

Cand.Merc. Applied Economics and Finance  
Department of Economics  
Master Thesis

# INVESTIGATION

of a new tech bubble



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Image is gathered from Fortune Magazine (2011)

Illustrating the founder and CEO of Facebook, a company that is considered to be among the biggest celebrities in the technology sector.

*“We don't get fooled again  
Don't get fooled again  
No, no!”*

The Who (1971)

# EXECUTIVE SUMMARY

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Stock prices for technology companies reached astronomical levels in 1999/2000, resulting from market speculation. The high priced companies were characterized by low and even no earnings to speak of. This thesis investigates the listed companies represented in four technology heavy indices in the U.S. based on a variety of ratios with a goal to determine overvaluation. Compared to the overall stock market, these are priced at a higher level, though not as high as for the dot-com the period. The corresponding earnings may be explained by sounder business models for these companies in the current situation.

Venture capitalists are eager to invest in technology due to the high growth and profitability opportunities. Venture capitalists' interests in technology are increasing, especially within the software sector and particularly for Internet related companies where social networking companies receive the highest investments. Based on IPOs being their most successful and profitable exit strategy, we find it plausible to assume that this increased interest will have a large impact on the public stock market.

Due to the financial crisis, a lot of private equity companies failed to exit their investments, leaving the record high investment deals in 2005-2007 still queued to be disinvested. This pipeline shadow of IPOs is also likely to have an influence on the public market when the IPO window widens due to increased liquidity in the market.

Due to the high valuation of companies soon to be listed, the thesis further investigates some of these companies within the Internet related company industry. LinkedIn went public recently, trading at a price earnings ratio of 1346 after the initial price surged from \$45 to \$94. 5, a 109 percent increase. This means that the transferred value of \$388 million from LinkedIn's existing shareholders to the new investors were made due to mispricing of the stock done by the company's underwriters. The subsequent companies have either filed, or have said that they will

file for an IPO within a short time frame; Groupon, Twitter, Zynga and Facebook. To be able to compare the companies under investigation, a price to sales ratio were computed, showing that all these companies had an over-valued market capitalization compared to the industry average. This may be a result of accepted overvaluation of these social networking companies due to a lack of benchmark companies, as this is a new type of industry.

The valuations and venture capitalist investments in later stage of development, point towards a hot market for social networking and gaming companies within the sector of technology. The subsequent high demand for such companies when entering the public market, may lead to a bubble. The high demand may in turn be explained by media attention towards these companies, the celebrity stock effect, an under-pricing of the stock done by the underwriters, herd behavior and an increase of non-professional investors entering the market.



# ACKNOWLEDGMENT

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The writing of this thesis has enabled us to get useful insight on highly relevant topics within the field of economics and finance, and it has been very interesting to apply theoretical aspects on to real life situations.

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# CHAPTER 1 - INTRODUCTION

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With the rapid expansion in implementation of information technology, companies have found ways to efficiently improve their business by benefiting from new technologies. With the birth of social networks, people and companies are now able to communicate with potentially millions of people all over the world. Not only can companies communicate directly, but also indirectly by arranging for people to share information about the company with their contacts. The strong network effects that some of the Internet companies have achieved, has led to high company valuations. We know from the previous Internet bubble, that the Internet is able to fascinate and create expectations by the development of new technological ideas and services. It is easy to be fascinated of how new technologies work, and cases of overconfidence in the new technology can lead to valuation uncertainty among investors.

The thesis is motivated by the curiosity to investigate if the development of new era technology has perceived people to overvalue Internet specific companies, and if these overvaluations have created a new dot-com bubble, or if a bubble is in the making. The topic is highly relevant in today's world, and has recently received a lot of attention in the media, as more and more companies are going public.

## Problem Statement and Research Questions

Our research aims to investigate the movements both on the listed and unlisted U.S. technology market, in an attempt to contribute to clarify the recent speculations with regards to the question of a new dot-com bubble. Our main topic of interest and problem statement is:

*Are we in, or approaching a new dot-com bubble?*

We aim to answer our main problem with the use of our research question. The research questions for this thesis are divided into two parts, and it is following:

1. *Can we find indicators from the U.S. stock market that point towards a new dot-com bubble?*
2. *And can we find behavior in the unlisted market that may indicate a new dot-com bubble?*

From the first research question we will focus solely on the companies listed in the U.S. stock market, and compare the development in fundamentals based on today and the previous bubble.

## Outline of the thesis

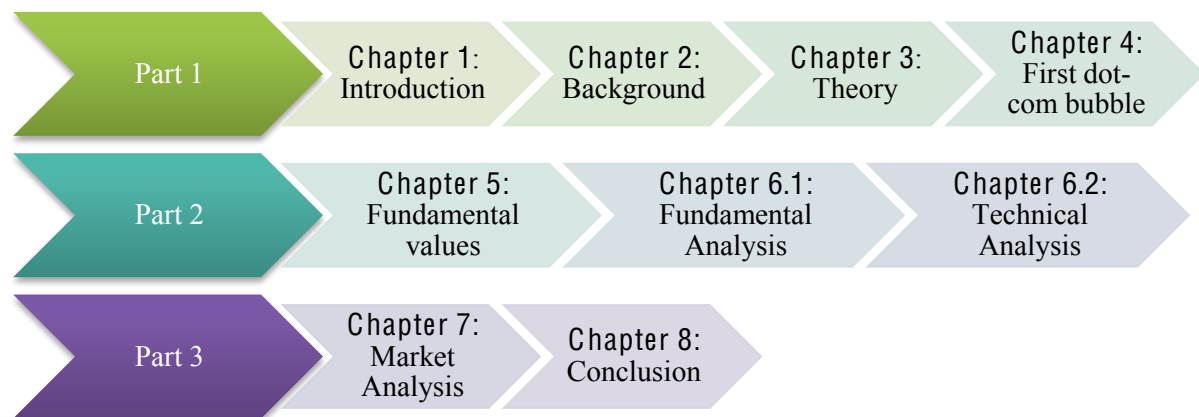


Figure 1 - The Outline of the Thesis

The thesis is structured into three parts. The first part provides the foundation of the thesis in terms of research questions and useful insights about the overall stock market and the stock market for Information Technology. The first part explains the indices of relevance and the theoretical part of a bubble going into different stages. Part 1 will also go through the theoretical framework used to support the conclusion. Within the theoretical chapter we will go into theories that are relevant for our investigation of a potential new dot-com bubble. By looking at the previous dot-com bubble we will examine different factors and mechanisms that contributed to the creation of the previous dot-com bubble as well as highlighting the perceived knowledge from the previous bubble.

In part 2 we will first provide explanations of different fundamental values that will be used in the analysis of the Internet related companies. By comparing the Internet indices to the general market we aim to investigate any irregularities, as well as identifying trends. The analysis will consist of a technical analysis where we aim to highlight the different events that had an impact on the development of the indices, as well as a fundamental analysis that will investigate the different fundamental values. By identifying trends and irregularities we aim to answer our first research question.

In part 3 we aim to shed light on the fact that the creation of the bubble not necessarily only happens for the listed companies, but it may happen within the unlisted companies as well. By looking at the movements in venture capitalist and private equity investments, number of IPOs, the development in the U.S. interest rate, as well as investigating five Internet companies, we aim to answer whether the movements outside the stock market is hot. Chapter 7 will be relying on the theories from part 1, as well as some of the factors from the last bubble. From this section of part 3 we aim to answer our second research question in order to proceed towards a conclusion. The last chapter connects the findings from the analysis with the findings from chapter 7, in order to answer our main problem statement, and to conclude if we are approaching a new bubble or if we currently are in a dot-com bubble.

## Scope and Delimitation

The subject of the thesis is broad and in order to be able to answer our research questions and problem statement we have narrowed down our scope of research. The concentrated focus aims to grasp the most important factors related to our research questions, however due to the restriction with regards to space and characters we have chosen to explicitly cover the American markets. Due to different limitations we do not take the large uncertainty in the U.S. and world economy into consideration. The thesis aims to focus primarily on the technology sector, but also to some extent the historical data and events from general market in order to create a benchmark. We do however compare historical events with the indices to see their reaction to previous events. Following the investigation in the U.S. market only, we aim to uncover a potential dot-com bubble for this market.

More specifically with regards to chapter four, our intention is not to list or describe all mechanisms and reasons for why the bubble happened, rather to highlight important mechanisms that based on research have been receiving attention, this in order to look for some similarities and differences within today's situation based on the experience from the previous bubble.

## Methodology

The main methodology used in this thesis is a quantitative method for an analysis of the companies represented in the stock market. In order to get a comprehensive picture, fundamental and technical analyses are conducted. Due to limitations in form of time, space and available information, an in debt qualitative analysis is not done. Instead, we have relied on work done by others when needed.

The thesis contains two analytical parts; the data analysis of listed companies in the U.S. and a more descriptive analysis of the market situation for newly listed and unlisted companies within

the social networking industry. For further calculations, raw data material and supplementary charts, we refer to appendix O.

The data series examined are the weekly and monthly closing levels in the main stock market indices in the technology sector in the U.S. based on the Global Industry Classification Standard (Morgan Stanley Capital International and Standard & Poor's). The indices are chosen to get an overall representation of this sector in the U.S.

Using data gathered from Bloomberg, on a monthly basis for the time frame of 1995 to 2011, we capture the run-up to the dot-com bubble and the current market situation. This is not possible for Nasdaq Internet Index (QNET) as Bloomberg could only provide recent data from 2011 hence it is charted from the first available date. To be able to see how the technology industry differs from the overall stock market, the S&P 500 index is used as a benchmark. We will also consider the Internet industry against the benchmark market, as not all technology companies are Internet companies. By solely using the Internet indices Amex IIX and QNET we will be able to differentiate, as well as look at Nasdaq Computer as a representative index for technology.

Charts are used to provide a visual display of data and help organize information. This reveal patterns between the variables and helps to compare and to see contrasts between entities. Some of the indices shown in the charts are rebased for the sake of comparison. When needed, tables are used for further evaluation and illustration.

Short- and long-term trends are, when possible, shown as moving average computed in DataStream based on 30 days and 200 days moving averages. However, this was not possible all over so when needed we compute the trends in Excel based on data from Bloomberg. Then the short-term perspective is calculated based on a monthly moving average in Excel from weekly data. The long-term trend is based on monthly observations, providing an overview of 180 days

instead of 200 days moving average. The 180 days are chosen to ease the calculations when manually computing the moving average.

The thesis contains two analytical parts; the data analysis of listed companies in the U.S. and a more descriptive analysis of the market situation for newly listed and unlisted companies within the social networking industry.

The data analysis for the listed companies is divided into technical and fundamental analysis. The technical analysis is applied to the price development in the indices under investigation to see how they respond to different economic events through time. Also index price versus earnings in the indices are examined in the light of these events. The purpose is to see if there are some differences between the markets that may indicate different responses to forthcoming events related to the current situation, where the oil price and interest rate level are of particular interest.

The fundamental analysis is applied to the different ratios we find of relevance. A number of different ratios were computed to be able to choose a range that provides us with the most comprehensive information in order to conclude on the current market situation as well as the trends in the technology market compared to the benchmark. Some commenting on the development of the ratios is done when it appears to be relevant.

With regards to the analysis of hot market in the second part, we have computed the Price to Sales ratio (PSR) based on estimates which are explained in the next section. The index average PSR is calculated with data gathered from Bloomberg, with monthly closing levels. Sharespost.com is an online market place for illiquid assets, which has provided us information in order to compute the PSR. We have chosen to use the implied valuation when available from Sharespost, as this valuation is calculated on the basis of outstanding shares and last traded share

price in the second market. Further analysis of the chosen unlisted companies in chapter seven is based on research done by neXtup, a company that is a part of Global Silicon Valley Partners. The research gives a good indication towards valuation of the companies in the second market, as these are based on information available from reliable sources such as the S-1 filings. Although the companies may be valued differently depending on who is valuating them, we found that after comparing these valuations to others done by different parties, these valuation ranges are supported by others as well. For LinkedIn, the data was gathered from Bloomberg, as this is a listed company.

Chapter seven is meant to illustrate the movements in the Internet sector, and to provide numbers based on estimates done by others. The main point is to illustrate the increased interest in Internet companies, by looking further into some of the companies which is considered pioneers and big players in the industry of social networking.

### Methodology and Limitation Critics

Two indices are generally considered as good benchmarks for the U.S. market; the Dow Jones Industrial Average (DJIA) and the Standard & Poor's 500 index (S&P 500). The DJIA consists of 30 large companies, where the average is price-weighted, representing their performance in the stock market. The S&P 500 index is a market capitalization weighted index of the 500 largest companies listed in the U.S. Based on the difference in methods of weighting as well as the number of companies, we choose to use the S&P 500 index as a benchmark for the overall representation of the U.S. stock market.

Due to lack of available accounting information for the companies in chapter 7, we chose to calculate the Price to Sales ratio in opposed to the Price Earnings ratio and the Enterprise Value compared to Revenue ratio. Most of these companies are relatively new to the business, which

also makes the PSR more suitable to use, as the ratios based on book values are suffering due to low or no earnings for companies in their early stages.

### Literature Review based on relevant theory on bubble theory:

Fama (1970) presented the market efficiency hypothesis with his article about Efficient Capital Markets. The theory contained the hypothesis that the stock market was looked upon as efficient, meaning that the stock prices reflected all available information. Burton took this further in his article where he is stating that the “stock markets are more efficient and less predictable than many recent academic papers would have use to believe” (Burton, 2003, p. 2). He also says that the prices from the past cannot explain the future prices, as the stock price tomorrow is only reflecting information of tomorrow, which again points that the development in stock prices are unpredictable. We will go further in detail both in terms of the efficient market hypothesis and the study of Burton further on in our theory chapter.

In accordance to Shiller (2002), he indicated that the days of glory for the market efficiency hypothesis was in the 1970s, and that the focus shifted in the 1990s where the field of behavioral finance did its entry. Shiller explains in his article “From Efficient Market Theory to Behavioral Finance”, the feedback model, and what he calls a price-to-price feedback theory (Shiller, 2002). A theory explaining how an increase in share price may lead to further price increase through factors as; word-to-mouth enthusiasm, public attention and people talking about new era and models that explain and justify the increase in price. This feedback goes into a loop as the further increase in price increases the demand which again increases the price. When this feedback is not interrupted, a creation of a bubble may be a fact. Shiller also notes that the feedback theory is not only creating the upside of a bubble, but also the downside as the feedback effect can effect negatively as well. The theory per se is nothing new, as Shiller illustrates with quotes showing that even in the 1600s the theory was present.



The term bubble is often used in today's society, and is often related to financial crises and speculations. Kindleberger and Aliber defines a bubble as "A bubble is an upward price movement over an extended period of fifteen to forty months that then implodes" (2005, p. 29). However in general, "Economists use the term bubble to mean any deviation in the price of an asset or a security or a commodity that cannot be explained in terms of the fundamentals" (Kindleberger & Aliber, 2005, p. 29). A bubble is important for investors as it opens the possibility to make large profits on boom state, and being able to recognize the peak of a bubble will prevent huge losses. It is important to highlight that even though a bubble may allow for revenues, it will also allow for massive losses due to a large downside.

