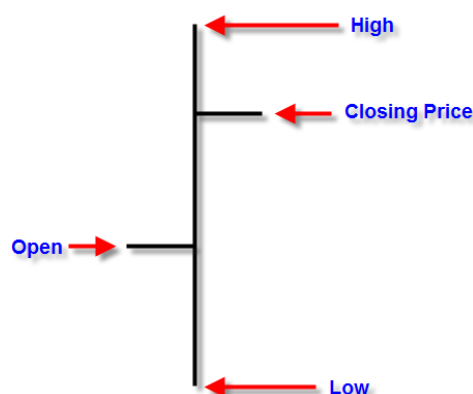
Basics: chart is a two dimensional interpretation of market reality represented by price in time where x-axis represents time and y-axis represents price. There is not much to say about x-axis representing time other than – that it usually represents closing price of time period depending on x-axis scale that can be based on annual quarterly daily or even minute basis. Bit more interesting is y-axis that is usually represented in linear way e.g. 50-100 in equal manner. In some cases logarithmic scale can be used, such cases are when growth accelerates and smaller values especially in beginning would be hardly visible. Another case is percentage scale where first period is 0% and than any change is visualized as percentage change from original value (0%).⁴²

Now that a environment of a chart was explained it is necessary to look into types of charts that are most common for analysts – each one usually offers some value added to the analyst. Basic chart types that will be explained are line chart, bar chart, candlestick chart and point and figure chart.

Line chart is simplest form of a chart that usually consist of closing prices not offering any idea about what the lows and highs of the day were but since closing prices are considered to be most important. Line chart gives a rough idea of the market.

Bar chart uses as a basis a line chart but adds a visualization of lows and highs of the day and also closing prices. The chart consists of vertical lines that represent range of prices

Figure 5 Bar Chart



Source: <http://www.mysmp.com/technical-analysis/>

⁴¹ CHEN, James. *Essentials of technical analysis for financial markets*.

⁴² CHEN, James. *Essentials of technical analysis for financial markets*.p.17,33,91

and also dashes on both sides that connect it to other vertical line (usually day). Dashes on the side represent closing (right of the bar) and opening (left of the bar) prices as the logic suggests.⁴³⁴⁴

Closing and opening prices are connected between two following days. Other information a chart gives is if overall the stock gained price or depreciated – this is done by color differentiation of a bar where red color is decrease in price and black or blue means appreciation. Colors are important since the height of the bar does not represent closing prices therefore with a quick glimpse at the chart it is not obvious whether the stock gained or lost.

45

Figure 6 Candlestick Chart



Source: www.chart-formations.com/stock-charts/

Candlestick chart is very similar to bar chart. It also uses vertical lines to indicate range of trading prices for the period (e.g. day) and visualization of difference between opening and closing prices which is done by bald vertical column filled with color. Tricky part is coloring since different sites can use different colors therefore reading legend is essential, but in general fully red column and vertical line will mean decrease and blue/black line with a blank/full bar will mean increase in value. In picture above increase is visualized by green color.

⁴³ CHEN, James. *Essentials of technical analysis for financial markets*. P.34

⁴⁴ CHEN, James. *Essentials of technical analysis for financial markets*. P.33

⁴⁵ VESELÁ, Jitka. *Investování na kapitálových trzích*.p.440

3.4.2.5 *Chart Patterns*

After getting to know how to read and understand charts well in previous chapter it is time to apply these skills to recognize chart patterns. Chart patterns are distinctive formations of charts that can be interpreted as a signal of future movement of a stock. People that specialize in recognizing chart patterns are called chartists (not to be confused with 19th century chartists in England or Czech signatory of Charta 77 in 20th century) .

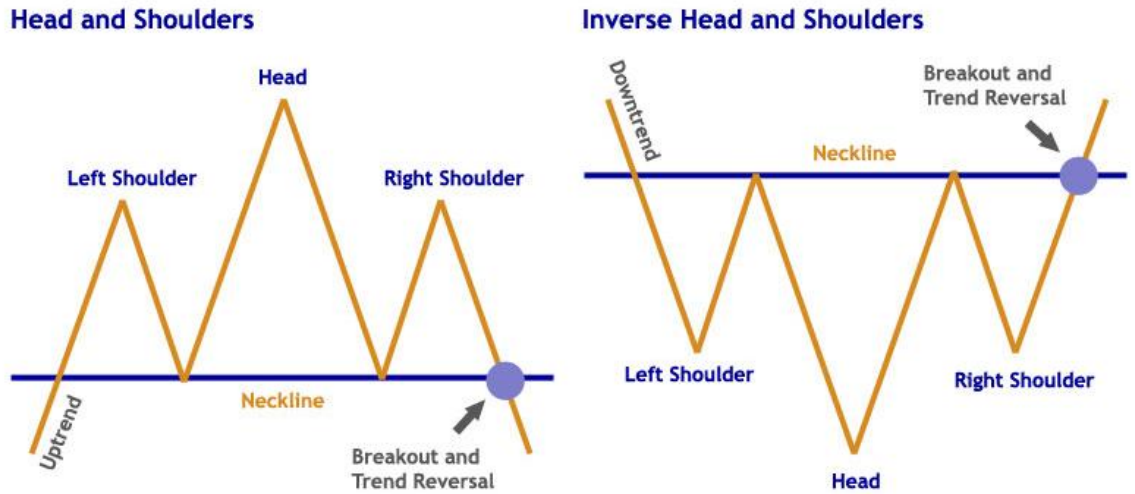
The theory of chart patterns assumes that history repeats itself and therefore same patterns can be seen over and over again. It has to be said that chart patterns are not 100% reliable method and sometimes its nature is considered more of a art than science. Overall there are two types of chart patterns reversal and continuation. As the names suggest reversal pattern signals that upon completion of pattern the trend will reverse on the other hand continuous pattern will upon completion of pattern continue in the already established trend. Some of the main chart patterns are.⁴⁶

3.4.2.5.1 Head and Shoulders

The head and shoulders is one of the most popular and also reliable chart patterns used in technical analysis. It is a reversal pattern that signals that stock price will probably move against current trend. On picture it is obvious that pattern is based on shoulder-head-shoulder scheme that consists of two shoulders (peaks) that are lower than a head (peak) that are connected by a neckline (low) that reaches level of support. Of course that in order to anticipate reversal to negative trend there is also inversed head and shoulders where necklines usually almost reach resistance level.

⁴⁶ CHEN, James. *Essentials of technical analysis for financial markets*. P.92

Figure 7 Head and Shoulders Pattern



Source: www.stocks-for-beginners.com/

3.4.2.5.2 Cup and Handle

The cup and handle is a chart pattern on bull stock that assumes further uptrend will ensue. It is characteristic by a cup with a handle shape and once confirmed followed by

uptrend again.

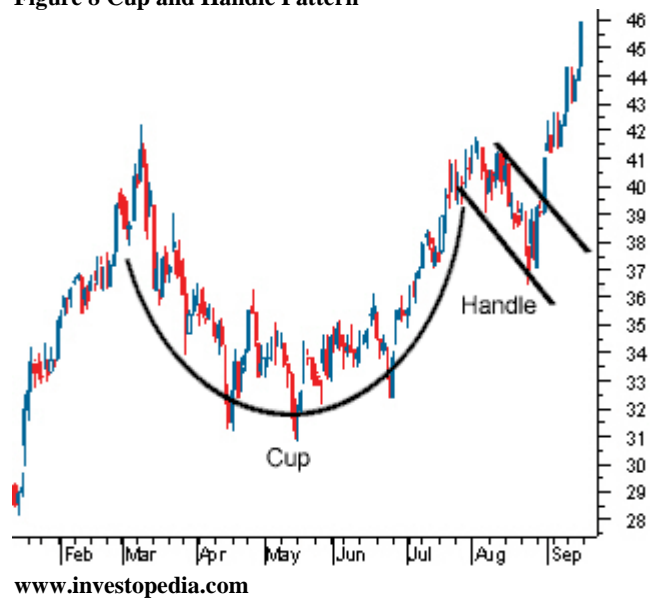
As seen on the picture, uptrend is followed by downtrend that is smoothly leveling out continuing by a uptrend stopped by resistance that forms the “handle” for short period of time to be continued by uptrend.

3.4.2.5.3 Double Tops and Bottoms

The double top and bottom is also one of the most used chart patterns

that signal reversal in a trend. It consists of either two following attempts to break resistance or to break support. Followed by a trend reversal this pattern is also closely related to price memory effect.

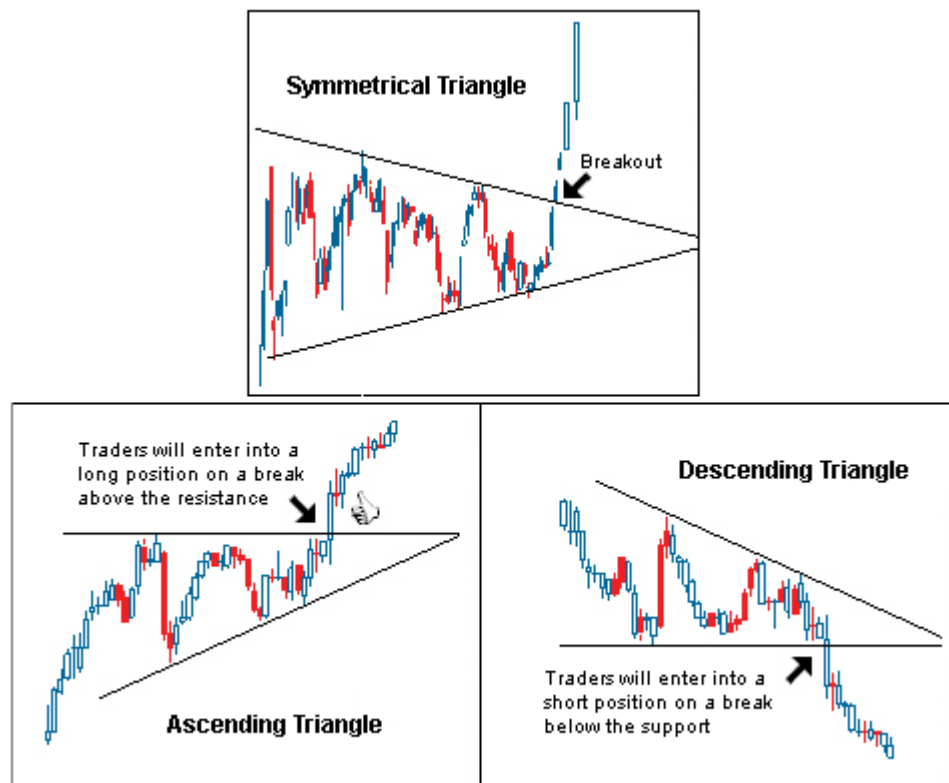
Figure 8 Cup and Handle Pattern



3.4.2.5.4 Triangles

The triangular chart patterns are one of the most well known chart patterns since they are more obvious than others and as the name suggests their pattern is based on a

Figure 9 Triangular Patterns



Source: www.investopedia.com

triangle like shape. Triangles are formed by upper and lower trendlines (resistance and support) that create triangle shape. There are three basic triangle shapes: symmetrical, descending and ascending.

In case of symmetrical triangle there is upward and downward trendline converging together into a breakout in one direction (it cannot be predicted if upward or downward) .It is also a confirmation of a new trend in the same direction as a breakout. In a case of ascending triangle that is considered to be a bullish pattern breakout is expected upward. Opposite is true about descending triangle pattern where breakout indicates bearish trendline.⁴⁷

⁴⁷ CHEN, James. *Essentials of technical analysis for financial markets*.

3.4.2.5.5 Triple Tops and Bottoms

The triple tops and bottoms are in almost every aspect similar to double top and bottom but is less common leading to some confusion since if analyst signals early for double top and bottom while triple develops – loss is imminent

3.4.2.5.6 Rounding Bottom

The rounding bottom sometimes also referred to as saucer bottom is long term pattern similar to cup and handle pattern but without handle. It is a reversal pattern that signals shift from downward to upward trend. Missing handle is making this pattern difficult to describe since there is no confirmation indicator.