For our thesis the focus is towards bubbles in the technology industry, and especially within Internet related companies, also known as dot-coms. The previous dot-com bubble has been examined briefly by academics and economist, among the most famous is Robert Shiller and Perkins & Perkins. They tried to explain the first dot-com bubble and how it was created. In the light of bubble theory, Shiller tried to explain the boom by psychological factors which led to the burst in his book *Irrational Exuberance*. Shiller's book has been extensively used throughout chapter 4 in order to explain the factors and mechanisms, alongside with Perkins & Perkins, another contributor describing the Internet bubble, in their book "Internet Bubble". Shiller illustrates in his book that the feedback theory was applicable explaining the boom of the bubble, and he highlight for example the media as an important contributor to the bubble, as the media initiated and delivered the message about successful increases in share prices, especially within the technology sector. With regards to Shiller, Fama, Kindleberger and Perkins & Perkins, are authors looked upon as trustworthy, and have contributed extensively to research.

The literature goes far in explaining the speculative bubbles, and Rodrigue (2006) takes it one step further by characterizing the different stages of a bubble, as a bubble is not necessarily something that happens overnight. To be able to put a bubble into system by classifying it into different stages, we rely on academic work done by Rodrigue (2006). The four main stages allow us to determine which of the stages the industry fit in to.

Books used for teaching at master degree level, base a foundation for underlying understanding of the topics emphasized on. Articles used in this thesis are mainly gathered from journals, making them great contributions towards research and different point of views within their topics of discussion. As the problem statement under investigation is evolving whilst this thesis is written, the completion of this paper is depending of information also gathered from certain web pages, for this to be up to date.

# CHAPTER 2 - BACKGROUND

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The purpose of this chapter is to provide relevant background information, elaborate on the stock market with focus on the technology market and present the different phases in a bubble.

## The Stock Market

The overall market consists of the stock market and the over the counter market. The stock market refers to the financial market where company shares, derivatives and other securities are listed on the stock exchange and traded between investors and security issuers. Different sized participants, such as governments, corporations, large hedge fund traders and banks, are involved in stock market activities.

The stock market may take form as virtual or physical arenas. This is either stock markets where trading is done electronically where traders are connected through a network of computers, or in open outcry where the traders enter verbal bids in physical locations like on a trading floor. The market acts as a marketplace and a clearing house for stock trading. A clearing house ensures the buyers and sellers that the counterpart will not default on the transaction. The stock exchanges collect and deliver securities traded, and guarantees for the payment (World Stock Markets).

## The Markets

The stock market is divided into the primary and the secondary market. The primary market is used to raise money for business, hence the market for new issues where corporations, governments and companies collect funds through issuing securities giving the investors the opportunity to invest in these securities and contributing to economic growth. The secondary market is the market where the already existing securities are traded. This also represent the dealer market, or the auction market such as an over the counter market (OTC) (World Stock Markets) .

### *The Primary Market*

The investment banks play an important role as the underwriters in the primary market, as they set the initial share price range and supervise the sales process of the company getting listed.

When a firm is going public its long-term financing, such as loans from financial institutions, are excluded from the primary market. The equity is essentially private capital that is converted into public by converting the amount into securities to common shareholders, where three different methods are available. Rights issue is offered to existing shareholders or through holding stock brokers where the right may be exercised fully, partially or not at all. If the shareholder exercises their right, the company receives capital from the shareholder in exchange for stocks and in this way raises new equity in the market (Lim, 2009). Preferential issue is a relatively faster way of raising equity by issuing shares for designated buyers, for example employees (Reuters, 2011). Initial public offering (IPO) is done when the company (the issuer) is placing its common shares in the stock market for the first time. This will be further elaborated later in the thesis.

### *The Secondary Market*

After trading in the primary market the security will enter the secondary market where an investor can buy a security directly from another investor and not directly from the issuer (Share Market Basics). The secondary market are said to be a liquid market and plays an important role due to the efficient capital market. The secondary market is divided into the dealer market for the OTC securities and the auction market referring to stock exchanges (Maps of World-2).

### *Over the Counter Market (OTC)*

Unlisted companies with, very often, small securities that do not meet the requirements of the market capitalization for being traded on a stock exchange, are traded through a dealer network instead. The dealers negotiate directly with each other using computer networks and phone to trade OTC securities. These types of securities are stocks and derivatives that are traded on the Over-the-Counter Bulletin Board (OTCBB) or on the pink sheets. The OTC market is the primary market for U.S. government and municipal bonds. Bonds are not traded on an exchange and are therefore considered as OTC securities, mostly traded, along with other debt securities,

by the investment banks. Nasdaq operates as a dealer network, but is generally not classified as an OTC market, but a stock exchange (Angel, 2004).

## The Information Technology Market in General

Information Technology (IT) can be defined as “any form of computer-based information system, including mainframe as well as microcomputer applications” (Orlikowski & Gash, 1992, p. 2). IT is a broad term used to explain the use of computers and other types of technology to transfer and share information over networks. A microcomputer application is a software application that you have on your personal computer, which allows for transferring and sharing information. One example of a software application, which contributes to discovery and sharing of information, is a web browser (e.g. Internet Explorer, Mozilla Firefox, Apple’s Safari, Google Chrome, Opera etc.). In short, a web browser connects a computer to the Internet. On the Internet we find extensive amount of companies and websites that are working for the purpose of delivering any kind of information. Mainframe is referred to a large computer with the possibility to run different applications. In order to illustrate what a mainframe computer does, we can use the example of employees in a bank. Most of the applications that run on each of the employees’ computer are processing outside the computer and from a network. This is where the mainframe computer comes in, as it is the device that actually runs the applications. The employees connect their pc through the network and get access to the application that is running on a mainframe computer.

The evolution of IT has made it possible for small companies to serve a large market, without having to have a large staff. The use of computer-based tools have allowed for easier and more efficient ways to distribute information.

An Internet-based company is a division within the IT sector where the company does most of its business on the Internet, usually through a website. Among many Internet-based companies we

have popular examples like Amazon, Google and eBay. The common denominator for these companies is that they provide some sort of information to their customers, hence they are also defined as IT companies. The evolution in the Internet-based market has led to the creation of several Internet indices, especially the NYSE AMEX Inter@ctive Week (hereafter known as the IIX, @Net or Amex), and the Nasdaq QNET index.

Technology companies, on average, enjoy high growth rates due to expectations of a more rapid growth compared to a traditional company. Even so, some technology companies do not have profits for the first ten years, characterized by losses or small profits. Bartov et.al explains this valuation of negative book value for Internet firms to be indicating investments in research and development and other intangible assets, perhaps in relation to an IPO (Bartov, Partha, & Seethamraju, 2002).

Technology companies tend to attract investors that are interested in profiting from increase in share price instead of dividends, as this sector is considered a leading sector for growth-based investments. For the companies to be able to grow, they retain dividends and reinvest profits for further expansion.

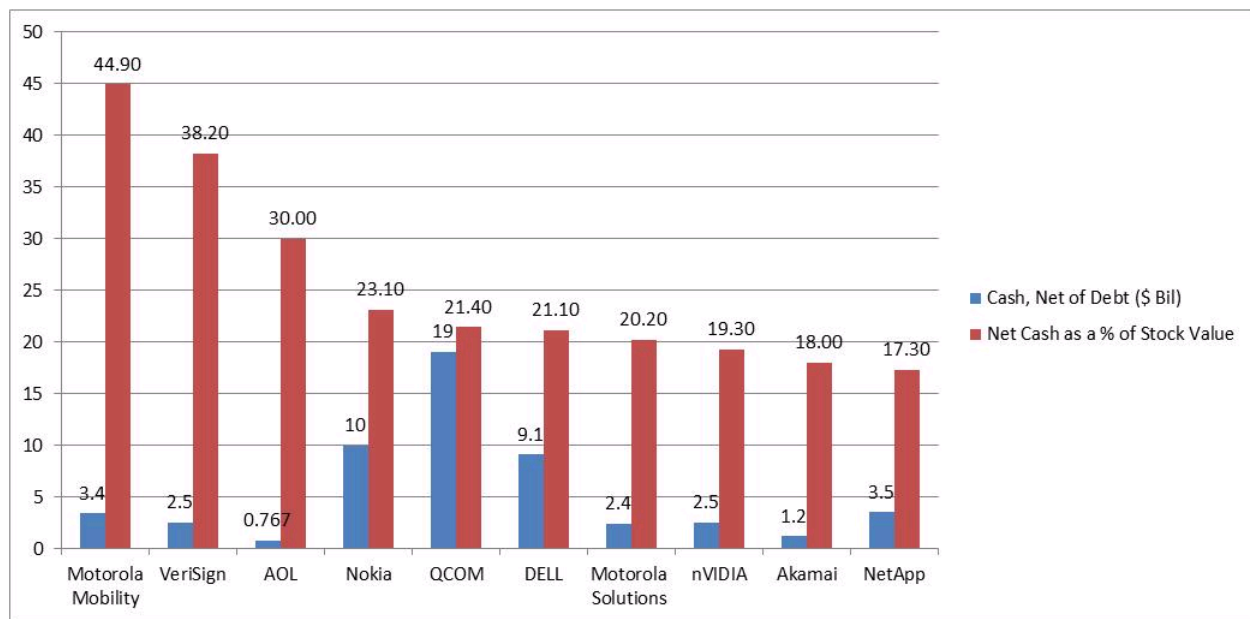
A traditional company consists of mainly tangible assets such as machinery, buildings etc, and relatively little intangible assets. Technology companies are characterized by minimal tangible assets, where the majority are intangible assets; nonmonetary assets without a physical substance, such as brand, reputation, and value of intellectual property in trademarks, software, etc. Human capital is a very important asset for a company. Intangible assets less the costs of development form a positive value under goodwill. Intangible assets and goodwill is some of the most complex assets to value, making valuations of companies in the sector difficult (Bartov, Partha, & Seethamraju, 2002).

## Solidity

Companies within the sector tend to have more cash on average than companies in other sectors. Technology companies tend to have lower debt ratios due to fewer tangible assets compared to companies in other industries. As a result, technology companies need to spend less of their income on debt payments, enabling them to build cash reserves.

The lower proportion of tangible assets allows tech companies to have a lower degree of debt, which in turn leads to lower proportion of the revenue to pay for debt. Instead many of the tech companies are able to build up large cash reserves. Large amounts of cash influence the stock price through the company's possibilities of further growth through mergers and acquisitions, research and development as well as the ability to pay dividends to shareholders. Large technology companies have enormous amounts of cash at the moment.

Figure 2 - The 10 tech firms with the largest net cash positions compared to price estimates



Source: (Nasdaq, 2011b)

In the technology sector, Internet companies have one of the highest cash contributions to stock value according to Nasdaq. These cash contributions, as a percentage of share price, amounts to 38.2 percent for VeriSign, 30 percent for AOL and 18 percent of Akamai (Nasdaq, 2011b).

Microsoft reported cash amounting \$ 40.2 billion, Google reports \$35.0 billion and Apple \$27 billion (Rosoff, 2011).

## Stock Index Calculations

Stock indices may be calculated differently based on weighting by either market capitalization (cap), price or it may be equal weighted (Bos, 2000). The market capitalization weighted index (Beabu.com-1) is also referred to as a market-value weighted index, and can also be a modified market capitalization weighted index. An individual stock in a market capitalization weighted index is given its weight proportionally to their market capitalization. This indicates that the bigger market capitalization for the individual stock, thus more influential is the individual stock on the index. Since the index is weighted based on market capitalization, it takes into account corporate actions like issues of new shares etc. This stock index calculation is the most common and is used by indices like the S&P 500. Some indices operate with a modified market capitalization, hence the market capitalization is computed from the last sale price of each share multiplied with an adjusted number of outstanding shares divided by a divisor (Nasdaq, 2011d).

Instead of weighting the shares based on market capitalization, another way is the price-weighted index. This weighting is based on the value of the stock price, meaning a stock of \$20 will receive a higher weighting than a stock of \$5. An index that is characterized by price weighing is the Dow Jones Industrial Average. However the price weighted method has some limitations as the price level is not necessarily explaining the size of the company. A high-tech company would normally have a high share price, compared to stocks from other industries (Beabu.com-2).



## Standard & Poor's

Standard & Poor's (S&P) is known to investors as a leader within credit rating, indices, investment research and risk evaluations. One of the most followed large-cap American stock indices is maintained by S&P, the S&P Composite 500 index (Standard & Poor's - about). Today S&P is a division within the McGraw-Hill company, which acquired S&P in 1966 (The McGraw-Hill Companies - Corporate History). With offices in 23 countries and a history of existence for 150 years, S&P is a well-known and respected company.

### Standard & Poor's Composite 500 index

Standard & Poor's Composite 500 index (S&P 500) is an index of the U.S. stock market first published in 1957 (Standard & Poor's - Indices). The S&P 500 targets to cover the 500 largest companies in leading industries of the U.S. Economy (S&P 500 - Fact Sheet) and is considered among the best measurement of the U.S. Equities market. The companies included in the index are selected on the basis of their market size, liquidity and sector, (Investorwords.com) and simply not just a list of the 500 largest companies by revenue or market capitalization (Fool.com). The S&P 500 index aims to be a liquid index supporting investment products like index mutual funds, exchange traded funds, index portfolios, index futures and options (Standard & Poor's - U.S Indices, 2011). In 2007 the S&P 500 index went from being a market capitalization weighted index to become float weighted, meaning that only stocks that are available for public trading are included in the index. The currently ten largest companies are presented in table 1 showing three out of ten is IT companies.

Table 1 - Top 10 largest companies by Market Cap on S&P 500

<b>Top 10 Constituents by Market Cap</b> (as of 29-Apr-2011)			
<b>Constituent</b>	<b>Symbol</b>	<b>GICS® Sector</b>	<b>Price (\$)</b>
Exxon Mobil Corp	XOM	Energy	88
Apple Inc.	AAPL	Information Technology	348.23
Chevron Corp	CVX	Energy	109.44
General Electric Co	GE	Industrials	20.45
Intl Business Machines Corp	IBM	Information Technology	170.58
Microsoft Corp	MSFT	Information Technology	26.02
AT&T Inc	T	Telecommunication Services	31.12
Procter & Gamble	PG	Consumer Staples	64.9
JP Morgan Chase & Co	JPM	Financials	45.63
Johnson & Johnson	JNJ	Health Care	65.72

Source: (Standard & Poor's - Indices, 2011)

## Global Industry Classification Standard (GICS®)

In cooperation between S&P and Morgan Stanley Capital International (MSCI) the Global Industry Classification Standard (GICS) was developed in 1999 in an attempt to provide a global standard for classifying what sector and industries each public traded company belonged to (Standard & Poor's - GICS, 2006). This eased the comparison of industries, on regional, country and on a global level. The GICS classification system looks at company performance rather than a module for tracking GDP and the economy in general. The GICS is divided into 10 different sectors, these sectors are divided into 24 industry groups, which are consequently divided into 67 industries, separated into 147 Sub-Industries. The ten different sectors are accordingly: Consumer Discretionary, Consumer Staples, Energy, Financials, Health Care, Industrials, Materials, Information Technology, Telecommunication Services, and Utilities (See Appendix A for a sector breakdown).