3.4.3 Moving Averages Convergence Divergence (MACD)

As we already learned most of the charts show a lot of price movement which makes it difficult to catch overall trend. However analysts use mathematic tools to smooth out charts to make results more comprehensible. One of major tools used is application of moving averages of prices over defined period of time. Moving averages remove day-to-day fluctuations of prices and help analysts to see overall trend.^{48 49}

There are three basic types of moving averages that differ in a way they are calculated. Essential differences are in a way values are weighted in calculation where on one side values are weighted equally and on other progressively. This is due to a fact that more recent values are considered more important than older ones in relation to present value.⁵⁰

3.4.3.1 Simple Moving Average (SMA)

The simple moving average is the simplest one of moving averages since it just takes the sum of all previous closing prices and divides it by number of values. E.g. SMA (5) takes last 5 closing prices and makes average while SMA (50) takes 50 closing prices. As the logic suggests the shorter the period the more of a fit to the chart but lacks power of more of a long term forecast.

⁴⁸ JOHN ALLEN PAULOS. *A mathematician plays the market*.p.41

⁴⁹ CHEN, James. *Essentials of technical analysis for financial markets*. P.119

⁵⁰ CHEN, James. *Essentials of technical analysis for financial markets*. P.119

3.4.3.2 Linear Weighted Average (LWA)

The linear weighted average as the name suggests weighs values in a linear manner where the more recent value is the more of a weight it gets. E.g. LWA (15) oldest value is multiplied by 1 and most recent by 15 and then the numbers are divided by sum of multipliers.

This moving average is used only rarely but offers insight into the logic of computation of the next moving average.

3.4.3.3 Exponential moving Average (EMA)

The exponential moving average is the most used method of smoothing out the chart by putting exponential factor to the each value, where most of weight is put on a most recent data. Analysts believe that it offers much more reliable data compared to other two methods since it puts highest response to recent data. Calculation of exponential moving average is done in three steps and also includes SMA – detailed algorithm for this calculation is not described in more detail since most analyst tools perform the calculation autonomously.⁵¹

In general moving averages (MA) are used to determine trends, their reversals and finding support and resistance levels.

The trend reversals can be quite easily found by comparing long term and short term moving averages or when prices move through moving averages. For example if short term MA crosses long term MA in an upward direction it is a signal for a trend reversal to uptrend. On the other hand if prices sink below long term MA it is also a signal of trend reversal in this case downtrend.

Figure 10 Simple Moving Averages



Source: www.investopedia.com

⁵¹ CHEN, James. *Essentials of technical analysis for financial markets*.

Support and resistance can be also set by long term MA since most analysts will follow e.g. MA (200) which sets support or resistance depending in which area the current prices.

It is important to keep on mind that moving averages are just a way of simplifying chart and does not offer ultimate tool for decision making.

3.4.4 Indicators and Oscillators

In the chapter indicators and oscillators collected knowledge from previous chapters of technical analysis will be used to summarize basic types of indicators. Indicators are essentially calculations that are based on price and volume, that help analyst to recognize trend volatility and momentum of a market. It is important to keep in mind that indicators are secondary source of information after price to analyze patterns and form buy and sell signals.

Indicators can be divided into two basic groups leading and lagging where leading precedes present value and therefore offers prediction while lagging lags behind present value and is used to confirm trend. Indicators can be also divided by their construction where indicators that have bound range are called oscillators (bound range being usually 0-100) and those non-bound describe general buy/sell signals or strong/weak development.⁵²

Now that we know what indicators and oscillators are reader should ask “How are they used?”. The sell and buy signals rely on crossovers and divergence where crossovers are the most popular method based on prices moving through average or two averages (short time and long time) crossing. Divergences occur when two indicators move in opposite directions meaning that trend is weakening. But still it is important not to rely only on single indicator but to use multiple methods to achieve maximum effectiveness.

3.4.4.1 Accumulation / Distribution Line

The accumulation / distribution line is one of the most favorite volume indicators that are focused on measurement of cash flows. It calculates a ratio of buy/sell by comparing price movement to volume movement in period. If the output trend is upward it is sign that there is increase of buying than selling and vice versa.

⁵² CHEN, James. *Essentials of technical analysis for financial markets*.

3.4.4.2 Average Directional Index

The Average Directional index (ADX) is being used to measure strength of current trend. Even though it does not say anything about direction of a trend it identifies momentum behind it. Calculation of ADX is done using two directional indicators (DI) where one is positive and other negative. As the name suggests positive focuses on measuring positive trend and negative on negative trend. Output number is ranging 0-100 where below 20 means weak trend and over 40 strong trend.

3.4.4.3 Aroon

The Aroon indicator is relatively new indicator (introduced 1995) that measures direction of a trend and also its strength. It is used to determine when new trend begins. Calculation is done by comparing two lines where one indicates time since last price high and other time since last low, timeframe is set by an analyst. In graphical view the line that is above the other one is dominant – determining trend and when crossover happens it indicates change of a trend.

Aroon oscillator is a simple expansion to Aroon indicator – it plots a chart of difference between Aroon up and Aroon down line. Therefore ranging -100 to +100 where 0 is a centerline. The score determines pressure of up/down trend and crossover confirms trend reversal.

3.4.4.4 Moving Average Convergence Divergence

The moving average convergence divergence is a follow up application of moving averages mentioned in previous chapter. It is probably the most used indicator in technical analysis. Calculation is based on two exponential moving averages (short term – long term) that measure momentum of a security. Centerline is in this case a point in which both moving averages are equal.

$$MACD = (\text{Short term moving average}) - (\text{Longer term moving average})$$

Therefore if MACD is positive it means the short term moving average is above long term moving average -> indicating upward momentum. Time span of short term and long term is set by analyst as well as centerline.

3.4.4.5 *Relative Strength Index*

The Relative Strength index (RSI) is one of the most used momentum indicators in technical analysis which helps to determine whether stock is overbought or oversold. RSI ranges from 0 to 100 where 70+ is usually used to indicate oversold and values below 30 indicate overbought situation. Therefore RSI helps analyst to indicate whether price of a stock has been unreasonably pushed or not. Time span depends on analyst and of course shorter period means more volatility.

3.4.4.6 *Stochastic Oscillator*

The stochastic oscillator is commonly used momentum indicator used in technical analysis. It is powered by simple idea that in an uptrend closing prices are close to day's trading maximum and in case of a downtrend situation is opposite. Histogram consists of %K line and %D line (computed by analyst tools) that usually are set to 14 day periods. Evaluation of signals is almost the same as in case of RSI where analyst sets boundaries of e.g. 20 - 80 and crossovers indicate change.

3.5 Behavioral Finance

Basic finance theory suggests that all participants of the market are rational – wealth maximizers. But in fact in many cases people make unpredictable and irrational moves. This is due to emotions and human psychology are influencing decision making processes.^{53 54}

Behavioral finance despite being a new field has gained popularity since it helps to explain situations that just could not be explained by conventional finance theories.⁵⁵

Such anomalies are for example

- **January Effect:** Average monthly returns for small companies are always higher than other months
- **The Winners Course:** At auctions winners that are aggressive tend to pay more than intrinsic value despite being informed as others.

⁵³ JOHN ALLEN PAULOS. *A mathematician plays the market*.p.17

⁵⁴ BREALEY, Richard A, Stewart C MYERS a Franklin ALLEN. *Teorie a praxe firemních financí*. P.412

⁵⁵ WÄRNERDY, Karl. *Stock-market psychology: how people value and trade stocks*. P.49

To prevent irrational moves eight key concepts of behavioral finance will be mentioned so that their effect can be minimized during investing.

Anchoring

Concept of the anchoring is based on a fact that people build their opinions on information (anchor) they take for granted. In fact such information does not have to be relevant or true. E.g. people used to believe world is flat - in investment world stock that was stable and lost 50% is believed to bounce back but this assumption is based purely on anchor of previous prices.

Mental Accounting

The mental accounting is a concept where people separate money based on their purpose or source e.g. saving money in a jar for vacation. This is highly irrational since money are fungible and additional benefit can be received when all money are treated equally. In investment practice e.g. two separate portfolios are owned despite same overall effect and more time spent.

Confirmation and Hindsight Bias

The confirmation bias is based on fact that people tend to look for facts that support their opinion believes and avoid contradicting opinions facts.

Hindsight bias occurs when person believes that event in history was predictable even though the event was completely random. Therefore people are looking for connections, leading to incorrect simplification.

Gambler's Fallacy

The gambler's fallacy is based on probability of events and expectation that trend will continue or stop. E.g. if flipping coins 10 times head up some will say now it has to reverse but in fact on every flip there is 50% chance and previous events do not influence the outcome. In investing selling after steep uptrend since you do not expect further uptrend is exactly that. Analyst should always decide based on fundamental or technical analysis.

Herd Behavior

The herd behavior refers to situation where investors just following the trend of other investors. This concept is based on two problematic thoughts. The first one is conformity which is pressure to “fit in” with others and second one is believe that it is unlikely that a large group of people would be wrong. Of course there are numerous examples of this leading to bubbles e.g. dot com or housing market in 2008.

Overconfidence

The name of this concept speaks for itself, it is based on a fact that almost all fund managers perceive themselves to be above average. More confident traders in fact trade more but yield less and often are outperformed by market.

Overreaction and Availability Bias

General idea of this concept is overreaction to new information. In fact this lead to experiment by Richard Thaler (Father of modern behavioral psychology) proving that stocks with more negative news outperformed both the market and stock with more positive news.

Prospect Theory

The prospect theory suggests that people value gains and losses differently. In general people feel more “pain” for losses than “joy” for gains. This leads to investors selling winning stocks soon and holding on to loosing stocks for longer time in real world rendering such investment strategy overall loss.

If investors keep in mind above mentioned concepts and think about investment also critically, falling into a trap can be avoided.

4 Practical part

In the practical part of this thesis methods reviewed in theoretical part will be applied to evaluate potential of investing into Google Inc. stock which during period of writing this thesis went through transformation into conglomerate Alphabet incorporated.

Both vertical and horizontal analysis will be used using fundamental, technical and basic psychological analysis. Data on Alphabet Inc. and its rivals will be collected from public sources e.g. financial statements and industry averages.

4.1 Google - Alphabet

Google Inc.(1998-2015) or nowadays Alphabet Inc.(2015+) is American multinational conglomerate and parent company of Google and several other companies previously owned by Google. Alphabet is in essence a technological giant but less people realize that core business of Alphabet is advertising through its technological platforms. Lately Alphabet extended its variety of businesses by investing to many startups not only related to IT but also ecology etc.

4.1.1 History

Google was founded on September 4th 1998 by Larry page and Sergey Brin while they were Ph.D. students at famous Stanford University where they started by designing a new search engine for web browsing that used revolutionary ranking system that ranked pages by number links between pages. As many other businesses Google started in a garage with a good idea.

First money injection of \$100 000 dollars came from co-founder of Sun Microsystems. Later on Page and Brin were more and more worried that Google is taking too much of their time and they wanted to pursue their academic goals while selling Google for \$1 million but they were rejected. In 2004 initial public offering (IPO) took place and Sergey Brin with Larry Page agreed to work for Google for next 20 years. IPO lead to concerns about changes in the company philosophy and culture which was based around mission statement *“To organize world’s information and make in universally accessible and useful”* and unofficial slogan *“Don’t be evil”*. Also in 2004 Google headquarters moved to Palo Alto ,Mountain View, California also known as Silicon Valley where they built their own “Googleplex”.

Google’s rapid growth after IPO led to acquisitions and partnerships beyond Google’s core business – search engine. Since 2001 Google acquired number of small companies eventually moving to bigger ones. E.g. in 2004 Keyhole Inc., that we today know as Google Earth, 2005 Urchin Software that is now basis of Google Analytics, 2006

YouTube or in 2011 acquiring Motorola Mobility selling it to Lenovo in 2014 without patent rights.

On August 10th 2015 Google reorganized its structure into a holding company Alphabet Inc. where now Google is a subsidiary and a umbrella company for Alphabets internet related interests. Both Larry Page and Sergey Brin remain in executive positions in Alphabet Inc..

4.1.2 Businesses

As was mentioned above nowadays then Google now Alphabet does not focus only on internet search engine business and its advertising related operations. In following paragraphs more of Alphabets products and services will be described.⁵⁶

Search Engine – Google Search engine is what made Google famous at the first place and as mentioned serves also platform for Google’s advertising activities. Google search enables to search not only web pages but also images, books or scholar articles used for this thesis.

Advertising – advertising remains the core business of Google by placing advertisement onto search results and web pages using Google’s AdSense AdWords and Analytics on basis of pay per click or pay per view. Advertising is biggest source of revenue for Alphabet.

GoogleMaps – is a mapping service by Google offering classic maps, satellite images, street maps with 360° street view, traffic overview and route planning for many modes of transport.

Google Apps – is a cloud computing productivity and collaboration software that includes similar possibilities as Microsoft Office. Tools are most importantly: Gmail, Calendar, Hangouts, Drive, Docs, Sheets

Google DeepMind- is a artificial intelligence research company acquired by Google that made headlines in 2016 by defeating human in strategy board game of Go by their AlphaGo program.

X – Formerly **Google X** – is a secretive advanced research company that is mostly known by development of self driving car but also works on other projects such as Wing – a drone

⁵⁶ *Here Are The Nine Companies Under Alphabet Inc.*, Investopedia [online]. [cit. 2016-03-29]. Retrieved from: <http://www.androidheadlines.com/2016/01/nine-companies-alphabet-inc.html>

delivery service. Glass – interactive glasses, Loon – providing internet coverage using balloons and authors favourite Boston Dynamics robotics company developing e.g. humanoid robots under supervision of Defence Advanced Research Projects Agency (DARPA).

Google ATAP – Advanced technology and projects – similar to Google X but focused on shorter term projects e.g. Tango – determining device positions based on multiple sources of information for mapping e.g. insides of a building.

Android – is a mobile operating system based on Linux and designed for mobile devices like smart phones, tablets and others. Currently Android is being used on more than 50% of smart phones.

Nest Labs– home automation producer of programmable self-learning – sensor-driven thermostats, smoke detectors and security systems.

Access and Energy – is Google’s internet service providing company formerly known as Google **Fiber**.

Verily – formerly **Google Life Sciences** – is a branch of Alphabet focusing on study o life sciences.

Calico – is a biotech research and development company with a goal of combating aging and associated diseases. (Not to be mistaken with Calico – firearms)

Sidewalk labs – start-up focused on improvement of urban living

Google Capital – is a venture capital fund focusing on late stage growth companies with intent of profit. Google Capitol offers companies in its portfolio access to Google’s people and knowledge to accelerate growth.

GV – Formerly Google Ventures – is also venture capitol fund similar to Google Capitol but focusing on start-ups in technology industry and also life sciences.

4.1.3 Alphabet Inc.

As of August 2015 Google transformed its structure into one of a conglomerate. Currently conglomerate is often perceived as a dirty word but not in case of Google. In times where many conglomerates slim down their operations to focus only on core business Google went exactly opposite way – creating Alphabet Inc. a corporate umbrella for its various businesses. By that Google clarifies to investors that it intends to also proceed in fields that are not as profitable as Google’s core advertising business. Various range of businesses under Alphabet were already mentioned in previous chapter.

Decision to transform structure of Google into Alphabet was done by Sergey Brin and Larry Page since they hold majority (54%) of votes in the company – using their 10 vote super shares. The company traded on stock market changed from Google Inc. into Alphabet Inc. but the changes didn't stop there. Stock was divided into two creating GOOGL and GOOG stock where GOOGL has 1 vote and GOOG has no votes. Both stocks are traded at similar prices nowadays (early 2016).⁵⁷

As the tradition dictates the name “Alphabet” is not just a coincidence – *“We liked the name Alphabet because it means a collection of letters that represent language, one of humanity's most important innovations, and is the core of how we index with Google search! We also like that it means alpha-bet (Alpha is investment return above benchmark), which we strive for!”*⁵⁸

Only time will show whether diversification as done in case of Alphabet, will be for good or ill.

4.2 Competitors

Alphabet competes on the market with other companies. List of competitors would be very long since alphabet competes on many markets. Search engine – Advertising is the core business of Google and therefore also of Alphabet but as was described in previous chapters Alphabet's reach is now very broad including financial services and robotics. Author determined that most direct competitors for Alphabet are Facebook , Yahoo, Microsoft and Apple. Facebook and Yahoo are in advertising/search engine business while Apple and Microsoft are giant companies in many ways similar to Alphabet Inc. conglomerate.

Facebook Inc.

Facebook is a corporation based around social networking service that is nowadays making money through advertising mainly since it can target audience precisely. Facebook is also active in Acquisitions including WhatsApp , Instagram or Oculus VR.

⁵⁷ *GOOG vs. GOOGL: Everything You Need to Know About the Google Stock Split*, Investorpalace [online]. [cit. 2016-03-29]. Retrieved from: <http://investorplace.com/2014/07/goog-google-stock-split/#.Vvr2inpFqAJ>

⁵⁸ *Larry Page explains Google's transformation to Alphabet*, Telegraph [online]. [cit. 2016-03-29]. Retrieved from: <http://www.telegraph.co.uk/finance/11795715/Larry-Page-explains-Googles-transformation-to-Alphabet.html>

Yahoo Inc.

Yahoo is almost like a less successful sibling of Google. Its business is also based on search engine and related advertising. Its services include similar productive tools as Google does – e.g. email.

Microsoft Inc

Microsoft is multinational technology company producing software , electronics personal computers and services. It is well known for its operating system Windows. Similarly to Alphabet it offers wide range of products including search engine Bing , browser, productivity tools Microsoft Office 365 and many more. Microsoft is also active in acquisitions owning companies like Nokia and Skype

Apple Inc.

Apple is iconic American technology company that is well known for innovative approach and its former CEO Steve Jobs. Apples business is based around design, development of software ,consumer electronics, computers and online services. Apple’s well known subsidiaries are Beats Electronics, Apple Store etc.

4.3 Fundamental Analysis

In the theoretical part of this thesis were described various methods of fundamental analysis. Those will be now used on Alphabet Inc. using quarterly data of 2013, 2014 and 2015. However thanks to limitations in format and to make results easier to read only second and fourth quarter data will be displayed. Full data set can be found in appendix of this thesis. This time period was chosen to provide up to date data for investment decisions and also it avoids years of general economic recession that do not represent typical market. Data used were obtained from official financial reports / statements that are in accordance with United States Generally Accepted Accounting Principles (US GAAP). Currency through this thesis is United States Dollar (USD) and units are millions of USD unless other is specified.

4.3.1 Vertical Analysis

Vertical analysis of balance sheets focuses on how components of balance sheet combine to form total assets and total shareholders equity with liabilities. To visualize the changes absolute numbers will not be used since they are hard to comprehend – relative contribution to total will be used to better illustrate changes between periods.

Table 1 Vertical Analysis of Assets

In millions of USD	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
Assets						
Current assets:						
Cash and cash equivalents	16.2%	17.3%	16.4%	14.2%	13.4%	11.2%
Marketable securities	38.3%	36.5%	34.7%	35.6%	37.3%	38.3%
Total cash, cash equivalents, and marketable securities (including securities loaned)	54.4%	53.8%	51.0%	49.8%	50.7%	49.5%
Accounts receivable, net of allowance	7.3%	8.1%	6.9%	7.3%	6.8%	7.8%
Receivable under reverse repurchase agreements	0.8%	0.1%	0.1%	0.7%	0.5%	0.3%
Deferred income taxes, net		0.0%	0.5%	0.5%		1.3%
Income tax receivable, net						
Prepaid revenue share, expenses and other assets	3.1%	3.0%	1.9%	2.6%	2.2%	2.1%
Assets held for sale			3.1%			
Total current assets	65.6%	65.1%	63.5%	60.9%	60.2%	61.1%
Prepaid revenue share, expenses and other assets, non-current			1.6%	2.5%	2.4%	2.2%
Deferred income taxes, net, non-current	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%
Non-marketable equity securities	1.6%	1.8%	2.0%	2.4%	3.2%	3.5%
Property and equipment, net	12.9%	15.2%	16.2%	18.5%	19.6%	19.7%
Intangible assets, net	6.6%	5.6%	4.4%	3.6%	3.1%	2.6%
Goodwill	11.4%	10.5%	12.2%	12.1%	11.3%	10.8%
Total assets	100,016	109,050	119,996	129,187	137,593	147,461

In the table above are summarized assets both short and long term. To visualize changes percentages of component is done by dividing component by overall total assets. Therefore in the bottom line we can see total assets in absolute value representing 100%.

In observed time period Alphabet's balance sheet seems to be stable without major fluctuations. However two gradual changes were observed. Cash and cash equivalents have in observed time period decreased by 5% between 2014 and 2015.

In general technological companies in e-business are known for accumulating huge amounts of cash and having problem using them (also related with tax avoiding and optimization). Most well known company accumulating cash is Apple Inc. that is facing lot of criticism for this accumulation.

Thus lowering cash and cash equivalents is not a bad sign since in case of Alphabet it is used to acquire and start new businesses under Alphabet. Also decreasing cash will be further investigated in analysis yet to come. Other than cash and cash equivalents there are no significant changes in current assets and overall current assets decline is equal to used cash.

Of course that cash and cash equivalents did not disappear into a thin air. In observed period 2013-2015 there was 6% increase in long term assets – property and equipment confirming transformation of short term assets into long term.

Also worth mentioning is growth of Alphabet's assets between 2013 and 2015 which is almost 50%. The fact that there are no extreme changes in distribution of assets leads author to a conclusion that company is stable and well managed however decrease in cash and cash equivalents might lead to less flexibility.

Table 2 Vertical Analysis of Alphabet's Liabilities and Stockholder's Equity

Liabilities and Stockholders' Equity	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
Current liabilities:						
Accounts payable	1.8%	2.2%	1.1%	1.3%	1.0%	1.3%
Short-term debt	3.0%	2.8%	1.7%	1.6%	2.2%	2.2%
Accrued compensation and benefits	1.8%	2.3%	1.8%	2.4%	1.8%	2.4%
Accrued expenses and other current liabilities	3.3%	3.4%	3.1%	3.4%	3.2%	3.2%
Accrued revenue share	1.5%	1.6%	1.4%	1.5%	1.3%	1.6%
Securities lending payable	3.2%	1.3%	2.6%	2.2%	2.0%	1.6%
Deferred revenue	0.8%	1.0%	0.7%	0.6%	0.5%	0.5%
Income taxes payable, net	0.2%	0.0%		0.1%	0.7%	0.2%
Liabilities held for sale			1.9%		0.0%	
Total current liabilities	15.5%	14.6%	14.2%	13.0%	12.6%	13.1%
Long-term debt	2.0%	2.1%	2.7%	2.5%	1.6%	1.4%
Deferred revenue, non-current	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Income taxes payable, non-current	2.3%	2.4%	2.5%	2.6%	2.6%	2.5%
Deferred income taxes, net, non-current	0.8%	0.4%	0.5%	0.6%	0.4%	0.1%
Other long-term liabilities	0.7%	0.7%	0.7%	0.9%	1.4%	1.2%
Total Liabilities	21.4%	20.2%	20.6%	19.6%	18.8%	18.4%
Stockholders' equity:						
Convertible preferred stock, \$0.001 par value per capital stock and additional paid-in capital, \$0.001 par value per share	24.3%	23.8%	22.6%	22.3%	22.3%	22.4%
Accumulated other comprehensive income (loss)	-0.4%	0.1%	0.4%	0.0%	-0.7%	-1.3%
Retained earnings	54.7%	55.9%	56.4%	58.1%	59.6%	60.5%
Total stockholders' equity	78.6%	79.8%	79.4%	80.4%	81.2%	81.6%
Total liabilities and stockholders' equity	100,016	109,050	119,996	129,187	137,593	147,461

Source: Alphabet's liabilities, own processing

Table 2 describes Alphabet's liabilities and shareholder's equity. Components are displayed as percentages of total liabilities and stockholders equity which are displayed in bottom line in absolute values units being millions of USD.

Alphabet's liabilities in observed period remain stable with few notions. During the period short term debt decreased by 0.8%. In normal logic decreasing debt is positive but in this case it could mean that Alphabet is not leveraging its position enough by using borrowed cheap capital. Similar case is securities lending payable that decreased by 1.5%. Therefore during observed period there was 3% decrease in total liabilities.

While liabilities decreased stockholder's equity increased especially because of retained earnings that went up by 6% . It is important to note that as in assets case – while

percentages remain almost the same the overall values have been increasing in observed period by 50%.