## American Stock Exchange

The American Stock Exchange is located in New York. The index is an auction based exchange, differing from an electronic exchange with respect to a physical trading floor where specialists are trading (Harper, 2004). The exchange has been subjected to several mergers and acquisitions; merging with Nasdaq in 1998 to become Nasdaq - Amex Market Group (New York Stock Exchange, 2011), becoming independent in 2004 (Wolkoff, Neal L, 2004) and again, in 2008, be acquired by NYSE Euronext and rebranded as, how we know it today, NYSE Amex Equities. NYSE Amex Equities is a market weighted index positioning to be a primary market for micro and small cap companies (New York Stock Exchange - Amex Equities). The range of micro-cap and small cap companies are defined to be businesses within \$50 to \$300 million for micro (Investopedia.com, 2011a) and \$300 million to \$2 billion for small cap (Investopedia.com, 2011b). NYSE Amex Equities specialize in options and exchange traded funds (ETFs), where the ETF fund consist of a variety of different securities, which together aims to represent the performance of an index. After Chicago Board Options exchange, NYSE Amex is the second largest options exchange in the U.S. with more than 500 operating companies and funds (Yahoo.com - NYSE Amex).

### Inter@ctive Week Internet Index

In a cooperation between the magazine Inter@ctive Week and The American Stock Exchange the AMEX Inter@ctive week index was created in august 1995, with the goal to create a benchmark measure for Internet related companies' performance. The index is a market value-weighted index and more specifically a modified market capitalization weighted index (Amex-1, 2011).

The Amex index consists of 36 Internet companies (See Appendix B for a detailed list), where the combination of relevant companies represent a broad range for benchmarking the fluctuations

related to the Internet industry. The index aims to measure “companies involved in providing Internet infrastructure and access, developing and marketing Internet content and software and conducting business over the Internet” (Nasdaq, 2011d). Several academic papers use the S&P500 and Amex for purpose of solid benchmarks, see Ofek & Richardson (2003) and Fong & Yong (2005) for further illustrations. The evolution of Internet companies during the first dot-com period led to an establishment of many Internet indices, however many of them is not maintained today. Some examples of other indices which exist in the U.S. today are the Nasdaq Internet Index (QNET), the Morgan Stanley Dean Witter Internet Index and Chicago Board Options Exchange Internet Index (INX).

#### Nasdaq QNET

In late 2007, the Nasdaq Internet Index (QNET) was launched by Nasdaq to track the growth of Internet companies aiming to be a benchmark for a broad range of Internet-related services. Nasdaq is known for a large share of Internet company listings. QNET consists of 67 companies (Nasdaq OMX-1, 2011), and the index is a modified market capitalization-weighted index (Nasdaq OMX-2, 2011). QNET is a price return index, which does not consider any cash dividends, and the stocks must be listed on Nasdaq Stock Market, NYSE or NYSE Amex. The index is rebalanced each quarter for the maximum weight not exceeding 8 percent and no more than five securities upholding this 8 percentage weight. The index is relatively new compared to the Amex index, hence a limitation of data for the index.

#### Nasdaq Computer Index

The Nasdaq Computer index (IXK) has existed since 1993. The index value is calculated based on a market capitalization-weighted index where securities are added or removed if a change in the Industry Classification Benchmark (ICB) is made, allowing reclassified securities to be a part of the Nasdaq Computer index (ICB, 2008). The ICB is an alternative to the GICS standard, though quite similar in structure. What differs them are a few dissimilarities in the subsectors. The ICB divides the Technology industry into Software & Computer Services and Technology Hardware & Equipment which subsequently are divided into seven different subsectors. Nasdaq Computer covers six of these subsectors omitting Telecommunications Equipments (Standard & Poor's - GICS, 2006). Even though the index covers Internet companies, it has a larger scope

including companies which is not purely Internet related. The range of companies, currently 404 companies (Nasdaq, 2011e), existing on the Nasdaq Computer index are all represented in the Nasdaq stock market.

### Short Conclusion

Evaluating the indices based on availability of data over time, as well as the number of indices components, we have decided to primarily use the Amex IIX as the representative for Internet companies in our analysis. This due to the fact that it has been present during the first bubble, and are still present today, as well as having a solid base of companies that the index follows. We have also decided to bring in the QNET index due to the amount of index components; however the availability of data is primarily from 2011. In order to cover a broader scope within the technology sector we have decided to bring in the Nasdaq Computer Index in our analysis, this in order to cover fluctuations in the technology sector.

### Nasdaq

Nasdaq is the largest U.S. electronic market and the first electronic stock market in the world. It made the first formal debut in 1971 lowering the spread between the bid and ask price of the stock, now bringing millions of investors and companies together by the use of technology. About 3300 companies are listed at Nasdaq representing business-leaders within several areas, including technology, retail, communications, financial services, transportation, media and biotechnology industries, but is well known for being a high tech exchange trading many new, high growth and volatile stocks due to a significantly lower listing fees than others, operating with a maximum price of \$150 000 (ADVFN, 2011). Nasdaq is a highly liquid market, trading more equity per day than any other U.S. market. Using complex computer and telecommunications network, the Nasdaq is able to deliver critical investment information to more than 1.3 million users in 83 countries at a timely transmit. The Nasdaq is a publicly owned company traded on its own exchange under the ticker NDAQ where 54% is traded on the exchange, making it the primary market for the primary listed stocks (Nasdaq, 2011a).

As the Nasdaq uses a computer and telecommunication system for trading, it has no physical trading floor. To create a physical presence, the Nasdaq Market Site is located in the middle of Time Square in New York providing financial information 24 hours a day. It is a trader's market and operates as a market maker where brokers buy and sell stocks through the Nasdaq rather than directly from each other. There are certain strict financial criteria to be met by a company to be listed on the Nasdaq Market Site. According to their listing requirements a company must have an initial minimum bid price of \$5 and must maintain a stock price above \$1, with a total value of outstanding stocks at a value of at least \$1.1 million. As an alternative for smaller capitalization companies, they can be listed on the Nasdaq SmallCap Market (Nasdaq Listings and Markets, 2009). From how the companies eligibility changes, Nasdaq will move the companies from one market to the other (ADVFN, 2011).

## Creation of a bubble

Bull markets are characterized by optimism, investors having confidence in the market segment and high expected future results. For a market to go from being a bull market to a bubble the increase in stock prices and volume are no longer underpinned on strong fundamental values. The stock prices continue to increase although fundamentals are not, moving away from intrinsic value. The bubble occurs after an extended period of overvaluation often stemming from speculation in the market. The speculators focus on the resale value rather than the intrinsic value. At artificially high asset values the investors focus on that the stock may be sold at an even higher, irrational price at a later date as illustrated by the greater fool theory. However at some point the bubble burst due to lost market confidence and market correction.

A speculative bubble are characterized by the greater fool theory which states that people continue to invest in overvalued stocks with the aim of selling within a short time to another investor, who is an even greater fool, at a yet higher price making a profit (Krantz, 2001).

Based on Kindleberger's theory; "Monkey see, monkey do", illustrates the fact that there is nothing more undermining for a person's self-esteem than to see its neighbor get rich. When households and companies realize that others are making money on speculative businesses they tend to follow as well, bringing non-professional investors to speculate in stock markets. The investment activity moves away from rational towards irrational behavior leading to bubbles, when this is recognized rational investors exits making a profit. More and more investors in the market realize this leading to a rush for cashing out stock returns, leading to a substantial decrease in stock prices (Kindleberger C. P., 1989).

History shows several examples where speculative trading in some commodity or financial assets lead to rapid rise in prices which in turn leads to collapse in the market. The Dutch tulip mania of the 1630s is considered as the first speculative bubble in history. Demand for certain tulip bulbs pushed prices to the extreme, reaching levels similar to a normal persons yearly income, until it peaked and became almost worthless in early 1637 (Dufwenberg, Lindqvist, & Moore, 2005).

According to Dr Jean Paul Rodrigue, bubbles have four phases; stealth, awareness, mania and blow-off (Rodrigue, 2006).

## Main Stages in a Bubble

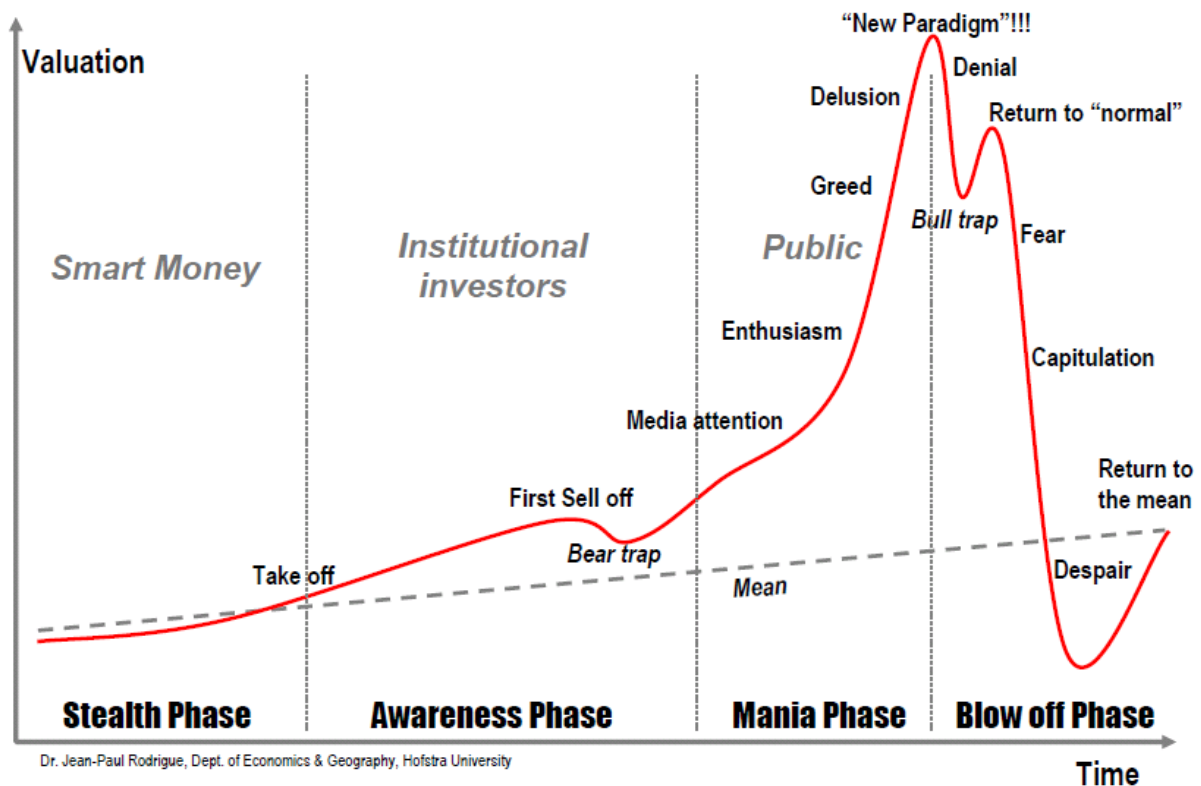


Figure 3 - Main stages in a bubble

### Stealth Phase

The stealth phase is characterized by professionals investing in an industry or market segment that others have not yet found. This is done quietly and cautiously to prevent others from taking the desired positions that may be of significant future valuations.

### Awareness Phase

In the awareness phase investors start to see the potential profit in the industry. Their increased investing drive prices up, and in this phase some investors make profit by selling off accompanied by further sell-off phases in the bull market. Media start to take interest in the activity in the industry or market segment during the later stages of this phase. According to



Davis (2006) media's attention can drive trading activity to extremes by affecting the investors in extreme market movements. Davis also found that media contributed to worsen the market response to news and to enhance irrational market expectations.

### Mania Phase

In this phase stock prices are raising attracting attention from the public. The awareness creates an increase in demand for stocks of companies in the segment as the result of the "investment opportunity of a lifetime". This in turn leads to overconfidence in the market which is based on stock prices driven by speculators focusing on the resale value rather than the intrinsic value. A lot of cash is circulating the market creating even higher expectations and pushing share values to excessive levels. At this point, professional investors such as institutional investors and venture capitalists exit their investments based on the high market demand, making profit. Investors still in the market at this point see paper profit and are interested in keeping the asset inflation going as they are heavily invested in the market.

At some point the high level of fundamentals are justified by theories rationalizing the market behavior and fundamental values by stating that this time it is different and that a permanent high level is normal. This also attempts to justify the future expectations of price increases. At this point, the bubble is about to burst.

### Blow off Phase

A paradigm shift occurs when investors realize that stock prices are artificial due to some kind of trigger. Everyone tries to sell their assets making the supply for stocks higher than demand pushing the prices down even further. Due to the greater fool theory the investors try to sell their assets to someone that still believe in increased prices, but this becomes more and more difficult as the demand is dropping. Stop-loss mechanisms kick in and leveraged investors are obligated to sell affecting the drop in stock prices even further.

# CHAPTER 3 - THEORY

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## Market Efficiency

Fama (1970) defined the market efficiency hypothesis in 1970, where he defines “an efficient market” as a market where the prices fully reflect all available information at all time. He suggested that all available information regarding the stock market was already implemented in the stock price, so no investor had the advantage in predicting the return on a stock price because all investors had access to the same information. This means that at any given time the prices reflect all available information in the market at that time for that specific stock. Through his empirical work he divided the tests into three forms of accessible information, namely weak, semi-strong and strong form. The weak form represents only historical prices. The testing of the semi-strong form examines if the prices adjust efficiently to other information that is clearly available to the public, such as information regarding announcements of annual earnings, stock splits, etc. In some cases some investors have access to information that no one else has, or has access to this information before the public, this is reviewed in the strong form tests. Fama came to the conclusion that the efficient market model holds up well (Fama, 1970).

The efficient market hypothesis is generally associated with the random walk model, stating that future prices are not to be predicted based on the prices from the past (Burton, 2003). This is the result of the believe in stock prices to immediately reflect the flow of information, so the stock prices of tomorrow reflects only the information of tomorrow and thereby are independent of the price changes today, making these changes unpredictable and random.

In general the stock market and individual stocks were believed to reflect information at the instant of the information to arise, incorporated into the prices without delay. Based on this believe, there is no use in technical analysis that tries to predict future prices based on the prices

in the past, nor analysis of fundamentals based on the financial information, allowing the investors to select undervalued stocks.