Table 3 Vertical Analysis of Alphabet's Income Statement

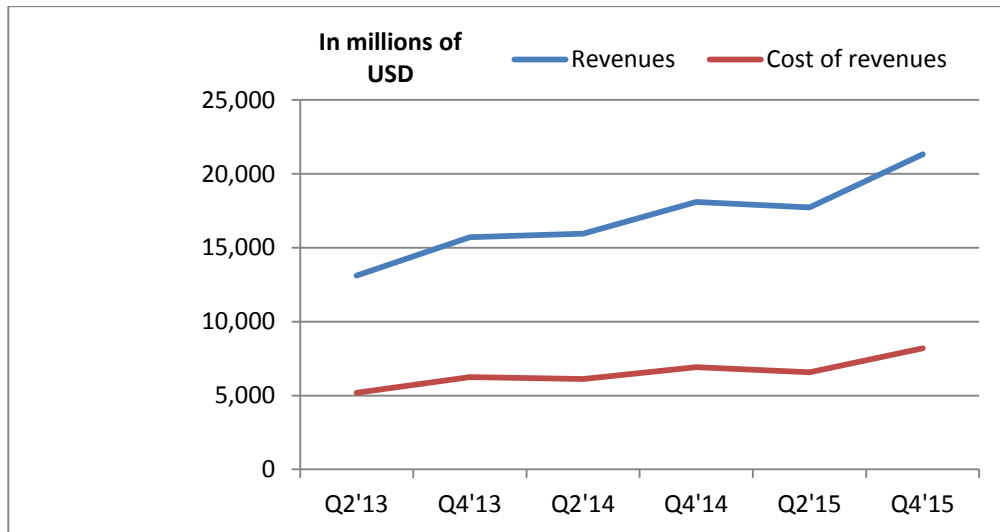
Income Statement	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
Revenues	13,107	15,707	15,955	18,103	17,727	21,329
Costs and expenses:						
Cost of revenues	39.6%	39.8%	38.3%	38.2%	37.1%	38.4%
Research and development	13.5%	12.3%	14.0%	15.5%	15.7%	16.5%
Sales and marketing	12.1%	12.1%	12.2%	13.1%	11.7%	12.6%
General and administrative	8.4%	7.5%	8.8%	8.8%	8.2%	7.4%
Receivable under reverse repurchase Agreements	73.6%	71.8%	73.3%	75.7%	72.8%	74.8%
Income from operations	26.4%	28.2%	26.7%	24.3%	27.2%	25.2%
Interest and other income, net	1.8%	0.7%	0.9%	0.7%	0.7%	-0.8%
Income from continuing operations before income taxes	28.2%	28.9%	27.6%	25.0%	28.0%	24.4%
Provision for income taxes	7.4%	4.5%	6.2%	4.5%	5.8%	1.3%
Net income from continuing operations	20.8%	24.4%	21.4%	20.5%	22.2%	23.1%
Net (loss) income from discontinued operations	3.5%	-3.2%	-0.4%	5.3%		
Net income	24.3%	21.2%	21.0%	25.8%	22.2%	23.1%
Net income available to all shareholders	24.3%	21.2%	21.0%	25.8%	19.2%	23.1%

Source: Alphabet's income statements, own processing

Above shown is a summary of quarterly income statements during observed period 2013-2015. Components are displayed as percentages of revenues to highlight possible changes in structure of income statement.

As the table suggests there were no significant changes in structure during observed period and since this table does not provide any interesting information author decided to use different visualization to find possible changes.

Chart 1 Vertical Analysis of Alphabet's Revenues and Cost of Revenues



Source: Alphabet's financial statements, own processing

Above in the graph is visualized development of revenues and their costs. It is obvious that revenues grow proportionally and in the end of 2015 slightly outpacing costs which is a good sign since acquisitions and many new projects were being financed in observed period. New projects run the risk of low revenues and increased costs in first years.

To summarize results of income statement in easy comprehensible way net income is displayed in table below.

Table 4 Alphabet's Net Income

	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
Net income in M USD	3,186	3,324	3,351	4,675	3,931	4,923

Source: Alphabet's financial statements, own processing

4.3.2 Horizontal Analysis

In the theoretical part of this thesis horizontal analysis was described in detail. Basis is a comparison of values in an observed time period of time. For horizontal analysis of Alphabet's balance sheet absolute values in millions of USD will be used to determine trend and possible future of balance sheet components.

Table 5 Alphabet's Horizontal Analysis - Assets

Assets	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
Current assets:						
Cash and cash equivalents	16,164	18,898	19,620	18,347	18,453	16,549
Marketable securities	38,268	39,819	41,584	46,048	51,327	56,517
Total cash, cash equivalents, and marketable securities (including securities loaned)	54,432	58,717	61,204	64,395	69,780	73,066
Accounts receivable, net of allowance	7,321	8,882	8,321	9,383	9,394	11,556
Receivable under reverse repurchase agreements	770	100	100	875	625	450
Deferred income taxes, net	-	-	-	-	-	-
Income tax receivable, net	-	46	586	591	-	1,903
Prepaid revenue share, expenses and other assets	3,118	3,253	2,336	3,412	3,049	3,139
Assets held for sale	-	-	3,668	-	-	-
Total current assets	65,641	70,998	76,215	78,656	82,848	90,114
Prepaid revenue share, expenses and other assets, non-current	1,882	1,911	1,962	3,187	3,308	3,181
Deferred income taxes, net, non-current	63	83	98	176	197	251
Non-marketable equity securities	1,564	1,976	2,415	3,079	4,409	5,183
Property and equipment, net	12,912	16,524	19,486	23,883	27,008	29,016
Intangible assets, net	6,558	6,066	5,234	4,607	4,213	3,847
Goodwill	11,396	11,492	14,586	15,599	15,610	15,869
Total assets	100,016	109,050	119,996	129,187	137,593	147,461

Source: Alphabet's balance sheets, own processing

In the table above are components of assets during observed period. The data illustrate the changes already described in vertical analysis. However in absolute values it is obvious that amount of cash and cash equivalents despite peak in second quarter of 2015 remained the same despite vertical analysis showing decrease. This is due to a fact that total assets increase quickly while absolute value of cash and cash equivalents remained the same - percentage share of total assets declined.

Table 6 Alphabet's Horizontal Analysis - Liabilities and Stockholders Equity

Liabilities and Stockholders' Equity	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
Current liabilities:						
Accounts payable	1,758	2,453	1,345	1,715	1,315	1,931
Short-term debt	3,000	3,009	2,009	2,009	3,008	3,225
Accrued compensation and benefits	1,803	2,502	2,102	3,069	2,466	3,539
Accrued expenses and other current liabilities	3,300	3,755	3,683	4,408	4,396	4,768
Accrued revenue share	1,458	1,729	1,686	1,952	1,823	2,329
Securities lending payable	3,211	1,374	3,086	2,778	2,694	2,428
Deferred revenue	799	1,062	882	752	712	788
Income taxes payable, net	172	24	-	96	948	302
Liabilities held for sale	-	-	2,304	-	-	-
Total current liabilities	15,501	15,908	17,097	16,779	17,362	19,310
Long-term debt	1,989	2,236	3,232	3,228	2,225	1,995
Deferred revenue, non-current	132	139	93	104	108	151
Income taxes payable, non-current	2,258	2,608	2,954	3,340	3,615	3,663
Deferred income taxes, net, non-current	811	439	545	758	540	189
Other long-term liabilities	704	743	810	1,118	1,960	1,822
Total Liabilities	21395	22073	24731	25327	25810	27130
Stockholder's Equity						
par value per share	24,334	25,922	27,111	28,767	30,722	32,982
Accumulated other comprehensive income (loss)	(398)	125	502	27	(929)	-1,874
Retained earnings	54,685	60,930	67,652	75,066	81,990	89,223
Total stockholders' equity	78,621	86,977	95,265	103,860	111,783	120,331
Total liabilities and stockholders' equity	100,016	109,050	119,996	129,187	137,593	147,461

Source: Alphabet's financial statements, own processing

In the table above are components of Alphabet's liabilities and stockholder's equity in absolute numbers. Results of this horizontal analysis confirm that Alphabet's liabilities and stockholder's equity is growing in a steady rate. Only difference is that while in relative amounts debt is decreasing, in absolute numbers debt remains the same and relative decrease is due to overall increase in liabilities and stockholder's equity.

Table 7 Alphabet's Horizontal Analysis - Income Statements

	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
Revenues	13,107	15,707	15,955	18,103	17,727	21,329
Costs and expenses:						
Cost of revenues	5,195	6,253	6,114	6,921	6,583	8,188
Research and development	1,766	1,933	2,238	2,813	2,789	3,510
Sales and marketing	1,583	1,908	1,941	2,377	2,080	2,679
General and administrative	1,098	1,184	1,404	1,593	1,450	1,572
Receivable under reverse repurchase agreements	9,642	11,278	11,697	13,704	12,902	15,949
Income from operations	3,465	4,429	4,258	4,399	4,825	5,380
Interest and other income, net	236	112	145	128	131	(180)
Income from continuing operations before income taxes	3,701	4,541	4,403	4,527	4,956	5,200
Provision for income taxes	969	711	984	819	1,025	277
Net income from continuing operations	2,732	3,830	3,419	3,708	3,931	4,923
Net (loss) income from discontinued operations	454	(506)	(68)	967	-	-
Net income	3,186	3,324	3,351	4,675	3,931	4,923
Net income available to all shareholders	3,186	3,324	3,351	4,675	3,409	4,923

Source: Alphabet's financial statements, own processing

In the table above are in detail displayed components of Alphabet's income statement. In general the values show steady growth. What is interesting is that while revenues almost doubled in observed period, the net income did not grow in proportion to revenues. However this seems to be no issue since with company growth its overall profitability decreases. This is especially true in case of Alphabet since its many new projects require capital for periods of time before making any profit on their own.

Overall horizontal and vertical analysis did not find any important problems regarding structure or values of components in balance sheets and income statements of Alphabet.

4.3.3 Ratio Analysis

4.3.3.1 Profitability Ratios

The profitability ratios are focused on measuring intrinsic value of the stock, theoretical background was already covered in theoretical part of this thesis. Selected methods will be used to analyze Alphabet's GOOGL stock.

4.3.3.1.1 Price to Earnings Ratio

Since Price to Earnings (P/E) ratio is one of the most popular ratios among investors it will be analyzed first. P/E ratio gives simple to understand information on how much investor is paying per dollar of earnings of Alphabet. But it is also important to realize that in calculation is used up to date / historical price of the stock. Therefore P/E ratio also reflects expectation of the company performance.

Table 8 Alphabet's P/E ratio

	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
P/E ratio	31.00	34.35	30.81	25.65	25.83	33.93

Source: Alphabet's financial statements, own processing

The table above shows that Alphabet experienced quite a quick rise with peak of 37 in first quarter of 2014 and suffered a downfall afterwards that stopped at 25. Later on P/E ratio started to climb again despite transformation into Alphabet.

Just by looking at these numbers analyst can sense the mood on the market but what is more important is comparison to Alphabet's competitors. In graph below can be seen comparison between Alphabet, Apple and Microsoft in analyzed period of 2013-2015. Author also tried to compare P/E values with other competitors such as Facebook and Yahoo but the graph became much less comprehensible since P/E values of those two companies are on different level e.g. Facebook hitting P/E of up to 6500. This is due to low earnings and possible bubble in their prices. Current (Q1'16) value of P/E ratio for GOOGL is 33.93 while industry averages 46.5. Thus Alphabet is underperforming the industry with possible explanation is in next article.

Chart 2 P/E Ratio comparison of Alphabet, Microsoft and Apple



Source: Ycharts.com, own processing

4.3.3.1.2 Price to Book Value Ratio

The Price to Book Value (PBV) ratio is similarly as P/E ratio one of the most used ratios thanks to its simplicity. It is easily interpreted as “How much is investor willing to pay for USD 1 of company equity.”

Below is a table of calculated PBV ratio values there is noticeable peak in the beginning of year 2014 with return to previous values later on during mid 2015 followed by growth in towards end of the year 2015. If analyzed in detail – massive decrease happened in April of 2014 due to “dividend” in a form of a stock split. To save space author decided not to add comparison with other companies in this and following ratios since graphs would otherwise take up too much space in this thesis. Comparison of current data to current industry average will be done instead. In case of PBV ratio current (Q1’16) of GOOGL is 4.34 and industry average being 5.76 therefore Alphabet underperforms industry, this is due to a fact that lately Alphabet spread its business over multiple industries thus averaging less.