Some of the market efficiency critics are arguing that prices could not possibly be set by rational investors based on events in several periods in the recent history, hence the dot-com bubble where psychological considerations must have played a role. From Burton G. Malkiel's point of view, markets can be efficient even if many of its participants are quite irrational, and even if stock prices experience greater volatility than what can be explained by fundamentals. One of the reasons for him, and other economists for doing so, is that they are strong believers of the market to reflect new information quickly and mostly accurately, not allowing investors to earn above-average risk adjusted returns. From his believes that if the market has predictable patterns in for example predicted returns, the professional investors should be able to beat the market. Based on a number of studies of the mutual fund performance, managers were not able to outperform indices, and thereby the market, even though they had strong incentives to do so. This shows a convincing evidence of market efficiency (Malkiel, 2003). In the article "The Efficient Market Hypothesis and its Critics" Burton G. Malkiel concludes that sometimes investors make mistakes and act less rational, making the market less efficient.

## Behavioral Finance

There are different views on the efficient market hypothesis. Opposed to the existing hypothesis there are also the alternative view that the stock market is partially predictable, this is the basis for the behavioral finance view. If so, this allows the investors to earn excess risk adjusted rates of return and that fundamental valuations are useful for predictable patterns.

The behavioral finance view represents a paradigm shift away from the efficient market hypothesis. Based on the idea that the investor not always behave rationally, but as human beings make mistakes in their decision making and thereby the market outcomes are not reflected from

perfect investor rationality. The behavioral finance view is in some way successive to explain the bubbles that arise in the economy based on a psychology perspective. Barberis and Thaler (2002) discuss different aspects of what psychologists' state that people base their beliefs on in practice. They found that people tend to have overconfidence in their judgments through both the confidence level and the poor elimination in probabilities. Based on Fischhoff, Slovic and Lichtenstein (1977) there are empirical evidence about events that investors are certain will happen is only happening in 80 percent of the cases and events they perceive is deemed to occur are occurring in 20 percent of the time. Investors' beliefs are characterized by wishful thinking and optimism of their abilities and prospects (Weinstein & Klein, 1996).

This leads us to the questions if the market follows a random walk or is mean reverting. The random walk hypothesis states that the market has no memory, hence no past information can be used to predict future prices in the market. The probability is the same for an increase in the price as for a decrease. Contrary, if the market is mean reverting some predictability is possible and the use of multiples may be valuable for predicting the market valuation. Due to Poterba and Summers' (1988) research paper on mean reversion in stock prices based on data from United States and 17 other countries, there is an element of predictability, especially in the small-caps, where there is positive correlation. In the long run markets tend to mean revert due to negative serial correlation. There is no agreement on how strong these findings are (Poterba & Summers, 1988).

Because information is costly, investors will sometimes make mistakes and there will be pricing irregularities in the market, so there will be incentives for investors to try to predict price patterns and prices before the information is reflected in the market (Grossman & Stiglitz, 1980). Such irregularities will exist in periods characterized as bubbles providing the investor the ability to obtain extraordinary returns based on patterns or irrationalities in the valuation of individual shares.

### Herd Behavior

Herd behavior is a theory within the field of behavioral finance aiming to explain why rational individuals can be irrational when behaving in groups. Herd behavior is said to be a result of information cascade (Shiller, 2005). Information cascade can be understood as even rational people can take part of a herd-like manner when opinions of others are taken into account, even if these opinions are irrational. Shiller gives an example with two restaurants starting up at the same time, and the first customer is to choose between one of the restaurants based on his own impressions of just looking at the restaurants. Then after the first customer has chosen, the second customer can see which restaurant the first customer has chosen and this continues on with the other customers. Based on the choice of one person, the restaurant A enjoys success and a lot of customers, while restaurant B has a tough time getting customers. This example provides an idea of how powerful herd behavior can be, and the theory is highlighted as a good way of explaining the dot-com bubble (Shiller, 2005). Applying this example to the stock market, one stock, or one type of stocks is chosen by investors, not based on other differences than the choice of others. This leads to an increase in the chosen stock's value without any increase in fundamental value.

According to Sian Owen (2002) individuals that have become convinced that the herd has more detailed and trustworthy information will be adaptable to ignore the information received as an individual, hence following the actions of the others. When this herd behavior occurs the creation of an informational cascade is soon to happen, meaning that the individual signals will be overshadowed by the opinion of the herd. Further Sian investigated the upwards information cascade hence illustrating that the upwards cascade ends when a shock to the system occurs, that allows the investor to realize that the investment will most likely not lead to returns. This can be caused due to change in investor's interest or a realization of wrong investment. As a result the upward cascade turns, which leads to a downturn in prices. This downturn may result in a crash, or a burst. On the notion that herd behavior explains the sudden increase/decrease in stock prices it becomes highly relevant to consider when looking at the potential threat of a new dot-com bubble.

Hwang and Salmon (2006) did a study on herding where they found a higher probability for herding to occur when the investors had homogeneous expectations of the market directions. They also found that herding does not necessarily need to be a fast process; hence it could be long lasting and slow moving, explaining why some bubbles are slow moving. Welch (2000) examined herding and found that herding has stronger influence when the market have been bullish, hence indicating that aggregation of information is relatively poorer in up-markets hence allowing for higher incidence of crashes in up-markets than in down-markets.

To sum up, herding is a theory which explains that individuals are copying the actions of a peer group based on trends and actions of the herd. Following trends may not be optimal for an investor, moving the invested amount from one trend to another leading to increased transaction costs, as well as not being able to stick to one trend for a longer period of time. Herd mentality amongst investors can potentially lead to creation of bubbles, and is therefore important to consider when looking for a new bubble.

## Initial Public Offering

Shares are listed on the stock exchange for the very first time through primary issues, taking a private company to the public through an initial public offering (IPO). When going public, the company raises capital by selling of a set number of shares at a given price, whereas there may be several reasons for doing so. The IPO is normally carried out by merchant banks on behalf of the issuer, the company, in a form of an offer for sale at an fixed price agreed between the issuer, the merchant bank, and the broker to the issue who advices to the market sentiment. The underwriter contract to buy any new shares not taken up by investors at the agreed price, this gives the issuing company the assurance of receiving the new funds regardless of what may happen to the stock market during the offer period (Rutterford, 1993).

### Motives for going public

Morgan Stanley (Brau & Fawcett, 2006) did a survey with the goal to provide a clear picture of the core issues involved in an IPO process.

In relation to the hypothesis that markets are efficient and that managers wish to maximize firm value, the main motive behind the public offering is to raise additional equity to fund investment opportunities in a way to minimize the average cost of capital. A second motive is to provide a current owner the chance to exit and to raise cash by selling of its shares. The public offering allows the insider to cash out since the company goes from being highly illiquid from being privately held to be more liquid in the public market. The founders of the respected company may now realize their value in the corporation, measured by the market value of the stock held by the owners.

On the basis of these two reasons, Morgan Stanley came up with subsequently different motives for going public; to create public shares to use in future acquisitions, providing the company with the opportunity to enter the M&A market, whether to acquire or to become a target for acquisitions. Going public allows the company to establish a market price/value of the firm as well as broaden the base of ownership. It often allows one or more principals to diversify personal holdings and makes a shift in capital structure possible from expensive debt to private equity.

### Private versus Publicly Held

There are several positive and negative effects for the company going from being privately held to be publicly traded. For an already well known company going public, the IPO can lead to large demands for the stock giving the stock price a boost and hence, being an early investor is desirable, leading to excessive returns. The public awareness gained through media attention followed by the company being public, may attract desired people for the management positions leading to increased performance. It provides the opportunity to use option plans as incentives for the employees and management to take part in the profit from growth, attracting the most

qualified employees to the company. The IPO may work as a funding source for future mergers and acquisitions whereas the company has the possibility to raise more capital by issuing additional stock. This liquidity in the company stocks enables it to raise the desired funding for the future acquisitions easier than for a privately held company, whose shares are less traded, making this a competitive advantage for the publicly traded company. Taking the company public may give a local corporation more exposure towards the national and even the international markets. This may make the company more noticeable providing it with increased credibility from their stakeholders.

There are also some reasons for why corporations' prefers to stay privately held. In this way, the company's founders and core owners keep the decision-making within the company and are able to protect their strategy through confidentiality. Staying privately held also limits the sharing of company's profits, and it avoids the lengthy reporting that are time consuming, and hereby can keep their focus on the business and not on other liabilities (Draho, 2004).

### Timing

Number of IPOs varies from year to year, coming in waves within different sectors. This is known as the "Hot issue markets" phenomenon where the issuers try to find the right time for going public, as where the price level of equities within the respected sector are growing together. This suggests that investment opportunities within a time period are better in certain industries compared to others (Ritter, 1984). Pagano, Panetta and Zingales (1998) do not completely agree on this view. They argue that in periods of increase in IPOs and an increase in investments is determined by the market as a whole, where shares, in general, are highly priced. Furthermore, they mention that the owners often choose to take companies public when high cash flows are possible, since high cash flows are correlated with high rates of stock market. Benninga et al. (2005) argue that macroeconomic conditions will affect more sectors simultaneously, where the upturn will facilitate IPOs in large parts of the market. The owners will gain the highest profit by exit the market when it is booming.



According to Morgan Stanley's survey (Braun & Fawcett, 2006) amongst CFOs' on which factors they emphasize regarding the market timing of their (possible) IPO, the response was that 66.5 percent answered that they were raising capital to finance continued growth, 82.9 percent answered that it was the overall stock market conditions. Especially VCs put great emphasis on stock market conditions to exploit high shareholder value when exiting. 70 percent also said that general industry conditions play a role as a factor for the market timing of their IPO.

### Mispricing

According to findings done by Harris and Gurel (1986) and Shleifer (1986) when a stock is added to an index, in this case the S&P 500 index, the stock price jumps. This increase is documented to be permanent and on average to be 3.5 percent, pointing towards mispricing; even though the fundamental value does not change, the price still jumps (Barberis & Thaler, 2002). Rutterford (1993) defines the intrinsic value of a share as the true worth of a share regardless of the market price, in her review of valuation techniques. In a theoretical perspective, the price should not be affected by the price dynamic in the market as a result from short term speculation. The mispricing occurs if the stock market is not efficient, leading to a possible difference in fundamental value and market price of great significance. This is exactly what happened in the dot-com bubble (Shiller, 2000).

### Findings

Purnanandam and Swaminathan (2004) found that IPOs for both tech and non-tech companies done in 1980 to 1997 were on average overpriced in the offer. The median IPO was overpriced with about 50 percent in this time perspective, compared to its industry peers. Abnormal returns on the first trading day exceeds the underpriced IPOs by five percent followed by a underperformance for the overpriced IPO starting in the second year, lasting up to year five.

Tim Loughran and Jay Ritter (2004) found that the increase in trading volume on the first day of the IPO doubled from 1980 to 1990 and doubled again from 1990 to 2000. The first day initial return on the IPOs increased from an average of 7 percent in 1980 to 15 percent in 1990-1998

followed by an enormous increase to an average of 65 percent in 1999-2000. After the burst of the bubble, it reverted to 12 percent on average for the years of 2001-2003. Tim Loughran and Jay Ritter (2004) explains this extremely high trading volume in the bubble period based on the underpricing of the IPOs, as a result of the change in the objectiveness of the issuer, who has less focus on maximizing the IPO.

## The role of the underwriter

### Money left on the table

Money left on the table is the first day profit of the share gained by the investors who had allocated shares at the offer price, representing a transfer in shareholder value from the existing shareholders of the issuing firm to the new investors. Money left on the table is defined as the difference between the opening price and the end of the day closing price of the first day, multiplied by the amount of shares issued (Ritter J. , 2006).

Jay Ritter made a list of 173 deals ranked on how much money was left on the table, where technology offerings represented 144, displaying huge underpricing. To illustrate, March the 2nd 2000, Palm went public with an offer price of \$38.00 and a first closing market price of \$95.0625. With a number of shares offered at 23 million, making the dollar amount left on the table equal to \$1,312,437,500 (Ritter J. , 2011).

During the year of 1999, 117 IPOs doubled in price on their first day of trading, leaving the amount of \$37 billion left on the table. First-day returns exceeded 30 percent every month from November 1998 to March 2000, where mostly of the firms were very young and had venture capital backing (Ritter J. , 2006). Clearly this represents a market of heavy demand where the interest from the prospective purchases exceeds the number of shares that the issuing company plans to sell. This hot issue market characterizes the dot-com bubble.

According to Tim Loughran and Jay Ritter (2002) the underpricing is a form of an indirect compensation to underwriters. Typically the percentage gross spread is negotiated in advanced,

so when the offer price increase after the stock is issued, this increases the revenues of the underwriters. When underpricing the IPO, it is easier for the underwriter to find buyers and hence, reducing their marketing costs. The underwriters are able to act this way because investors are willing to offer quid pro quos to gain favorable positions on hot deals.

The combination of underpricing and the gross spread allows the underwriter to take a much higher total cost than if all costs were implemented into a direct fee.

## Venture Capital

For new companies to get funding there are especially two ways to get money, either through bank loans or through venture capitalists. The impact of venture capitalist funding is still a field under investigation, but as found by Black & Gilson (1998), many large companies has become successful by funding from venture capitalists that has enabled them to converting their innovation into profitable technologies and enhanced their growth opportunities. The role of venture capitalists has become important as they provide funding for companies that are not able to get funding elsewhere. It is also worth mentioning that the US venture capital market is one of the largest and oldest in the OECD, characterized by an entrepreneurial and risk-taking culture (OECD-1).

Venture capitalists (VCs) are professional investors managing a fund, looking for start-ups or expansions to provide capital for, and include in their fund. These may be wealthy investors and investment banks. Representing the American venture capital community, the National Venture Capital Association (NVCA), encourages the VCs to provide funding for innovative entrepreneurs and hereby create jobs and economic growth. In 2011 venture backed firms enabled 12 million employments and revenue of \$3.1 trillion in 2010 (National Venture Capital Association).

The VC is mainly focusing on the rate of return and is interested in ventures with exceptional high growth opportunities, like the technology industry which are subject to high volatility because of high variance in returns. Venture capitalists usually design a contract for venture capital, the share purchase agreement, in a way to protect themselves against downside risk and for them to be able to benefit from upside potential. This is done through, amongst others, convertible securities and preferred shares. The use of convertible securities provides the venture capitalist with claims on company assets in liquidation, and allows the venture capitalist to enjoy a share appreciation if so. Preferred shares gives a downside protection through seniority rights on future cash flows guaranteeing the venture capitalist a predetermined dividend payment before payments to common shareholders (Schwienbacher, 2009).

There are mainly five ways for the VC to exit their investment. The disinvestment may be done through either an initial public offering (IPO) where the VC's shares become liquid enabling them to sell their shares to the public. Another option to exit is through acquisition, where a company, preferably within the same sector, buys the company. The VC can disinvest through a management buyout, or a repurchase, where the company's previous owners buy back the company shares. The VC may also sell its shares to another institutional investor through a secondary sale, or the final exit opportunity is to liquidate or write-off, filing for bankruptcy.

Disinvestments through IPOs tend to be successful exit routes for the VCs in the U.S. whilst the others do not. Gompers (1995) found that the average return for a VC disinvesting through an IPO is 60 percent opposed to only 15 percent through acquisition. Cumming and Macintosh (2003) find empirical evidence on VCs' holding period of 4 to 6 years before disinvesting in the company, Pandey & Rajan (2011) find that VCs tend to exit after 2 to 4 years.

Cumming et.al (2005) found that timing of the exit strategy is critically affected by the liquidity of the exit markets, the stock market, linking the providing of venture capital to the stock market. They provided empirical evidence on the VC's investment and exit behavior are affected by the state of the market. They tend to follow business cycles; so when the exit market is highly

illiquid, VCs tend to lower their investments and invest in early stage as a result of less exit opportunities ahead, postponing the disinvestment need. In hot issue markets, VCs are more eager to invest in later-stage companies in order to exit quickly.

VCs confidence in the high growth venture entrepreneurial environment is reflected in the Silicon Valley Venture Capitalist Confidence Index based on an estimation of 6 to 18 months. The index is based on a 5 point scale where 5 is indicating *high* confidence and 1 is indicating *low* confidence in the San Francisco Bay venture entrepreneurial environment. The intention of the index is to provide an ongoing leading indicator for the overall expectations for the growth in the venture environment (Cannice, 2011).

# CHAPTER 4 – THE FIRST DOT-COM BUBBLE

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## The Beginning

The first dot-com bubble was a speculative bubble within the Internet related services, well known as the "dot-com". The origin of the name dot-com is from the popular top-level domain .com.

## The First Day

There are some uncertainty about the exact timing of the origin of the first technology bubble dot-com bubble is to some extent blurry as there are several alternatives to when the IT bubble was initiated. Shiller (2005) points towards one alternative; when the company Mosaic Communications Corporation, that was founded in 1994 by Marc Andreessen and Jim Clark. Mosaic, delivered a browser service that allowed people to take advantage of the Internet. The browser went public in February 1994, introducing the World Wide Web (www) for regular people. A browser allows for connection to different websites, making it possible for shopping online (E-commerce). The company enjoyed 80% of the browser market during the mid-1996 (Yoffie & Cusumano, 1999), and in 1998, Mosaic was converted into Netscape Communications Corporation, a company with a value of half a billion dollars. In 1999 Netscape was the fastest growing software company of all time. The fact that Netscape connected people to the web made it possible to showcase the possibilities of the Internet, which help increasing the interest for Internet related companies.

When Netscape went public their first day share price went from \$28 to \$75 before ending up at \$58.25 (Perkins & Perkins, 1999) the demand for Netscape stocks were so high that it took several hours before the stock actually started trading. In fact the day before the offering, a Netscape share went from \$14 to \$24 in the second market. With a 108% increase the first trading day, Netscape's IPO planted a belief in Silicon Valley that successful IPOs were

possible. This led to an increased amount of IPOs, and because of this, Netscape's IPO is considered to be the first day of the Dot-com bubble. However, the Internet Sector being in a bubble during 1995 is discussable, as the real growth in the market took place from April 1997 and continued until the peak on Nasdaq 10 march 2000, where the index reached 5132.52 during the intraday, and closed at 5048,62 (See Appendix E).

DeLong and Magin (2006) highlights that one other alternative that has been considered the first day of the bubble was little before Alan Greenspan held his Irrational Exuberance speech, where he indicated that the stock market was overheated. However DeLong and Magin (2006) points out that based on fundamental analysis that the bubble started in April 1997, however academics have not come to a conclusion whether to define the first day based on physiological factors, or on fundamentals.

So what led to the start of the bubble and what factors emphasized the growth in the Internet related companies?

## Factors and Mechanisms

In order to explain the rise of the first dot-com bubble, it is necessary to look at some of the most important factors and mechanisms that contributed to the boom. Highlighting several important growth factors for the first bubble, allows for better understanding of why the bubble arise and how it burst, as well as the knowledge that was learned from the bubble. The first factor we will consider is the lack of business models.

### Business Models

A factor that is emphasized for why the bubble burst is the lack of business models with the purpose for long-term profits. Osterwalder, Pigneur & Tucci define a business model as;

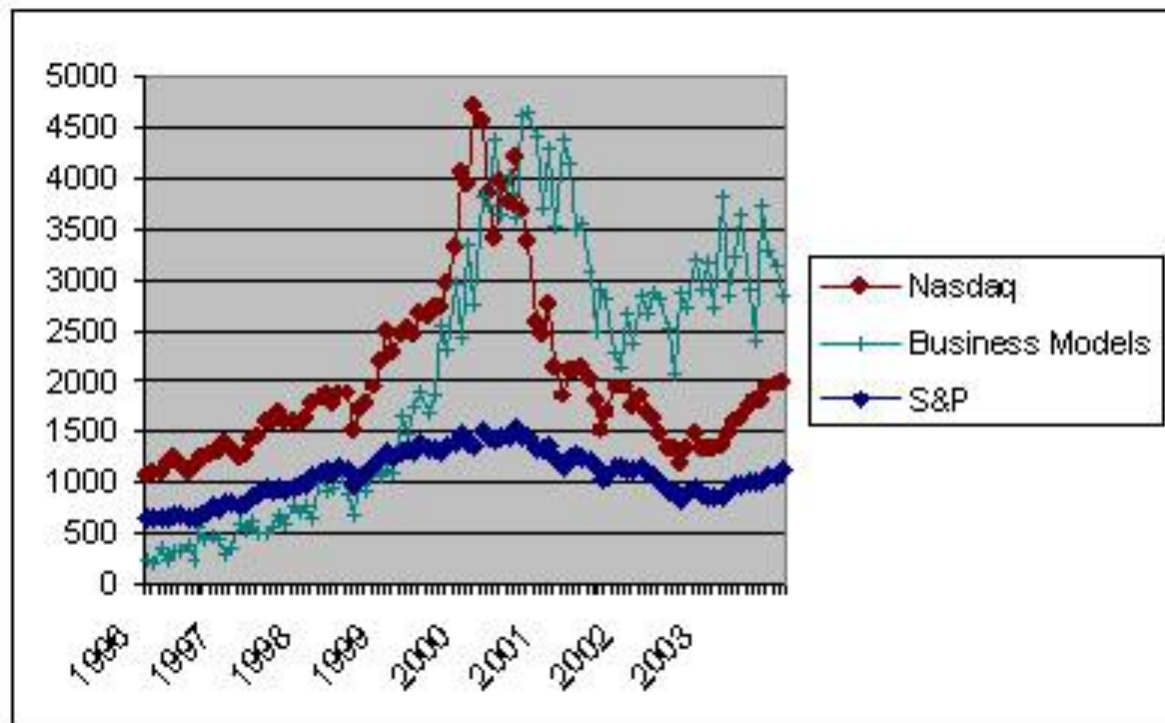
*“A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams.”* (Osterwalder, Pigneur, & Tucci, 2005, p. 17)

The definition implies that the term business model is used for a broader context than just profits and revenue. Osterwalder, Pigneur and Tucci (2005) address nine building blocks that can be found within a business model. These are built on formal research and consist of: Value proposition, target customer, distribution channel, customer relationship, value configuration, capability, partnership, cost structure and revenue model. This illustrates clearly that the revenue model is a part of the business model ontology, but not the only part of it (See Appendix C).

An interesting observation made by Osterwalder, Pigneur and Tucci (2005) shows the relation between how many times the term business model was used in scholar journal reviews compared to the development in Nasdaq and S&P 500 over time.



Figure 4 - Business model compared to Nasdaq and S&P 500.



Source: (Osterwalder, Pigneur, & Tucci, 2005)

The figure 4 illustrates that the use of the term business models follows the trend development of Nasdaq. The mentioning of the term “business models” is below the Nasdaq from the time span of the dot-com bubble, implying to some extent support for the lack of focus on business models during this period. There is a shift between the business model curve and the Nasdaq index curve after the burst of the bubble which indicates a lack of business models in the pre-bubble period, as well as an increased focus for the subsequent time. A business model is per se not a strategy in itself but is influencing the information and communication technologies (ICT), the business strategy, and the business organization, which form the business triangle. This triangle is influenced by external factors (See Appendix D).

### Business Strategy

A second factor that may have contributed to the first bubble is the overall business strategy and the importance and focus on a large customer base. The use of Internet and the increased

globalization made it possible to reach a large audience, as the web is to some extent borderless. A famous business strategy expressed by Robert Spector in his book about Amazon.com is the phrase “Get Big Fast” (2000). This was the intended strategy that Amazon’s Founder Jeff Bezos followed in the beginning, however Amazon also emphasized the importance of the long-term business perspective. The concept of Get-big-fast is a concept that indicates the importance of having many customers. A good example is the E-commerce industry, where companies like Amazon is taking advantage of a large customer base, which in turn gives the opportunity for lower unit cost per product as the increased volume, will allow for larger possibility for a discount from the supplier. Having the lowest cost and prices on products will attract new customer which will increase the customer base. The larger customer base the more revenue is generated and hence also the possibility for a larger product variety, which subsequently leads to more sales and an even larger customer base. Therefore the concept of Get-big-fast is an important concept in order to be able to survive and be profitable in an increasingly competitive environment. However, a common procedure in the E-commerce business is mainly to sell below cost the first period in order to build up a large customer base. This however is an expensive process, but often necessary when entering a competitive market, especially when competing with commodity goods. Amazon managed to enjoy success due to a successful strategy, which was different from other E-commerce sites in relation interacting with its customers. This increased interaction is done through newsletters and on-site suggestions to other products based on customer interests. However the story is not always a success story and failure to attract customers will eventually lead to lack of revenues. A similar expression is that it is expensive to be poor, as without a large customer base and low sales it is hard to get lower cost per product that in turn makes it harder to reach a profit on each product. The opportunistic view of the Internet market allowed for easier access to capital, which allowed startups to be able to invest heavily in infrastructure in terms of distribution and technological infrastructure. A Get-big-fast strategy can easily overshadow the importance of being profitable, and instead be too narrow on creating a large customer base.

During the first dot-com period companies often went public before they had a plan on how to be profitable in the long-term, and even without a finished product. The access to capital led to a

rush for getting public leading to a tremendous amount of IPOs during the years of the bubble. This will be addressed in chapter 7. The belief of Internet companies being the next big thing led to another mechanism that affected the bubble, the investor mania.

### Investor mania / Optimism

During the dot-com period there was a particular interest in Internet stocks. According to the book "The Internet Bubble" (Perkins & Perkins, 1999) individual investors poured millions of dollars into more than 2000 Internet startups. The rate of return on venture capital for the 30 years in pre-bubble period was around 23 percent whilst in the period of the bubble could be between 50 and 150 percent, making investments in Internet companies very attractive for venture capitalists as well as for pension funds. This boom in returns attracted even more people to participate in the high growth resulting in even more capital being pumped into the Internet market. In 1998 alone, the number of new venture funds equaled 139, more than \$17.3 billion of new capital was provided to companies in the sector, 47.5 percent more than the previous year (Perkins & Perkins, 1999). The book illustrates the mania in the years of the bubble by providing examples of percentage increase in closing prices at the end of first traded week after an IPO was done; Healtheon had an annualized return of 3339 percent, eBay had a 3269 percentage increase and a 1853 percentage increase of for AboveNet after their first week (Perkins & Perkins, 1999, p. 13). Another example of the optimism that was present during the boom state of the bubble is illustrated based on how the companies characterized itself as a dot-com company. To characterize a company as a dot-com company, became a way to signalize that it was an Internet firm, and in fact having ".com" as part of the company name gave a positive effect on the valuation of the company. Cooper, Dimitrov, & Rau (2001) investigated the effect of a name change to .com, .net or Internet as a part of the company name. From a sample of 95 firms the study showed a positive effect on a name change giving an abnormal return. In fact adding the extension to the company name gave effects even if the company was not primarily involved in the Internet business. The authors suggest that the fact that a name change gave abnormal effects was an indication of investor mania, as investors had strong beliefs in the Internet sector and were willing to invest money in that sector during the boom of the bubble.

The large interest in Internet companies made startups rush to get public even before they had finalized products. Among economists there is a broad agreement that the rush mitigated the revenue plan, and the optimistic view of the Internet industry allowed companies with no plan on how they could earn money to achieve high valuations. An example of such company was govWorks.com, a company that “*facilitates interaction between consumers, businesses and governments with a proprietary suite of Internet-based applications*” (Publicdatasystems.com, 2000). The documentary Startup.com is a documentary about this company, which illustrates how it was possible to raise money based on an idea that was lacking an actual finished product. GovWorks ended up failing to meet the high expectations that had been created by the market through the high valuations, and when the product, the website platform, was actually released it did not meet the expectations made by the market, and other competitors managed to provide a more solid platform, leading to bankruptcy for GovWorks.

### Confidence Index

Robert Shiller did a survey of investors’ confidence in stocks from 1996 to 2004, where he asked the question: “The stock market is the best investment for long-term holders, who can just buy and hold through the ups and downs of the market” (Shiller, 2005, p. 57). Comparing the year 2000 and 2004, 97 percent of the respondents agreed strongly partially agreed with the statement in 2000, compared to 83 percent in 2004. The number of respondents that agreed strongly changed from 67 percent in 2000 to 42 percent in 2004 (Shiller, 2005).

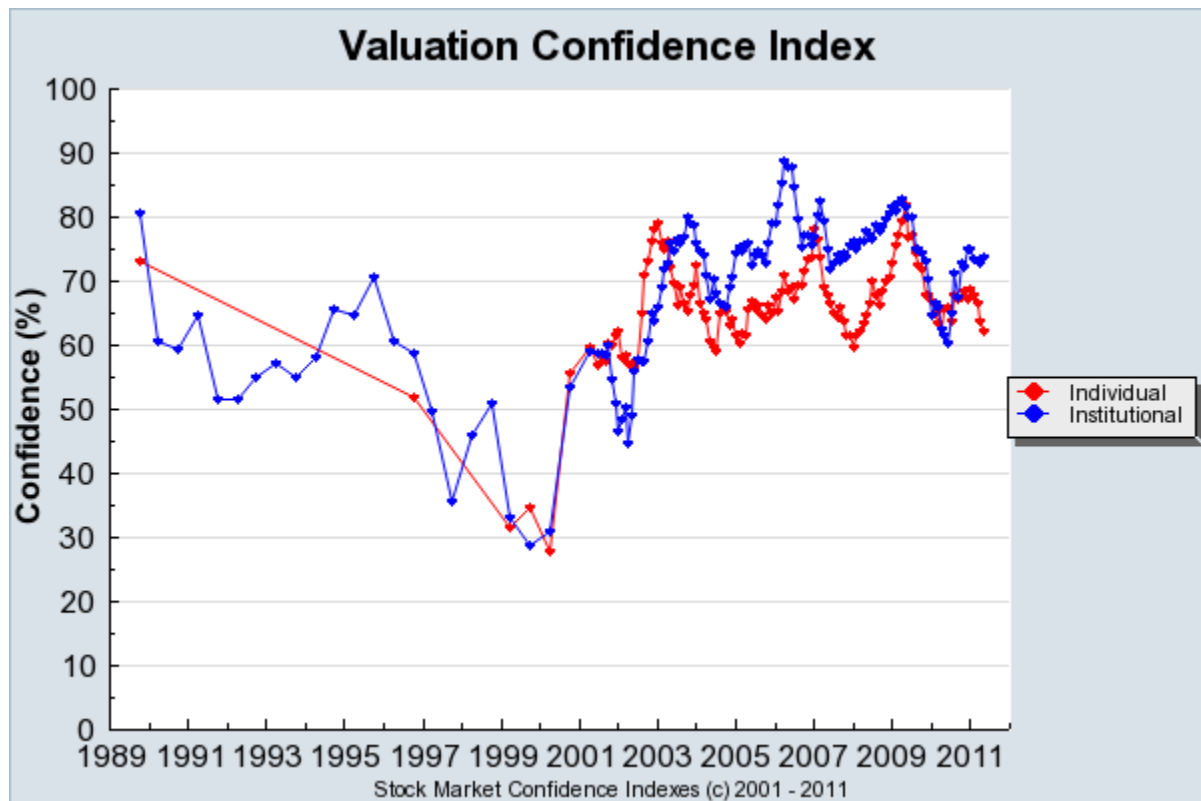
The Valuation Confidence Index done by Yale School of Management is another measurement for confidence in stocks, based on the following question;

*“Stock prices in the United States, when compared with measures of true fundamental value or sensible investment value, are (1) Too low, (2) too high, (3) about right and (4) do not know”* (Yale School of Management - Indices explanation).