Table 9" Alphabet's Price to Book Value Ratios

	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
P/BV ratio	3.75	4.31	4.13	3.48	3.41	4.68

Source: Alphabet's financial statements, own processing

4.3.3.1.3 Return On Assets ratio

The Return On Assets Ratio (ROA) is an indicator of how profitable company is relative to its total assets. In general it gives comprehensive idea of how well management employs assets of the company. In case of Alphabet we can see the values in table below. However it is important to put the numbers into context since each industry has its specifics especially regarding asset requirements. Therefore is important to state that current (Q4'15) ROA for Alphabet is 11.48% and industry average is 9.25% which means Alphabet performs better than the industry in its asset effectiveness.

Table 10 Alphabet's Return On Assets

	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
ROA ratio	12.6%	12.8%	11.7%	11.8%	11.5%	11.5%

Source: Alphabet's financial statements, own processing

While the table above shows 1% decreases in ROA over period of 3 years it has to be mentioned that in 2011 and 2012 ROA was at 15.5% meaning almost 3% decline between 2012-2013. Author suggests that this decrease is due to aggressive acquisition policy that increased overall assets while those assets were not in productive time of cycle – therefore lowered ROA.

4.3.3.1.4 Price to Sales Ratio

The Price to Sale (PS) ratio similarly to previous two ratios evaluates how much investor value \$1 of company's sales. The biggest benefit of PS ratio is that it can provide accurate information even if company is in loss and that PS ratio is not sensitive to different accounting methods.

Below are displayed PS ratios for observed period. Similarly to previous two ratios after a peak in fourth quarter of 2014 there is a sudden decline only to be followed by intense growth on third quarter of 2015 (not displayed on table – available in detailed analysis). Current (Q1'16) value for GOOGL is 7.09 while industry average is 8.36 meaning Alphabet is underperforming the industry.

Table 11 Alphabet's Price to Sales Ratios

	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
P/S ratio	6.00	7.47	6.56	5.52	5.38	7.19

Source: Alphabet's financial statements, own processing

4.3.3.2 Liquidity Ratios

Theoretical background of liquidity ratios was already described in more detail in theoretical part of this thesis. Simply said liquidity ratios determine the margin of safety the company has regarding coverage of short-term debts.

4.3.3.2.1 Current Ratio

The current ratio describes ability of a company to cover short and long term obligations. This is done by comparison of current assets versus current liabilities. For Alphabet the ratios in observed period are as displayed in table below.

Table 12 Alphabet's Current Ratio

	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
Current ratio	4.36	4.58	4.55	4.69	4.85	4.77

Source: Alphabet's financial statements, own processing

Results show that current ratio remains around 4.6 almost whole period with small increase by 1 in second quarter 2015. Industry average is 5.25 therefore Alphabet underperforms market. That being said if analyst investigates in more detail it is obvious that before 2013 Alphabet had current ratio as high as 11.5 (Q3'09) therefore author suggests this decline of current ratio is effect of transforming the whole structure of company and acquiring businesses also outside "search engine" business.

4.3.3.2.2 Acid / Quick Test ratio

On similar basis as current ratio another of liquidity ratios will be applied. This time it is the acid ratio. The acid ratio is believed to be more robust than current ratio since it only accounts for highly liquid assets (short-term). In more depth acid ratio was also described in theoretical part.

In observed period we can see the results in table below.

Table 13 Alphabet's Acid Ratio

	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
Acid ratio	4.43	4.28	4.14	4.49	4.6	4.5

Source: Alphabet's financial statements, own processing

Results show that Alphabet's acid ratio is stable with values around 4.5 where industry average is 1.43 therefore Alphabet is highly outperforming its competitors in the industry. After examining data also outside of observed period it is clear that similarly to values of current ratio – values were almost double previous to 2011. Author suggests same reasoning as in case of current ratio.

4.3.3.3 The Du Pont System

The Du Pont system is based on assumption that performance can be easily measured by use of operating efficiency, asset use efficiency and financial leverage. This theory is described in more detail in theoretical part of this thesis. Using mentioned components Return on Equity (ROE) is calculated. Individual components results won't be reviewed to focus on bigger picture – ROE.

Table 14 Alphabet's Return On Equity

	Q2'13	Q4'13	Q2'14	Q4'14	Q2'15	Q4'15
Return On Equity	16.2%	16.1%	14.8%	14.9%	14.4%	14.6%

Source: www.tradingview.com, own processing

In the table above are results of ROE for Alphabet within observed period. ROE shows declining trend with stabile ROE from second quarter 2014 until present (Q4'15). However analysis of longer period (10 years) reveals that before 2012 ROE was between 19-23%. Author suggests that this is due to aggressive acquisition policy of Alphabet (then Google) after 2012.

4.4 Technical Analysis

Theoretical information regarding technical analysis was already described in theoretical part of this thesis. Short summary will follow to highlight key aspects analyst should keep in mind.

Technical analysis is based on three key assumptions.

- Market discounts everything
- Prices moves in trends
- History tends to repeat itself

These key assumptions are further reflected in chosen methods of technical analysis and help analyst to comprehend application and results of analysis.

Technical analysis will be performed on “observed period” of 3 years (2013 – 2014- 2015). Only GOOGL stock will be observed since GOOG class C stock moves in the same manner since the split and is valued only similarly. This time period was chosen since it gives information on recent trends and therefore can help reader with investment decision timing right after being published. Also this period does not include crisis of 2008 that would make overall numbers too volatile. If needed also different period of time will be analyzed for special purposes such as – long time trends analysis.

4.4.1 Alphabet’s Historical Trends

Alphabet Inc. or Google Inc. as was the company named before 2015 went public on august 19th of 2004 when 19,605,052 shares were offered at a price of \$85 per share (traded at \$50 after release). Meaning the company went public only 4 years after being founded. Since then Alphabet’s market capitalization went up by 880%. Reasons for such development were already described in previous parts of this thesis.

Below is chart of Alphabet’s price since 2004 until early 2016. In this chart are highlighted approximate levels of support and resistance. It is clear that from 2004 till 2008 Alphabet was growing , reaching price of \$350 in late 2008 only to be followed by steep year long fall to \$150 in December of 2009. Author suggests that this year long decline in price was caused by recession of the whole economy. However the trend

reversed into strong uptrend in December of 2009 followed by period of volatility between 2010 and 2012 only to be followed by steep uptrend until nowadays (Q4'15).

Chart 3 Alphabet's Historical Trendlines (2004-2016, monthly)



Source: www.tradingview.com , own processing

4.4.2 Alphabet's Current Trends

For analysis of current trends was chosen period of past 3 years (2013-2014-2015) since this period was also analysed in fundamental analysis – therefore should provide additional information on which investment decision can be made.

In the chart below is displayed candlestick chart for Alphabet in period of last 3 years. Levels of resistance and support are highlighted with thin green line while general trend is marked by thick black line. Author also highlighted triangular pattern (red triangle) from early 2014 to mid 2015. In general observed period is characterised by uptrend (2013-2014) , horizontal movement (2014 – mid 2015) followed by strong uptrend (mid 2015 – onwards)

Chart 4 Alphabet's Current Trends (2013-2015, monthly)



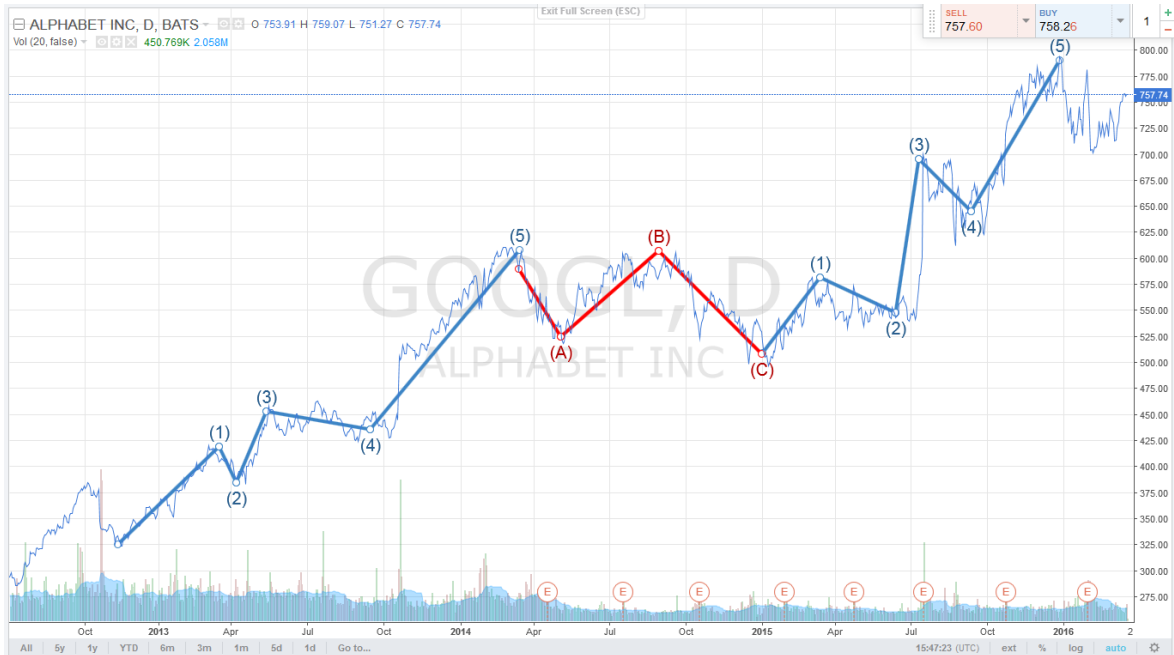
Source: www.tradingview.com , own processing

4.4.3 Elliott Wave Theory

The Elliott wave theory suggests that price movement chart consists of waves that incorporate three impulse waves and two corrective waves (5-3 pattern). Important fact is that Elliott waves are fractals and therefore can be applied without scale limitation. In more detail is Elliot's Wave Theory described in theoretical part of this thesis.

Below is displayed authors application of Elliott's Wave Theory onto three year price chart where blue line is impulse part of the wave and red is corrective part of the wave.

Chart 5 Elliott Wave Theory Application 2013-2015



Source: www.tradingview.com , own processing

On the next chart is highlighted scaled down fractal of Elliot’s Wave with impulse part being orange and corrective red. Important is that fractal approximately fits the length of the third impulse wave of longer period Elliott’s Wave.

Chart 6 Elliott Wave Theory Application - short term



Source: www.tradingview.com , own processing

After analysing observed period with focus onto Elliot's Wave Theory it is obvious that in December 2015 prices hit high (end of impulse part of cycle) and will contract (corrective waves) before another impulse period will start.

Latest results show that impulse part should start around first quarter of 2016 possibly by breaking \$ 800 price level.

4.4.4 Moving Averages Convergence Divergence (MACD)

Moving averages convergence divergence or shortly (MACD) is a technique used to determine direction and strength of a trend. Its calculation was already described in detail in theoretical part of this thesis. For practical period of 2013 -2015 will be used.

Below displayed is observed period with MACD displayed in lower part of chart where orange line represents 26 day Simple Moving Average (SMA) and blue line represents 12 day SMA. In the chart are highlighted significant crossovers between moving averages by red dots with exclamation marks inside. These crossovers indicate trend reversals in price.

Chart 7 Alphabet's MACD



Source: www.tradingview.com , own processing

It has to be said that author was positively surprised by degree of prediction MACD offered since chosen MACD periods provided early signals of trend reversals. Of course that in periods of low activity or extreme volatility these indicators become less effective.

4.4.5 Relative Strength Index (RSI)

The Relative Strength Index (RSI) is a technical momentum indicator that focuses on recent losses and gains to determine if stock is overbought or oversold.

In chart below in its lower part is displayed Alphabet's RSI. As a channel is used 70 for upper and 40 for lower trendline. It is obvious that in most cases crossover over 70 line was correct signal for trend change since stock was overbought. Only exception happened in late 2013 till first quarter of 2014 when market carried on bullish trend despite obvious signals of being overbought.

Chart 8 Alphabet's RSI



Source: www.tradingview.com , own processing

4.4.6 Stochastic Oscillator

The Stochastic Oscillator is a tool of technical analysis that is based on assumption that in bullish market prices close high and in bearish market prices close low. On this

basis K and D indicators are calculated where for purposes of observed period – computation period for K is 14 days and for D is 3x period of K. For illustrative purposes author also decided to include stochastic oscillator with 30 day period.

In the chart below in its middle part D is done by blue color and K is by orange color. For analyst the crossovers between D and K are the most important aspects. It is clearly visible that longer periods used for calculation are easier to read but might omit some weak signals. Therefore using short period (e.g. 14) might lead to faster reaction to the market but also misjudging the situation.

Chart 9 Alphabet's Stochastic Oscillator



Source: www.tradingview.com , own processing

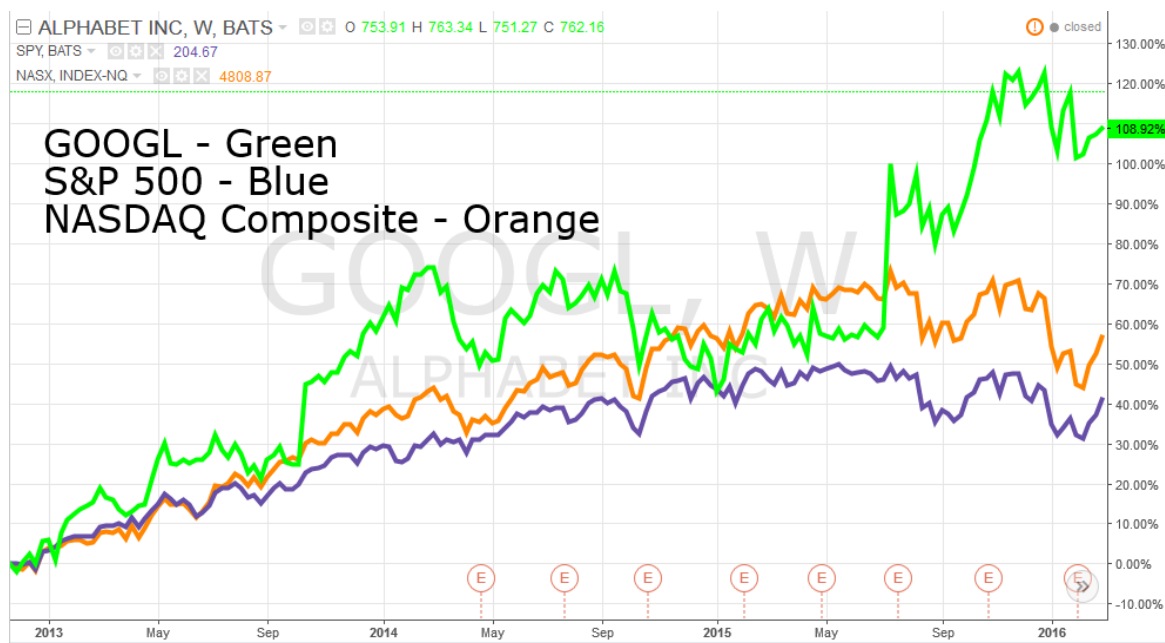
4.4.7 Alphabet vs. Market

Of course Alphabet's stock is not the only securities traded. That is why author decided to also compare Alphabet's stock with market. For this comparison was chosen Standard and Poor's 500 and NASDAQ Composite Index.

Chart below displays all three charts next to each other. Observed period is the same as in previous chapters 2013-2015. Important fact is that vertical scale is in percents of change on weekly basis, this was done in order to fit charts to common scale since

currently (Q4'15) SP500 is around 200 , GOOGL at 750 and NASDAQ around 4800. Another important thing to know about the chart is that all three components start on a same level of 0%.

Chart 10 Alphabet vs. Market



Source: www.tradingview.com , own processing

On this chart analyst sees that S&P500 rose in three years by 40% , while NASDAQ Composite rose by 57% and finally Alphabet’s GOOGL rose by 109%. By comparing the graphs it is obvious that trends for observed period are the same. In fact while two used indices almost copy each other with NASDAQ being approximately 20% better of than S&P500 , Alphabet still outperforms both indices. Therefore e.g. random walk theory would be less effective than investing solely into Alphabet’s stock.

Alphabet’s ability to outperform indices is characterised by its Beta which is used to describe volatility of stock compared to market. Alphabet’s Beta currently being at 0.9 meaning Alphabet’s reaction to market changes shows only by 90% of movement on the Alphabet’s price.

4.5 Psychological Analysis

In this thesis main sources of information are fundamental and technical analysis. Psychological analysis will be also used but only with caution. High level of caution has to

be used since psychological analysis and in this thesis employed behavioural finance methods have high degree of concern regarding objectivity of analyst. Similarly to learning curve of fundamental/technical analyst – inexperienced analyst using theoretical approaches can end up with somewhat confusing results.

Based on information summary gathered in theoretical part each concept will be questioned by author whether there might be risk. This is also reason why this behavioural part is towards the end of this thesis – in time when author gathered and analysed data needed.

- **Anchoring** – Author believes that there is a high possibility that people anchored alphabet as IT giant with infinite possibilities – but since Alphabet went through transformation, this is not entirely true.
- **Confirmation and hindsight bias** – Possible since in fundamental part it has been proven that despite growth the price grows faster. Also Alphabet is more visible since it now competes on various markets – therefore it is easier to find “good news”.
- **Herd behaviour** – Since 2013 Alphabet’s stock price went up 3 times and are still growing. This suggests that lot of people might be taking a ride “up”. Such a obvious development runs a risk of creating a bubble. As the saying suggests: “when a shop clerk tells you that stock is going up – it is time to get out”
- **Overreaction and availability bias** – Suggests that people overreact to good news and disregard bad news even though companies with bad reputation outperforms others with good reputation. This clearly might be case of alphabet since there is lot of positive hype around the company.

Above mentioned are the concepts that come into play when deciding whether to invest or not. Most of these concepts are based on game theory and mostly one of its concepts “Hawk and dove” game that suggests that strategy should depend on if there are majority of hawks or majority of doves.

5 Evaluation of Results and Discussion

After completing all analyses it is time for a summary of achieved results since the practical part is 30 pages long and reader might lose track of what was result 30 pages back. Author will also add his own interpretation of results and their use for investment evaluation. Interpretation of results is one of the most challenging tasks for analyst since it can be based on bias as mentioned in chapter of behavioral finance or any other subjective reason. Also it has to be mentioned that not all methods described in theoretical part were used in practical part since they did not provide any important additional information and more importantly analyst should concentrate on evaluation of major methods not to be overwhelmed by “noise”.

5.1 Results of Fundamental Analysis

For purposes of this thesis both long term and shorter term periods were analyzed with focus on recent 3 years as basis for investment decision.

On basis of fundamental horizontal and vertical analysis were not found any irregularities and Alphabet’s structure remains relatively same even though there are effects of decreasing relative revenues and debt but in absolute values these numbers remain the same or increase disproportionately to overall Alphabet’s growth that is characterized by over 50% in observed period of 3 years.

It is important to note that due to transformation from Google Inc. into Alphabet Inc. – operations of whole conglomerate changed since they started to move from relatively capital non intensive to capital extensively intensive fields such as biotech , engineering, manufacturing and life sciences. Meaning Alphabet dissolved lot of its excess cash/cash equivalent reserves into such projects. However according to financial statements horizontal and vertical analysis there was not found any sign of instability.⁵⁹

As from the point of view of various ratios Alphabet performs close to industry averages. Exception that caught eye of author was rising P/E ratio that is possible indicator of stock being overpriced which is in contrast to PBV ratio. On the other hand PBV ratio is

⁵⁹ *How Google's Transformation to Alphabet Will Impact Shareholders* , Investopedia[online]. [cit. 2016-03-29]. Retrieved from: <http://www.investopedia.com/articles/investing/081115/how-googles-transformation-alphabet-will-impact-shareholders.asp>

lower thanks to recent transformation and diversification of businesses. Making purely ICT oriented businesses averaging more than Alphabet.

Results of fundamental analysis lead author to conclusion that Alphabet performs well, but its price seems to be too high especially taking into account its transformation.

5.2 Results of Technical Analysis

In technical analysis long term and short term trends were analyzed. In a long run Alphabet shows bullish behavior especially in periods 2004-2008 and 2013-2015 with a horizontal movement in between. In detail was examined observed period of 2013-2015 which shows strong bullish tendency.

Using Elliott Wave Theory was identified end of impulse period and beginning of trend reversal by two contraction waves towards first quarter of 2016. Based on identification of Elliott Wave we can assume that next impulse waves will start in April/May of 2016.

Using Moving Averages Convergence Divergence (MACD) was determined that current downtrend is not favorable for entering market. Interestingly Relative Strength Index is in normal band signaling no overbought or oversold situation despite authors fear of being overbought. Stochastic oscillators used show no strong signals and in short term show slight downward trend. However since Elliott's Wave Theory predicts that April will be still influenced by corrective period of wave, it probably will be time when MACD and RSI will signal good buying opportunities.

Compared to market Alphabet shows higher percentage growth than both Standard and Poors 500 and NASDAQ Composite index despite Alphabet's beta ratio being 0.9 meaning its price movements should be damped compared to market. Thus making Alphabet a good investment when applying Random Walk Theory in a long run.

5.3 Results of Psychological Analysis

Psychological analysis was used only marginally in this thesis for a simple reason of extremely difficult interpretation that is highly dependent on analyst.

Author was therefore trying to be as objective as possible when identifying possible pit falls of investing into Alphabet Inc. Probably the biggest risk identified was

getting emotional with the stock and the company it represents along with herding represented by public knowledge that Alphabet is a “good investment” and as many experienced analysts tell “when your barbers talks about stock going up – it is time to get out”.

Overall the psychological analysis suggests there is high risk of stock being overvalued.

5.4 Risk Factors and Future of Alphabet Inc.

When analyzing a stock of a company it is important to realize what possible risks is the company facing both now and in the future since such risks could negatively influence performance of the company and thus price of its stock.

In part of practical part author reviewed the company and concluded that Alphabet’s economy is stable. However there are certain as risks. First of all author identified risk of lowering effectiveness of company’s assets due to transformation and diversification. Of course that diversification is a way of decreasing risk , however risk comes hand in hand with profits that are in some of Alphabet’s companies questionable.

Among risks that Alphabet and mainly its core business Google is facing are politics and their leverage through e.g. policy making. Google is currently often criticized for handling of personal information about his users for commercial purposes or for security purposes on governmental level. Such security concerns might even lead to forbidding Google’s services in some countries as previously happened in China after Google did not comply with governments request to access user data leaving Chinas huge market to Baidu.

Another risk for Alphabet and its core business are its competitors e.g. Apple that could take away customers / users from Google. In this way Apple has quite aggressive policy where it is vendor locking its users by developing products that are on purpose incompatible with mainstream devices. One would think it is only hardware but in fact Apple is even starting its own search engine business.

Yet another possible risk is new technology that would make Alphabet’s core business obsolete. Even though author deems this a low risk especially since Alphabet is

essentially a technology firm that has buying off new technologies as a part of its business model.

Biggest risk author sees is associated with fact that Alphabet is not paying any dividends which is not a problem on its own but its reasons might be. The management control is both a weakness and a strength since founders of the company hold majority of votes and have control over the company they can follow their own goals without being questioned by shareholders. This could lead into extreme situations such as becoming extreme philanthropists and destroying the company in process. Of course that this would be extreme case that is unlikely but diverting profits to other than reinvestment purposes would decrease overall profitability.

One of the risks that was not yet mentioned is of course failure of data interpretation by analyst – in this case author. To prevent this from happening author spent extensive time studying quantitative and qualitative information on the subjects described in this thesis. However long time experience with stock market is a virtue author can offer only to a limited extent, which also has its positives.

After summarizing risks Alphabet is or potentially will be facing is necessary to conclude that nowadays (Early 2016) future of Alphabet is looking bright based on stable economy, large investments into research and development and fact that Alphabet is pioneering in many new fields yet to be harnessed such as autonomous cars, advanced robotics and innovative health care.⁶⁰

Author decided that only evaluation metric that can be used without any bias will be weighing of individual results of each analysis. This seemingly easy task has one pitfall, choosing correct weighs for analysis. Author decided to use “1 point” as a weigh of every analysis, results follow.