Then the index based on the number of those that choose answers (1) or (3) calculated as a percentage of all that has answered 1, 2 or 3. The purpose of the index is to indicate the percentage of the population who think that the market is not too high (Yale School of Management - Indices explanation). The Valuation Confidence presented in figure 5 shows that the lowest confidence in the end of 1999 was 29.03 percent for institutional investors and 31.17

percent for individual investors (Yale School of Management, 2011). This means that approximately 30 percent believed that the market was not overvalued, and 70 percent believed it was. After the peak the confidence level increased. The low confidence in the market may have been an important factor when the bubble actually burst, as the market was anticipating it to happen, and when it first did happen people started to panic and sold their shares.

Figure 5 - Valuation Confidence Index.



Source: (Yale School of Management, 2011)

### Short sale restrictions

Short sale restrictions have been considered one of the reasons why the bubble took place, as well as why pessimistic investors did not neutralize the optimistic investors. When a set of investors enters the market with the same optimistic belief, the pessimistic investors can be overruled if the amount of optimistic investors is higher than the pessimistic investors. The pessimistic investors will then not be able to bring the price level down to reasonable levels. This is considered to be one of the restrictions that occurred during the Dot-com period (Ofek &

Richardson, 2003). Another explanation is the possibility for a borrowed stock to be recalled, hence the short position would be closed before the market correction have taken place (Battalio & Schultz, 2006). Ofek and Richardson (2003) argue however that the selling of stocks happened after the expiration of the lockup period. Lockup period due to an IPO is simply that the shareholders are not allowed to sell their shares for a given time period. Besides the lockup, other restrictions such as a higher short interest on Internet stocks prevented investors to short stocks (Ofek & Richardson, 2003). However Battalio & Schultz (2006) did a study to examine the presence of arbitrage opportunities based on sale of actual shares and going long in synthetic shares was indicating that short-sale constraints were binding. They did not, however, find any evidence supporting the apparent arbitrage opportunities that in fact short-sales restrictions limited investors from shorting Internet stocks. Further on, they argue that an investor could have shorted stock synthetically by purchasing puts and writing calls.

### News media

News media is a business that makes money on delivering stories and news that catches the reader's attention. A newspaper company has to compete on having the newest and most interesting news to survive in the market, which has definitely evolved after the evolution of the Internet. Typical for a newspaper is making a headline as dramatic as possible in order to catch the reader's attention, and often the headline is not suitable for the article itself. Robert Shiller (2005) characterize the media as an initiator of series of events that change people's general perception of the market, and is not necessarily the explanatory factor in a one-day decrease or increase in a stock. One example of these fluctuations in the stock price may be the way of forecasting the stock price. The forecast may be influenced by the news provided by the media, and if this forecasting is done by a sufficient number of people, then fluctuations may occur. Media is an initiator and can often shape the expectations of people, even though it is just rumors and in some cases false information.

## Why did the bubble burst?

In March 2000, Nasdaq had reached its peak and the burst of the bubble was initiated. The mechanisms that drove the boom of the bubble essentially became the part of the reasons for the burst of the bubble. Further we will continue explaining how some of the mentioned mechanisms contributed in the downturn of the market.

### Confidence Index – A lost belief in the market

During the end of 1999 the individual investors and the institutional investors was having strong beliefs that the market was in fact overvalued, as illustrated in the section about the confidence index. The market was somehow expecting something to happen, and when it actually did the panic was a fact. This panic and anticipation of the fact that the market was overvalued contributed to the downturn, however it was probably not a direct effect of a downturn in the index. Hence more of an indirect effect when the burst suddenly happened, and the buy recommendations turned into sell recommendations. From this moment on, the low confidence in the fact that the market was not overvalued created a sense of panic that was one of the reasons why the market started its way down the hill.

### Business models and Investor mania

The fact that a name change could result in a permanent increased valuation illustrates how blinded the investors were as they kept pouring money into Internet startups, and as more money was poured into the market the less critical the investors became in projects to invest in. The idea of being left behind was not what venture capitalist and other investors wished. The short-term orientated business models was now starting to become a problem for the startups, as they failed to realize the high expectations that the market had, and the sales was simply too low compared to the expected sales. In March the results for the first quarter in 2000 was presented to the public, and the failure to meet the expectations probably turned optimistic investors to be more rational than they had been in the past.

### Increased Interest rate

A factor that slowly gave the market a wakeup call was the increase interest rate that took place from June 1999 until May 2000. During the period the Federal Reserve increased the interest rate six times, from an interest level of 5.00 to 6.5% in 16<sup>th</sup> of May 2000 (Federalreserve - Openmarket archive). The increased interest was one important factor that participated in the decreased willingness to invest in stocks, and was probably an important factor to limit the access to startup capital for new Internet companies.

### Bankruptcy / Snowball effect

The interest rate increased, the expected sales were not met and the unsustainable business models were starting to show signs of weakness. The recommendations from the analyst had suddenly turned from buy to sell, and the confidence in the fact that the market was overvalued had reached its lowest level in a long time. Many effects started the burst, and were strongly influential in the rapid decrease in Nasdaq from March 2000 and onwards. The development of the burst can be illustrated as a little snowball being push from a high mountain with snow, as it gets further the snowball just gets bigger and bigger. Now the problem for the investors was not to find new projects to pour money into, but rather find other people that were willing to buy their shares in the different startups. As the level of the Nasdaq Index and in particular in the Internet Index the concept of greater fool was more prominent. The problem was simply to find the next “fool” to buy the shares until many of the companies’ filed bankruptcy. The years of 2000 and 2001 was the years where many startups was liquidated from the market, examples given boo.com, govWorks.com, pets.com, and many more (German, 2008).

### What have the technology industry learned from the dot-com bubble?

In the light of the dot-com crash questions about what was wrong with the business models became important. What went wrong, and what should be done differently to avoid such a disaster yet again? Many experts speculated in what factors that contributed to the crash, we will enlighten some of these factors in the following.



### *Focus on Sound Business Models*

The venture capitalists have increased their requirements for their investments in start-ups compared to the mid-90s. Back then, when the dot-com started to appear everywhere, many startup companies put aside best practices of business and IT management to be the first one in the market. The importance of capturing users had its base in the, at the time, business model that was geared towards how much traffic the company could generate on their web site, instead of focusing on profit. This impatience led to a lack of sound business models in the dot-com companies resulting in short term goals.

Under the time of the dot-com bubble venture capitalists spent excessive amount of money on startups based on ideas without the ability to show for real cash flows. The ideas basically involved how to use the Internet in a way that attracted peoples' attention. The venture capitalists now have a larger focus on the expected cash flow and sustainable business models (Scarborough, 2010).

A sound business plan is driven by mainly two factors, high returns and a convenient and profitable exit opportunity. We will examine some of the important factors for the venture capitalists when investing in startup companies (Scarborough, 2010), and the larger focus on these factors are based on some of the wrong doings in the dot-com period.

### *Management Team*

Many of the founders of startups in the dot-com bubble were people with ideas, but with little or no industry knowledge and little experience as managers. How the business idea is executed may be the difference between failure and success, so the people behind it are of great importance for investors. Ideally, the venture capitalists would like a management team with previous success and experience within the industry, if the management lacks this knowledge, consultants or other outsiders with this experience should be included to fill this gap. Venture capitalists look for

companies with management teams that demonstrate engagement and involvement in the company's future.

#### *Competitive Edge in a Growth Industry*

Since most investments are failing, the winners need to be very profitable. This is why venture capitalists look for companies within industries with high expected growth that also have a competitive edge enabling them to have a potential to become at least a \$100 million business within three to five years.

Because of the undefined growth opportunities in new business areas, the venture capitalists may not focus solely on the financials when making their investment decisions, but these are important indicators to see how the entrepreneur picture the opportunity and the cost of bringing the idea to the market. They are looking for realistic estimates and serious founders. Since the business model is unproven, multiple revenue streams need to be defined, providing a fallback revenue source if the initiated source fails.

The funders are required to have a carefully worked out plan for how to make money. The value of marketing research is great for all types of ventures in terms of the long-term prospect. This enables the company to investigate the demand for their products/services, and hence if there are possibilities for earning money on their idea, this enables the management to make strategic decisions for future sustainability in income (Zimmerer, Scarborough, & Wilson, 2008).

#### *Financing Stages*

The investor need to be convinced that the startup company has thought through the need for financing and that the business has a future. The founding is based on several financing stages that need to be realistically put into a timeline depending on the development of the company's business. The financial stages of development are divided into four stages; *seed*, *early stage*, *expansion stage* and the *later stage* financing (PricewaterhouseCoopers, 2010).

The first stage of the venture capitalists' funding is the *seed* financing. This is initial investments of relative small amounts often made by the founders or independent investors. Usually the company is in a development phase of a product or concept and has existed for less than 18 months. The funds obtained in the *early stage* of financing are used for pilot production or testing of the service. When the company has been in business for more than three years the next phase of financing is the *expansion stage* where the service or product is commercially available and, compared to the previous stages when there is no or a small revenue, the growth in revenue is significant and the company may or may not show profit. The investments are done to build a customer base, for support in relation to marketing and so on. In the *later stage* the company is more likely to be profitable by generating positive cash flows due to the widely available product or service (PricewaterhouseCoopers, 2010).

These stages provide the investor with a form of control of the potential losses based on bad decisions done by the owner or manager (Sahlman, 1990).

#### *A Clear Exit Strategy*

The companies need to provide the venture capitalist with a clear exit strategy. This can take form as a planned buyout or an IPO to provide the venture capitalist with its payback (Black & Gilson, 1998). Venture capitalists look for exit strategies within three to five years, compared to an average of less than three years in 1998 (Scarborough, 2010).

# CHAPTER 5 - FUNDAMENTALS

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## Fundamental Values

Fundamental analysis is one of the basic ways to evaluate stocks. It attempts to discover their true value, the intrinsic value, by examining related economic and financial factors. The intrinsic value is the actual value of the asset based on the tangible and intangible company assets. This is done by looking at, amongst others, the debt load, margin, price multiple, book value, cash flows, price to book ratio and price to earnings ratio. The ratios are computed so the analyst is able to analyze the numbers and be able to compare the stock to similar stocks. This makes the analyst able to determine if the company is over/under valued and to sell/buy stocks. The hope is to invest in stocks whose intrinsic value is greater than the market value.

Short introductions to the ratios that are relevant for the thesis are represented below, as well as some of the advantages and disadvantages associated with them. We started out with numerous ratios and chose the subsequent ratios due to relevance and limitations regarding data available and how they fit the technology market. For further elaboration on how the ratios are computed, see appendix N.

## Earnings per Share

The earnings per share (EPS) is the net income per share, this is what the company has available per share of the common stock. To be able to see how much profit one share produces without the noise of market optimism/pessimism or consensus, the investor can use the ratio;

$$\text{EPS} = \frac{\text{Company Earnings}}{\text{Number of Outstanding Shares}}$$

This is a way to compare companies, but it is not reliable as a valuation method, though it is important in the company valuation process.

The ratio is exposed to manipulation, leading the investor to confusion. It is important to take the amount invested to gain the earnings into account when evaluating the company. It may be a major difference in how much equity that has been required to gain the income (Brealey, 2008).

### Price-Earnings Ratio

The price earnings ratio is the value of the company's current share price compared with the earnings per share (EPS). The price is the market value per share based on the markets' expected future earnings. EPS may be based on the past (trailing) earnings, the rolling EPS represented by the most recent EPS of the four quarters, or the forward estimated earnings. Usually the ratio is calculated based on the market price of the share divided by trailing earnings (Penman, 2010).

$$\frac{\text{Market Price per Share}}{\text{Earnings per Share}}$$

The ratio shows how much an investor is willing to pay per dollar in earnings, hence the ratio is reflecting anticipated future growth in earnings. For the ratio to be able to provide any useful information it needs a benchmark. This may be the P/E ratio for the market as a whole, the previous company ratio or P/E ratio for other companies within the same industry.

It is important to note that the ratio is exposed to manipulation through investments that creates growth but this does not necessary create value. The earnings growth may be created by accounting. This exposes the investors to paying too much for growth. For technology

companies the P/E ratio tends to be higher relative to other industries because of the expected growth potential.

### Price Earnings Growth

The price earnings growth ratio (PEG) is the price earnings ratio divided by the percentage growth rate, at most times the forecasted growth rate in earnings per share. The ratio gives an indication of the possible value of the stock, taking both the price earning and the growth into account. It is optimal for the investor to pay as little as possible for the future earnings growth, so a relative low PEG is preferable indicating that the stock is undervalued (Nasdaq, 2011c). A stock that is considered to have a fair value has a PEG ratio of 1.

$$\text{PEG Ratio} = \frac{\text{PE ratio}}{\text{Annual EPS Growth}}$$

There may be some pitfalls in using the ratio as it is based on estimated values, exposing it to great uncertainty. Companies taking great risks may trade at relative low PEGs compared to companies with comparable growth rates. It may also be misleading as companies investing in high quality projects and companies that reinvest are trading at a relatively high PEG rate (Penman, 2010).

### The Price to Sales ratio

The ratio aims to explain the relationship between the company's market capitalization and their revenue. The Price to Sales ratio (PSR) is the market capitalization divided by the company's total sales over the past 12 months.

$$\text{Price to Sales ratio} = \frac{\text{Market Capitalization}}{\text{Total Sales for the Past 12 Months}}$$

A low ratio indicates either low market capitalization compared to revenues, or high revenues compared to market capitalization. The PSR explains how much investors value each dollar of the company's sales, and is often used to value growth stocks, or startups with no earnings.

The ratio was widely used during the first dot-com bubble, as many of the companies that got listed did not have any earnings, and therefore not possible to calculate the company's P/E. It is especially useful when the company suffers from negative earnings, hence an unidentified P/E. By comparing PSR within an industry the ratio may indicate whether the investigated company is under- or over-valued (McClure, 2010).

Basing investment decisions solely on the background of revenue may be inaccurate, as revenue does not provide a complete picture of the business. A company may act as an intermediate, by receiving a lot of money that is going to be paid out as it is not their earnings. Another pitfall is that debt is not taken into account, hence using enterprise value / sales can be more accurate, but requires more details making it harder to compute. Enterprise value adds the company's long-term debt to the company's market capitalization and subtract-for cash (McClure, 2010).

The PSR can be helpful to value startups in cases of negative and no earnings or when little information is available. With respect to the last point the estimated market cap is simpler to calculate than enterprise value, as well as estimated revenue can be easier to calculate than estimated earnings, due to fewer variables. The ratio should only be used to compare companies within the same industry as the degree of leverage varies between sectors (Damodaran A. , 2002).

### Free Cash Flow Yield

Free cash flow is the cash flow generated from operations that results from investments subtracted the cash used to make the investments. The free cash flow enables the company to pursue opportunities to enhance shareholder value, hence it is important for paying dividend, reduce debt and to make acquisitions. The free cash flow may be a good indicator for company performance as it is not as easily manipulated as earnings through accounting methods. It is harder to fake cash flows, so the free cash flow may be a good indicator for a company's cash generation, hence its profits.

$$\begin{array}{r} \text{Net Income} \\ + \text{Amortization/Depreciation} \\ - \text{Change in Working Capital} \\ - \text{Capital Expenditure} \\ \hline = \text{Free Cash Flow} \\ \hline \hline \end{array}$$

A negative free cash flow may lead the investor to think that the company is worse off than it actually is. When investing in projects, this may lead to negative free cash flows in the short term, whilst in the long term perspective this may provide the company with great payoff.

The cash flow yield provides information of how well a company generates cash flows from its current operations.

$$\text{Free Cash Flow Yield} = \frac{\text{Free Cash Flow per Share}}{\text{Current Market Price per Share}}$$



This ratio is considered a relative better financial indicator than the P/E ratio for measuring the fundamentals in a company. Although this indicator should also be seen in relation to others to get a more complete picture of the fundamental performance for a company (Damodaran A. , 2002).

### Financial Leverage

The financial leverage ratio (FLEV) is a balance sheet ratio providing the information of the relative size of net financial assets or obligations, and the long term solvency of the firm. The totals are compared to common shareholders' equity (CSE), depending on if the company is holding net debt or net financial assets showing the relationship between net financial obligations and the shareholder equity.

$$\text{Financial Leverage ratio} = \frac{\text{Net Financial Obligations}}{\text{Common Shareholders' Equity}}$$

The capitalization ratio shows the relationship between the net financial assets and the common shareholder equity.

$$\text{Capitalization ratio} = \frac{\text{Net Operating Assets}}{\text{Common Shareholders' Equity}}$$

The capitalization rate subtracted with FLEV should always be equal to 1. Both ratios may be used to find the degree of how net operating assets are financed with common equity or net financial debt.

The shareholders may be better off if the company has financial leverage. This is true if the company earns more on its net operating assets than its obligations on borrowing costs. If this is the case, the FLEV generate a higher return for the company's shareholders, but if not, the FLEV ends up hurting them instead. The company is in general characterized safer with a relative higher equity based financing, hence a low ratio (Penman, 2010).

### Moving Average

Identifying trends is important in technical analysis. Moving average works as a trend indicator, where the trend is identified by the development in the market, i.e. the stock prices. A trend occurs when the market develops in the same direction within a time frame. A growing trend is identified by looking at the price going from being below the average curve to break through the moving average. If the stock price breaks up through the trend, the positive signal is enhanced. Conversely, a declining trend is characterized from the price being above the average to decline below the average curve. If the market is in a downward trend when the stock price break down through the average the negative signal is enhanced. The moving average curve shows what trend the stock is in, indicating how to ride the market.

The method is signaling trends and breakage of trends, useful in market analysis and predictions. The number of days, that the moving average is calculated over, depends of the preference for time line. To identify and study a short-term perspective, normally, a 30-60 day moving average is used, whilst 100-200 days moving average is often used to study the longer-term perspective (Trend Tech Securities).

# CHAPTER 6 - ANALYSIS

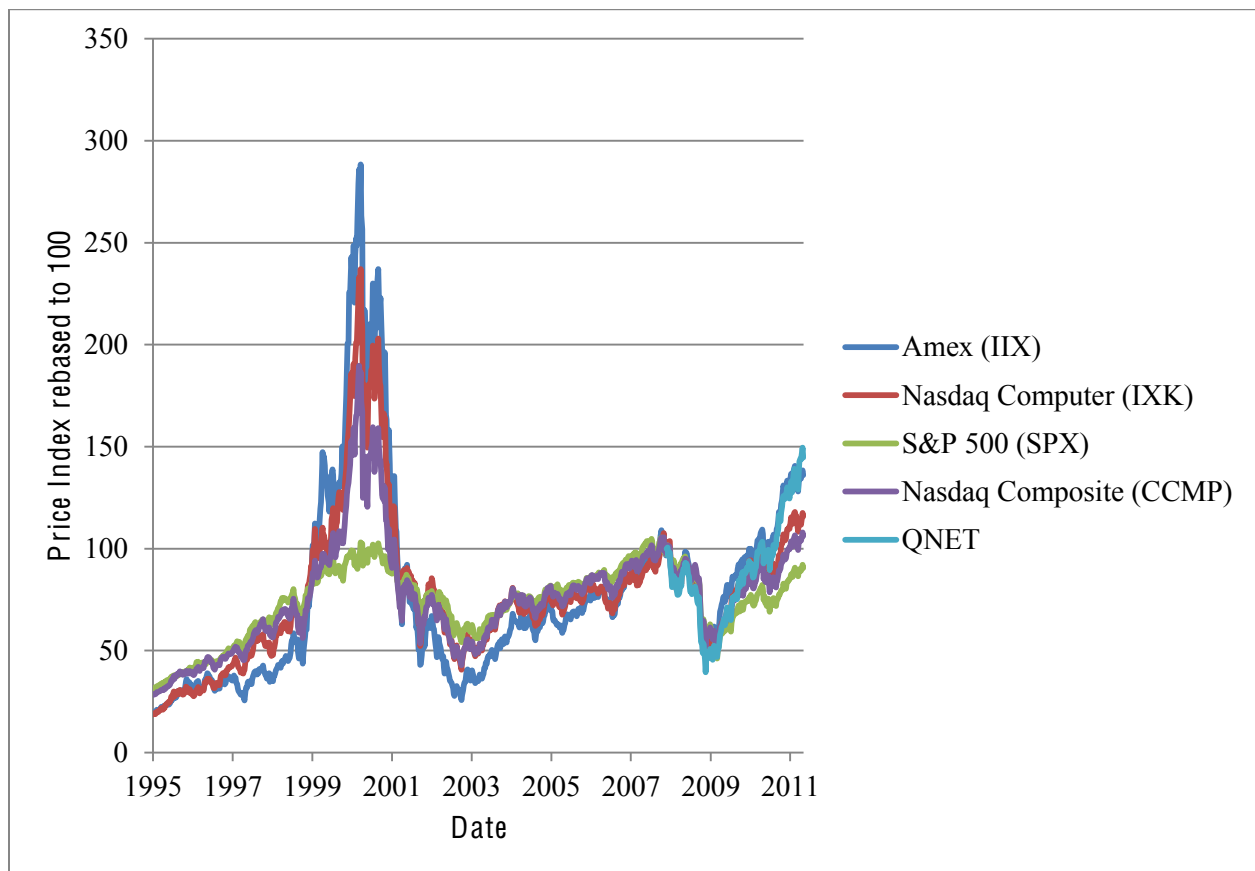
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## 6.1 - Technical Analysis

### Price index

The chart provides us with an indication of how the index values are evolving with respect to different economic events. In the period of 1995 to 1999 the S&P 500 index had a higher price level compared to the technology market, this however turned when believes in the dot-com companies increased and the price level reached sky high levels due to overconfidence in the technology market, later known as the dot-com bubble.

Figure 6 - Price Indices from 1995 to 2011. Rebased to 100.

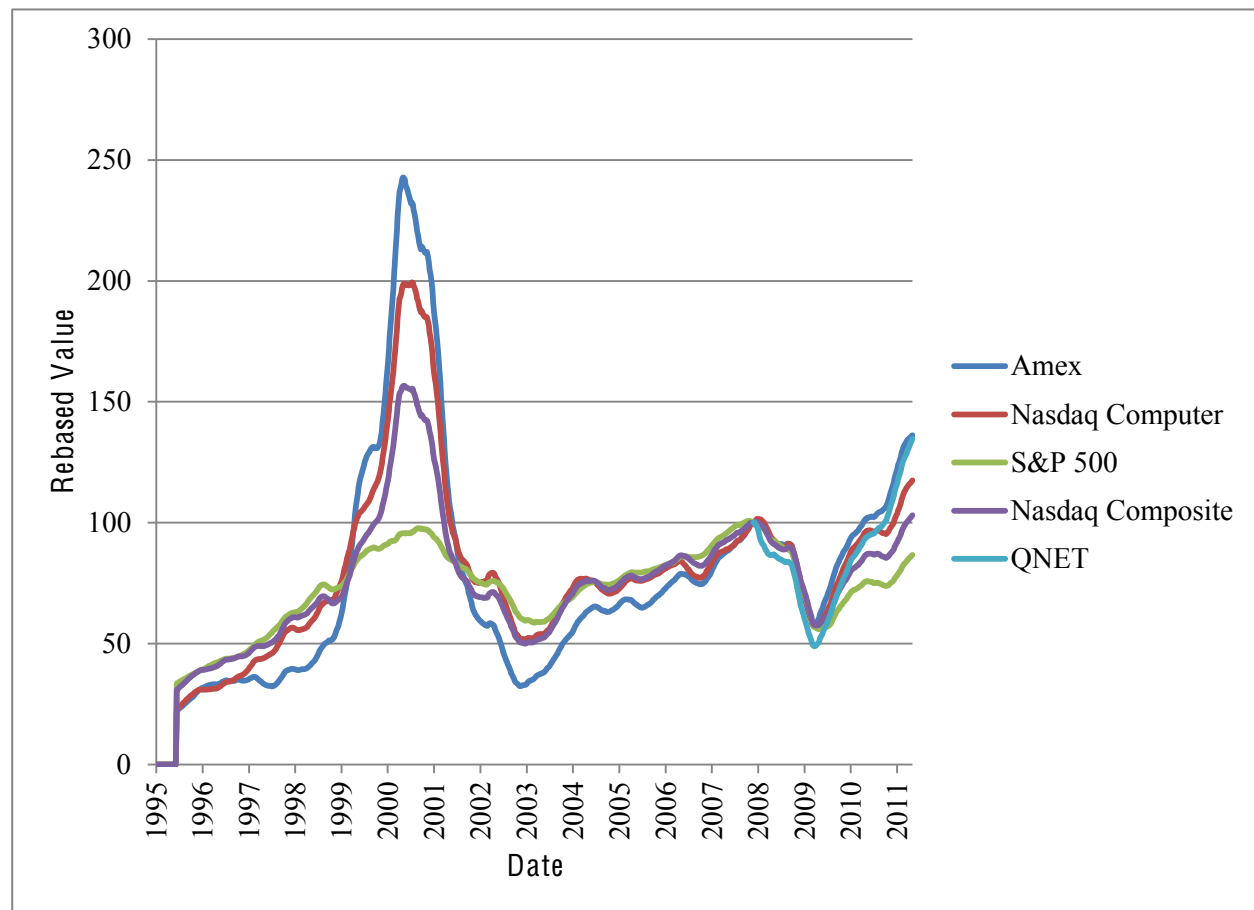


Source: Appendix O, Figure 6

The bubble burst, and as a result the chart illustrates a higher price level for S&P 500 compared to the Amex Interactive Week Index. This development continued from approximately 2001 until 2008, when due to the financial crisis the level for all indices fell. The subsequent development in the indices went from being aligned to develop with different growth rates. The index with the highest rebased price level has shifted between Amex and QNET, both indices representing solely Internet related companies. The growth rate in the market in general has been upwards sloping however with a lower growth rate. This result in a gap between the Internet indices and the benchmark which indicates a stronger belief in the Internet market compared to the market in general.

During the first dot-com bubble the price development in the Internet related companies had the highest growth in demand as seen in the Amex index. The subsequent level of demand was represented by the following; Nasdaq Computer, Nasdaq Composite, and then the S&P 500. Indices containing Internet related companies are ranked from highest to lowest in the following order; Amex, Nasdaq Computer, Nasdaq Composite, S&P 500. It is interesting to see that the same ranging order is about to repeat itself when looking at the current situation, where the common denominator for the development for the growth in demand for the companies listed on the indices is the amount of Internet related companies. This is still valid after the Internet index QNET is included.

Figure 7 - Long-term trend based on 180 days Moving Average Price Index for the five indices.



Source: Appendix O, Figure 7

Looking at the long-term moving average it becomes even clearer that the S&P 500 index level took the hardest beat during the financial crisis. This may be one of the explanations for why the index shifted from being the leading index of the five, from 2005 to about 2008, to be at the relatively lowest point ever in 2009. When investors again started to believe in the stock markets, the market again started to grow. The trend is upward sloping for all indices, though with a steeper trend for Internet indices compared to the overall market, increasing the gap between them. Investors' appetite may be larger for technology shares due to a potential upside based on good track records and expectations for future growth. The same trend can be seen by short-term moving average as well (See Appendix F).

Isolating the price developments in the indices, it may seem plausible that some of the same trends, as seen in the pre-dot-com bubble, are about to repeat themselves shown by an upward trend in the development of price levels. The trend is especially steep for the indices consisting of solely Internet companies, the Amex and QNET indices. Based on the current market situation a higher proportion of Internet related companies might result in an even higher growth rate for these indices.