⁶⁰ *Google Stock: Alphabet Inc Just Won the Biggest Bet in Technology* , Profitconfidential[online]. [cit. 2016-03-29]. Retrieved from: <http://www.profitconfidential.com/stock/google-stock-alphabet-inc-just-won-the-biggest-bet-in-technology/>

Table 15 Results Evaluation

Evaluation of results		Recommend investment?	
Analysis	Evaluation Metric	Yes	No
Fundamental	Reputation		1
	Vertical	1	
	Horizontal	1	
	P/E ratio		1
	P/BV	1	
	ROA	1	
	P/S		1
	Current r.	1	
	Acid r.	1	
	ROE	1	
Technical	Current trend		1
	Elliott Wave		1
	MACD		1
	RSI	0.5	0.5
	Stochastic Oscillator	1	
	Vs. Market		1
Psychological	Overall		1

Results			
Fundamental	Technical	Psychological	OVERALL
4	-3	-1	0

Source: Own processing

The results of evaluation are quite surprising. Despite authors best effort to avoid any sort of bias, the result scores zero points out of +/-17 maximum points. The result speaks for itself. The result does not offer any recommendation for buy or sell, therefore recommendation is not to buy. If stock is already in portfolio, it is recommended to hold and wait for future signals.

Overall result is that GOOGL stock is currently overvalued and investment is therefore not recommended since it is expected that stock will be bearish in following month or two. In two months time, it will be time for reconsideration and possible investment since bullish behavior is expected.

6 Conclusion

After evaluation of all results from fundamental, technical and psychological analysis, the decision whether to invest or not to invest into Alphabet's stock boils to a question of whether investor plans to make a short term or a long term investment.

In the case of short term investment investing into Alphabet's stock is not recommended based on current price and situation on the market where further 1 or 2 months of possible contractions and volatility are expected. However after this period, re-evaluation is recommended since impulse waves are expected with possible break through \$800 price level.

Short term signal: SELL

However in the case of long term investment Alphabet starts to make more sense, if investor uses facts mentioned in previous paragraph and waits for a favourable price to buy. Proving classic investor saying "*patience is a virtue*". Alphabet makes a viable long term investment since it in general outperforms markets and shows steady growth and stable fundamentals.

Long term signal: HOLD

This thesis had a simple goal of providing complete answer to: "*Are Alphabet's stocks nowadays a viable investment?*" using fundamental, technical and psychological analysis. Since technical and fundamental analysis results are contradictory it has to be stated that: Investment into Alphabet Inc. based on results collected is inconclusive since it does not offer simple answer whether to invest or not. Future re-evaluation is recommended (only adding new up-to date data). For further stock analysis author would suggest stock that is less "known" to public since many analysts agree on selling stock "*When even your barber recommends it.*"

7 References

7.1 Books

BODIE, Zvi, Alex KANE a Alan J MARCUS. *Investments*. 3rd ed. Boston: Irwin McGraw-Hill, c1996. ISBN 02-561-4638-1.

BREALEY, Richard A, Stewart C MYERS a Franklin ALLEN. *Teorie a praxe firemních financí*. 2., aktualiz. vyd. Překlad Vladimír Golik, Zdeněk Mužík, Liběna Stiebitzová. Brno: BizBooks, 2014. ISBN 978-80-265-0028-5.

BULKOWSKI, Thomas N. *Fundamental analysis and position trading: evolution of a trader*. Hoboken: WILEY, 2013. Wiley trading series. ISBN 978-1118464205.

FRASER, Lyn M a Aileen ORMISTON. *Understanding financial statements*. 6th ed. Upper Saddle River, N.J.: Prentice Hall, c2001. ISBN 01-302-7782-7.

CHEN, James. *Essentials of technical analysis for financial markets*. Hoboken, N.J.: John Wiley, c2010. Essentials series. ISBN 978-0-470-53729-9.

JÍLEK, Josef. *Akciové trhy a investování*. 1. vyd. Praha: Grada, 2009. Finanční trhy a instituce. ISBN 978-80-247-2963-3.

JOHN ALLEN PAULOS. *A mathematician plays the market*. London: Penguin, 2004. ISBN 978-014-1012-032.

MOYER, R, James R MCGUIGAN a Ramesh P RAO. *Fundamentals of contemporary financial management*. 2nd ed. Eagan (Minn.): Thomson South-Western, c2007. ISBN 978-0-324-23596-8.

VESELÁ, Jitka. *Investování na kapitálových trzích*. Vyd. 1. Praha: ASPI, 2007. ISBN 978-80-7357-297-6.

WÄRNERDYD, Karl. *Stock-market psychology: how people value and trade stocks*. Cheltenham, UK [u.a.]: Elgar, 2001. ISBN 18-437-6218-8.

7.2 Online Sources

Dow Theory , Investopedia[online]. [cit. 2016-03-29]. Retrieved from:

<http://www.investopedia.com/university/dowtheory/>

Elliott Wave Theory, Investopedia [online]. [cit. 2016-03-29]. Retrieved from:

<http://www.investopedia.com/articles/technical/111401.asp>

GOOG vs. GOOGL: Everything You Need to Know About the Google Stock Split,

Investorpalace [online]. [cit. 2016-03-29]. Retrieved from:

<http://investorplace.com/2014/07/goog-google-stock-split/#.Vvr2inpFqAJ>

Google Stock: Alphabet Inc Just Won the Biggest Bet in Technology ,

Profitconfidential[online]. [cit. 2016-03-29]. Retrieved from:

<http://www.profitconfidential.com/stock/google-stock-alphabet-inc-just-won-the-biggest-bet-in-technology/>

Here Are The Nine Companies Under Alphabet Inc., Investopedia [online]. [cit. 2016-03-

29]. Retrieved from: <http://www.androidheadlines.com/2016/01/nine-companies-alphabet-inc.html>

How Google's Transformation to Alphabet Will Impact Shareholders ,

Investopedia[online]. [cit. 2016-03-29]. Retrieved from:

<http://www.investopedia.com/articles/investing/081115/how-googles-transformation-alphabet-will-impact-shareholders.asp>

Income Statement, Investopedia [online]. [cit. 2016-03-30]. Retrieved from:

<http://www.investopedia.com/terms/i/incomestatement.asp>

Larry Page explains Google's transformation to Alphabet, Telegraph [online]. [cit. 2016-

03-29]. Retrieved from: <http://www.telegraph.co.uk/finance/11795715/Larry-Page-explains-Googles-transformation-to-Alphabet.html>

What You Need To Know About Google's P/E Ratio , Investopedia[online]. [cit. 2016-03-

29]. Retrieved from: <http://www.investopedia.com/articles/investing/040215/what-you-need-know-about-googles-pe-ratio.asp>

7.3 Appendices

	Appendix 1 Alphabet's Quarterly Consolidated Statement of Income (2013-2015)											
	Q1'13	Q2'13	Q3'13	Q4'13	Q1'14	Q2'14	Q3'14	Q4'14	Q1'15	Q2'15	Q3'15	Q4'15
Revenues	\$ 12,951	\$ 13,107	\$ 13,754	\$ 15,707	\$ 15,420	\$ 15,955	\$ 16,523	\$ 18,103	\$ 17,258	\$ 17,727	\$ 18,675	\$ 21,329
Costs and expenses:												
Cost of revenues	5,136	5,195	5,409	6,253	5,961	6,114	6,695	6,921	6,356	6,583	7,037	8,188
Research and development	1,617	1,766	1,821	1,933	2,126	2,238	2,655	2,813	2,753	2,789	3,230	3,510
Sales and marketing	1,435	1,583	1,628	1,908	1,729	1,941	2,084	2,377	2,065	2,080	2,223	2,679
General and administrative	1,015	1,098	1,135	1,184	1,489	1,404	1,365	1,593	1,637	1,450	1,477	1,572
Receivable under reverse repurchase agreements	9,203	9,642	9,993	11,278	11,305	11,697	12,799	13,704	12,811	12,902	13,967	15,949
Income from operations	3,748	3,465	3,761	4,429	4,115	4,258	3,724	4,399	4,447	4,825	4,708	5,380
Interest and other income, net	134	236	14	112	357	145	133	128	157	131	183	(180)
Income from continuing operations before income taxes	3,882	3,701	3,775	4,541	4,472	4,403	3,857	4,527	4,604	4,956	4,891	5,200
Provision for income taxes	398	969	661	711	903	984	933	819	1,089	1,025	912	277
Net income from continuing operations	3,484	2,732	3,114	3,830	3,569	3,419	2,924	3,708	3,515	3,931	3,979	4,923
Net (loss) income from discontinued operations	(182)	454	(193)	(506)	(198)	(68)	(185)	967	-	-	-	-
Net income	\$ 3,302	\$ 3,186	\$ 2,921	\$ 3,324	\$ 3,371	\$ 3,351	\$ 2,739	\$ 4,675	\$ 3,515	\$ 3,931	\$ 3,979	\$ 4,923
Less: Adjustment: Payment to Class C capital shareholders	-	-	-	-	-	-	-	-	-	(522)	-	-
Net income available to all shareholders	\$ 3,302	\$ 3,186	\$ 2,921	\$ 3,324	\$ 3,371	\$ 3,351	\$ 2,739	\$ 4,675	\$ 3,515	\$ 3,409	\$ 3,979	\$ 4,923
Basic net income (loss) per share of Class A and B common stock:												
Continuing operations	\$ 5.28	\$ 4.11	\$ 4.67	\$ 5.72	\$ 5.30	\$ 5.06	\$ 4.32	\$ 5.46	\$ 5.16	\$ 4.99	\$ 5.80	\$ 7.16
Discontinued operations	(0.28)	0.68	(0.29)	(0.76)	(0.29)	(0.10)	(0.27)	1.43	-	-	-	-
Basic net income per share of Class A and B common stock	\$ 5.00	\$ 4.79	\$ 4.38	\$ 4.96	\$ 5.01	\$ 4.96	\$ 4.05	\$ 6.89	\$ 5.16	\$ 4.99	\$ 5.80	\$ 7.16
Basic net income (loss) per share of Class C capital stock:												
Continuing operations	\$ 5.28	\$ 4.11	\$ 4.67	\$ 5.72	\$ 5.30	\$ 5.06	\$ 4.32	\$ 5.46	\$ 5.16	\$ 6.51	\$ 5.80	\$ 7.16
Discontinued operations	(0.28)	0.68	(0.29)	(0.76)	(0.29)	(0.10)	(0.27)	1.43	-	-	-	-
Basic net income per share of Class C capital stock	\$ 5.00	\$ 4.79	\$ 4.38	\$ 4.96	\$ 5.01	\$ 4.96	\$ 4.05	\$ 6.89	\$ 5.16	\$ 6.51	\$ 5.80	\$ 7.16
Diluted net income (loss) per share of Class A and B common stock:												
Continuing operations	\$ 5.17	\$ 4.04	\$ 4.59	\$ 5.61	\$ 5.21	\$ 4.98	\$ 4.25	\$ 5.38	\$ 5.10	\$ 4.93	\$ 5.73	\$ 7.06
Discontinued operations	(0.27)	0.67	(0.28)	(0.74)	(0.29)	(0.10)	(0.27)	1.41	-	-	-	-
Diluted net income per share of Class A and B common stock	\$ 4.90	\$ 4.71	\$ 4.31	\$ 4.87	\$ 4.92	\$ 4.88	\$ 3.98	\$ 6.79	\$ 5.10	\$ 4.93	\$ 5.73	\$ 7.06
Diluted net income (loss) per share of Class C capital stock:												
Continuing operations	\$ 5.17	\$ 4.04	\$ 4.59	\$ 5.61	\$ 5.21	\$ 4.98	\$ 4.25	\$ 5.38	\$ 5.10	\$ 6.43	\$ 5.73	\$ 7.06
Discontinued operations	(0.27)	0.67	(0.28)	(0.74)	(0.29)	(0.10)	(0.27)	1.41	-	-	-	-
Diluted net income per share of Class C capital stock	\$ 4.90	\$ 4.71	\$ 4.31	\$ 4.87	\$ 4.92	\$ 4.88	\$ 3.98	\$ 6.79	\$ 5.10	\$ 6.43	\$ 5.73	\$ 7.06

Source: Alphabet's Investor Relations at <https://abc.xyz/investor/>

Appendix 2 Alphabet's Consolidated Balance Sheets Quarterly (2013-2015)

Alphabet Inc. Quarterly Consolidated Balance Sheets (In millions, except share and par value amounts which are reflected in thousands, and par value per share amounts); unaudited)	Q1'13	Q2'13	Q3'13	Q4'13	Q1'14	Q2'14	Q3'14	Q4'14	Q1'15	Q2'15	Q3'15	Q4'15
Assets												
Current assets:												
Cash and cash equivalents	\$ 15,375	\$ 16,164	\$ 15,242	\$ 18,898	\$ 16,639	\$ 19,620	\$ 15,605	\$ 18,347	\$ 16,976	\$ 18,453	\$ 18,068	\$ 16,549
Marketable securities	34,723	38,268	41,281	39,819	42,740	41,584	46,552	46,048	48,460	51,327	54,689	56,517
Total cash, cash equivalents, and marketable securities (including securities loaned)	50,098	54,432	56,523	58,717	59,379	61,204	62,157	64,395	65,436	69,780	72,767	73,066
Accounts receivable, net of allowance	7,612	7,321	7,921	8,882	7,827	8,321	8,237	9,383	8,584	9,394	9,749	11,556
Receivable under reverse repurchase agreements	700	770	100	100	50	100	100	825	825	625	400	450
Deferred income taxes, net	-	-	-	-	-	-	-	-	-	-	-	-
Income tax receivable, net	164	-	270	46	91	586	342	591	109	-	287	1,903
Prepaid revenue share, expenses and other assets	3,023	3,118	2,589	3,253	2,475	2,336	2,979	3,412	3,720	3,049	2,688	3,139
Assets held for sale	-	-	-	-	3,873	3,688	3,988	-	-	-	-	-
Total current assets	61,597	65,641	67,403	70,998	73,695	76,215	78,128	78,656	78,674	82,848	85,891	90,114
Prepaid revenue share, expenses and other assets, non-current	2,175	1,882	1,775	1,911	1,698	1,962	1,990	3,187	3,501	3,308	3,236	3,181
Deferred income taxes, net, non-current	40	63	12	83	101	98	93	176	168	197	354	251
Non-marketable equity securities	1,470	1,564	1,843	1,976	2,123	2,415	2,470	3,079	4,090	4,409	4,813	5,183
Property and equipment, net	12,300	12,912	14,867	16,524	17,877	19,486	20,981	23,883	25,448	27,008	28,338	29,016
Intangible assets, net	7,324	6,558	6,290	6,066	5,317	5,234	4,744	4,607	4,380	4,213	4,023	3,847
Goodwill	10,595	11,396	11,426	11,492	14,177	14,586	15,461	15,589	15,573	15,610	15,675	15,689
Total assets	\$ 95,501	\$ 100,016	\$ 103,616	\$ 109,050	\$ 114,988	\$ 119,986	\$ 123,867	\$ 129,187	\$ 131,834	\$ 137,593	\$ 142,330	\$ 147,461
Liabilities and Stockholders' Equity												
Current liabilities:												
Accounts payable	\$ 2,094	\$ 1,758	\$ 2,124	\$ 2,453	\$ 1,623	\$ 1,345	\$ 1,368	\$ 1,715	\$ 1,688	\$ 1,315	\$ 1,549	\$ 1,931
Short-term debt	2,150	3,000	3,009	3,009	3,009	2,009	2,009	2,009	2,009	3,008	3,237	3,225
Accrued compensation and benefits	1,445	1,803	1,999	2,502	1,531	2,102	2,428	3,069	1,911	2,466	2,988	3,539
Accrued expenses and other current liabilities	3,007	3,300	3,071	3,755	3,305	3,683	3,933	4,408	4,494	4,396	4,598	4,768
Accrued revenue share	1,437	1,458	1,472	1,729	1,674	1,686	1,761	1,952	1,755	1,823	1,889	2,329
Securities lending payable	2,237	3,211	1,893	1,374	2,153	3,086	3,402	2,778	1,657	2,694	3,266	2,428
Deferred revenue	882	799	907	1,062	947	882	820	752	699	712	705	788
Income taxes payable, net	-	172	-	24	-	-	-	96	123	948	-	302
Liabilities held for sale	-	-	-	-	2,028	2,304	2,199	-	-	-	-	-
Total current liabilities	13,252	15,501	14,475	15,908	16,270	17,087	17,920	16,779	14,336	17,362	18,457	19,310
Long-term debt	2,989	1,989	2,238	2,236	3,234	3,232	3,230	3,226	3,225	2,225	1,994	1,995
Deferred revenue, non-current	79	132	125	139	103	93	154	104	93	108	133	151
Income taxes payable, non-current	2,179	2,258	2,413	2,608	2,788	2,954	3,060	3,340	3,636	3,615	3,596	3,663
Deferred income taxes, net, non-current	981	811	946	439	763	545	255	758	1,071	540	25	189
Other long-term liabilities	737	704	710	743	534	810	991	1,118	1,735	1,960	1,884	1,822
Stockholders' equity:												
Convertible preferred stock, \$0.001 par value per share, 100,000 shares authorized; no shares issued and outstanding	-	-	-	-	-	-	-	-	-	-	-	-
Class A and Class B common stock, and Class C capital stock and additional paid-in capital, \$0.001 par value per share	23,429	24,334	25,004	25,922	26,652	27,111	27,948	28,767	29,527	30,722	31,864	32,982
Accumulated other comprehensive income (loss)	356	(398)	99	125	345	502	(82)	27	(371)	(929)	(1,592)	(1,874)
Retained earnings	51,499	54,685	57,606	60,930	64,301	67,652	70,391	75,066	78,581	81,990	85,969	89,223
Total stockholders' equity	75,284	78,621	82,709	86,977	91,289	95,265	98,257	103,860	107,737	111,783	116,241	120,331
Total liabilities and stockholders' equity	\$ 95,501	\$ 100,016	\$ 103,616	\$ 109,050	\$ 114,988	\$ 119,986	\$ 123,867	\$ 129,187	\$ 131,834	\$ 137,593	\$ 142,330	\$ 147,461

Source: Alphabet's Investor Relations at <https://abc.xyz/investor/>

Appendix 3 Alphabet's Quaterly Consolidated Statement of Cash Flows (2013-2015)

Alphabet Inc. Quarterly Consolidated Statements of Cash Flows (In millions; unaudited)	Q1'13	Q2'13	Q3'13	Q4'13	Q1'14	Q2'14	Q3'14	Q4'14	Q1'15	Q2'15	Q3'15	Q4'15
Operating activities												
Net income	\$ 3,302	\$ 3,186	\$ 2,921	\$ 3,324	\$ 3,371	\$ 3,351	\$ 2,739	\$ 4,675	\$ 3,515	\$ 3,931	\$ 3,979	\$ 4,923
Adjustments:												
Depreciation expense and impairment of property and equipment	584	747	693	757	816	813	884	1,010	938	1,011	1,030	1,153
Amortization and impairment of intangible assets	315	283	281	279	270	266	663	257	239	223	218	251
Stock-based compensation expense	708	847	886	902	887	915	1,290	1,187	1,203	1,132	1,432	1,436
Excess tax benefits from stock-based award activities	(94)	(104)	(104)	(179)	(155)	(137)	(175)	(181)	(105)	(111)	(138)	(194)
Deferred income taxes	202	63	(140)	(562)	144	(282)	(360)	394	71	(221)	(416)	387
Loss (gain) on divestiture of businesses	26	(716)	(15)	5	-	-	-	(740)	-	-	-	-
(Gain) loss on marketable and non-marketable investments, net	(50)	(106)	17	(27)	(284)	(81)	(12)	(13)	16	17	(1)	302
Other	61	41	81	89	50	41	66	35	61	55	41	55
Changes in assets and liabilities, net of effects of acquisitions:												
Accounts receivable	256	(194)	(516)	(853)	267	(721)	(36)	(1,151)	698	(767)	(267)	(1,758)
Income taxes, net	(291)	221	126	532	282	(192)	487	14	827	1,123	(857)	(1,272)
Prepaid revenue share, expenses and other assets	(354)	(152)	311	(735)	(308)	827	(13)	(47)	43	19	142	(522)
Accounts payable	87	(159)	357	320	177	(163)	(127)	549	(24)	(374)	230	371
Accrued expenses and other liabilities	(1,059)	696	93	983	(1,079)	1,011	484	341	(601)	838	583	777
Deferred revenue share	(27)	35	-	246	(70)	2	104	209	(205)	84	52	408
Deferred revenue	(33)	17	92	157	23	(23)	-	(175)	(69)	25	(21)	98
Net cash provided by operating activities	3,633	4,705	5,083	5,238	4,391	5,627	5,994	6,364	6,617	6,985	6,007	6,415
Investing activities												
Purchases of property and equipment	(1,203)	(1,611)	(2,289)	(2,255)	(2,345)	(2,646)	(2,417)	(3,551)	(2,927)	(2,515)	(2,373)	(2,100)
Purchases of marketable securities	(7,834)	(14,945)	(8,964)	(13,698)	(12,082)	(12,775)	(18,335)	(13,118)	(12,568)	(20,568)	(23,091)	(18,151)
Maturities and sales of marketable securities	6,319	10,687	6,235	15,073	9,406	14,199	13,045	14,665	10,389	17,197	19,274	16,045
Purchases of non-marketable investments	(86)	(136)	(299)	(98)	(168)	(299)	(69)	(691)	(1,074)	(375)	(322)	(401)
Cash collateral related to securities lending	564	974	(1,316)	(519)	779	934	316	(626)	(1,120)	1,036	572	(838)
Investments in reverse repurchase agreements	-	(70)	670	-	50	(50)	(725)	(50)	50	200	225	(50)
Proceeds from divestiture of businesses	38	2,313	174	-	-	-	-	386	-	-	-	-
Acquisitions, net of cash acquired, and purchases of intangibles and other assets	(289)	(1,012)	(27)	(120)	(2,947)	(543)	(1,142)	(256)	(64)	(78)	(102)	8
Net cash used in investing activities	(2,441)	(3,803)	(5,818)	(1,617)	(7,307)	(1,180)	(9,327)	(3,241)	(7,304)	(5,103)	(5,817)	(5,487)
Financing activities												
Net payments related to stock-based award activities	(210)	(56)	(369)	(144)	(326)	(595)	(627)	(521)	(493)	(511)	(606)	(765)
Excess tax benefits from stock-based award activities	94	104	104	179	155	137	175	181	105	111	138	194
Adjustment Payment to Class C capital stockholders	-	-	-	-	-	-	-	-	-	(47)	-	-
Repurchases of capital stock	-	-	-	-	-	-	-	-	-	-	-	(1,780)
Proceeds from issuance of debt, net of costs	2,922	2,729	2,899	2,418	3,416	2,877	2,874	2,458	3,305	3,393	3,634	3,373
Repayments of debt	(3,323)	(2,880)	(2,701)	(2,421)	(2,423)	(3,881)	(2,877)	(2,462)	(3,308)	(3,396)	(3,637)	(3,387)
Net cash used in financing activities	(517)	(105)	(267)	32	822	(1,462)	(455)	(344)	(391)	(450)	(471)	(2,365)
Effect of exchange rate changes on cash and cash equivalents	(78)	(8)	80	3	(5)	(4)	(227)	(197)	(293)	45	(104)	(82)
Net decrease in cash and cash equivalents	597	789	(922)	3,656	(2,099)	2,981	(4,015)	2,582	(1,371)	1,477	(385)	(1,519)
Cash and cash equivalents at beginning of period	14,778	15,375	16,164	15,242	18,898	16,639	19,620	15,605	18,347	16,976	18,453	18,068
Reclassification of assets previously held for sale	-	-	-	-	(160)	-	-	160	-	-	-	-
Cash and cash equivalents at end of period	\$ 15,375	\$ 16,164	\$ 15,242	\$ 18,898	\$ 16,639	\$ 19,620	\$ 15,605	\$ 18,347	\$ 16,976	\$ 18,453	\$ 18,068	\$ 16,549

Source: Alphabet's Investor Relations at <https://abc.xyz/investor/>