## Price versus Earnings

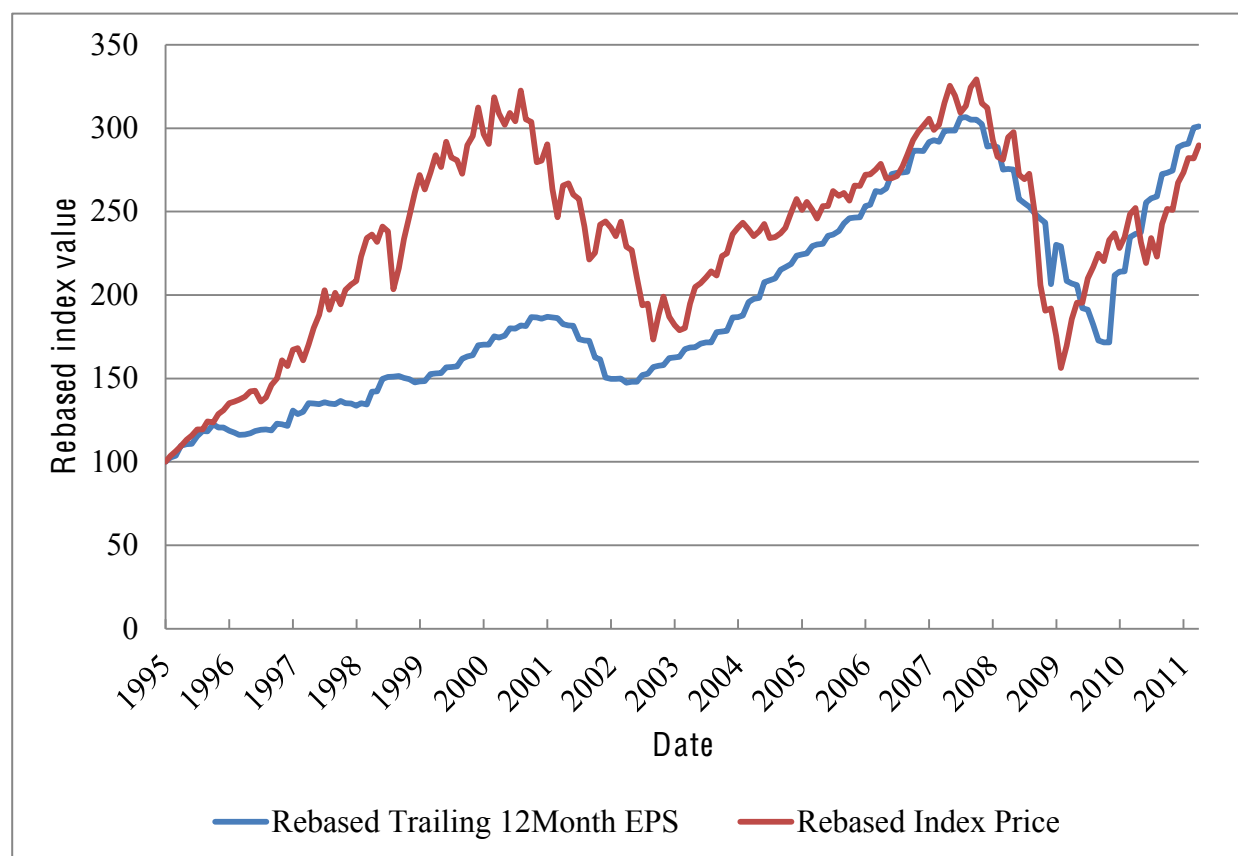
Since the market price is reflecting the market's expected future earnings, it is interesting to illustrate the willingness to pay compared to the actual earnings. Bubbles are indicated by hot markets, so we investigate if the market for technology shares is hot, hence the willingness to pay will be relatively large. We try to explain how the indices' price levels and earnings reacted to different economic events to see how they differ with respect to sensitivity to these events. To capture the trend for short- and long-term in the respected markets, we take a look at moving average in both the price and earnings.

## Fed trying to limit price levels

### *S&P500*

Figure 8 shows that the price level is sufficiently higher than earnings in hot markets, such as in the dot-com bubble. The difference between the two reached an all-time high right before the burst of the bubble.

Figure 8 - S&P 500 Index Price versus Earnings. The values are rebased to 100.



Source: Appendix O, Figure 8

As an attempt to limit the growth explosion in the technology stock market, Fed increased the Federal Funds rate from 5.00 to 5.25 percent in August 1999 leading to an increase in discount rate from 4.50 to 4.75 percent. This increase continued quarterly until May 2000 when the Federal Funds rate reached the top of 6.5 percent. As a result the growth in the S&P 500 slowed down considerably in both index price and earnings.

### *The Technology Industry*

Looking at the technology market, we see that the price did not go beneath the earnings curve at any point in time indicating a relatively stronger belief in this sector compared to the overall market. The figures 9,10 and 11 present the development of price and earnings for the

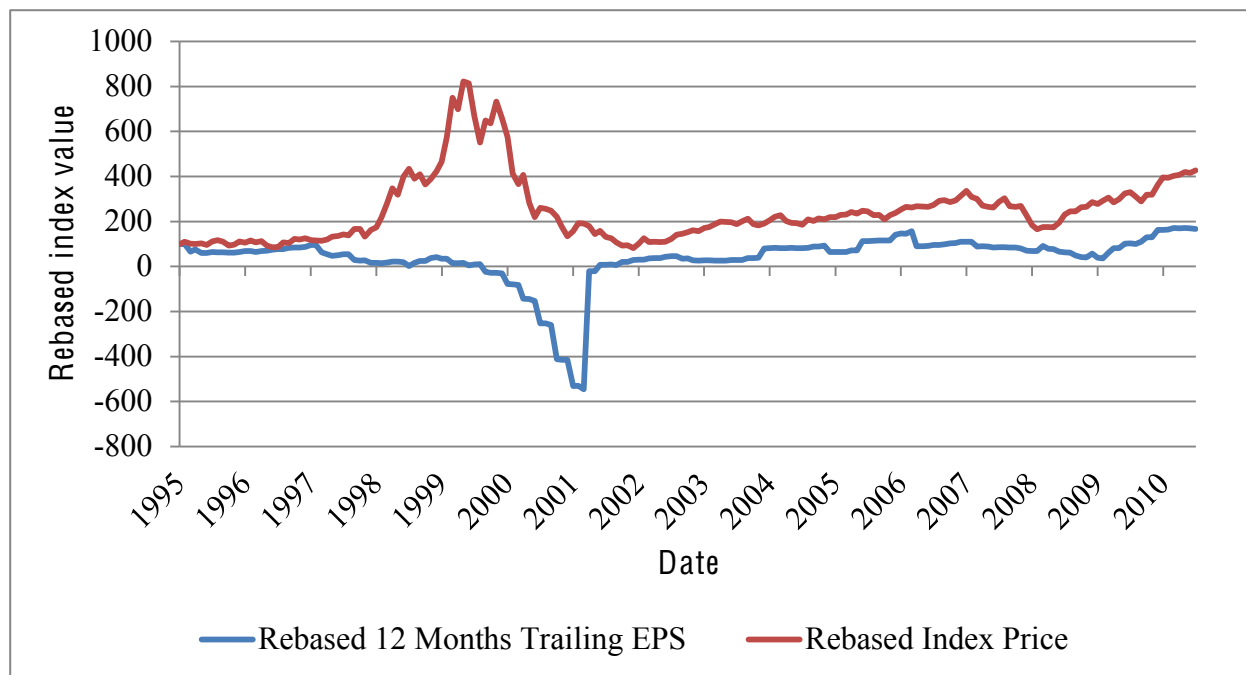
technology sector shows a pattern where the price rose to extreme heights while earnings were low and actually negative for some time; the bubble.

These charts indicate a decoupling of the price and earnings for the technology industry in the run-up to the bubble. Based on theory, the price reflects the expected earnings, so when there is a decoupling of the two, this signals irrational investor behavior in the market.

#### Amex

At the time when Fed started to increase interest rates in 1999, the index value of Amex had already started to drop. The respective earnings had a massive drop that continued until January 2001 when the Federal Reserve made a surprise cut in interest rate, The Federal Funds rate reduced to 6.0 percent from a previous 6.5 percent level. This resulted in a reduction in discount rates from 6.0 percent to 5.5 percent.

Figure 9 - Amex Index Price versus Earnings. Rebased to 100



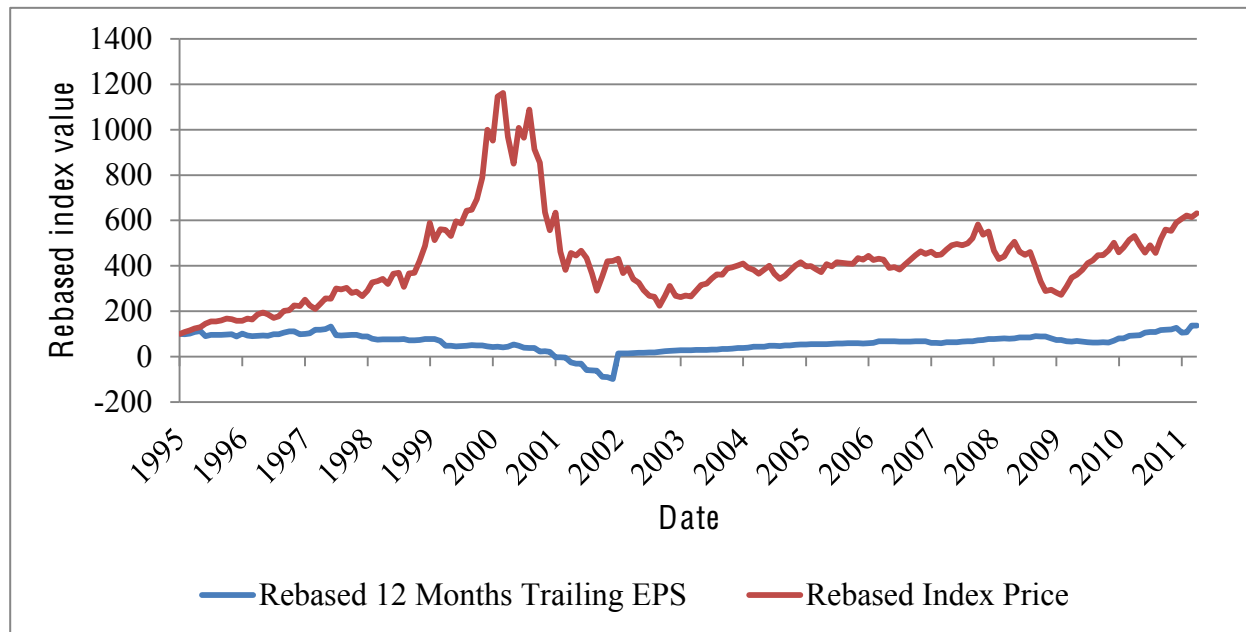
Source: Appendix O, Figure 9



### Nasdaq Computer

The growth in price level of Nasdaq Computer was not sufficiently slowed down by the increase in interest rates, it continued to rise until February 2000 when its value had a steep drop until late May. Though, the increased rate may be one of the factors on earnings that in 2000 turned negative.

Figure 10 - Nasdaq Computer; Index Price versus Earnings. Rebased to 100.

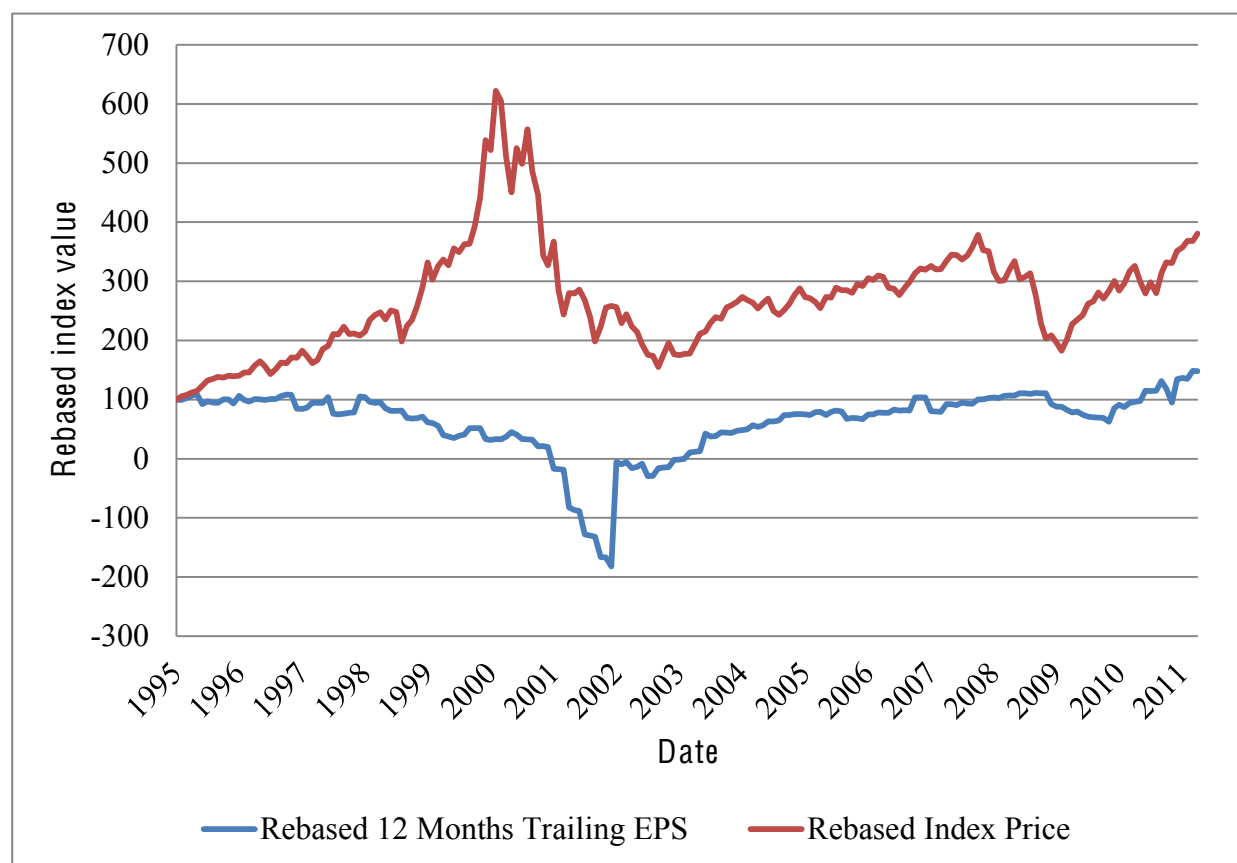


Source: Appendix O, Figure 10

### Nasdaq Composite

The index price of Nasdaq Composite continued with a rapid growth even after the interest rate was increased in August 1999. This continued until the burst of the bubble in March 2000. The continuously increase in interest rates may have enhanced the drop in the index price as well as in the earnings. The cut in interest rates made by the Federal Reserve in January 2001 did not stop index value, or the earnings, from dropping rapidly. Earnings went negative in late 2000 and continued to drop until December 2001, turning positive in 2003.

Figure 11 - Nasdaq Composite; Index Price versus Earnings. Rebased to 100.



Source: Appendix O, Figure 11

### Oil Supply and Burst of the Bubble

The start of 2001 was characterized by the burst of the technology bubble as well as raising production costs due to OPEC cutting oil production by 1.5 million barrels a day amounting to 5.6 percent of current output. This slowed production growth in the U.S. economy. To stimulate further growth, Fed continued to decrease the Federal funds rate from 6.0 to 5.5 percent leading to a reduction in discount rate from 5.5 to 5.0 percent in late January. In end of March 2001 GDP grew at an annual rate of only 1 percent, the lowest in more than 5 years. In August, Fed continued their stimulation of the economy by again reducing the Federal funds rate from 3.25 to 3.00 percent after reduction in the rate in April and May, as well as a government tax cut in June along with a further decrease in the Federal rate. This led to a discount rate of 3.00 percent in August.

### *S&P 500*

The overall market had growth in earnings until January 2001 where increasing, oil prices put an end to this growth and earnings start to fall. The trend in index value was also affected negatively.

### *Amex*

The burst of the bubble made the index value drop, it is not clear how much of an impact the increased oil price had on companies listed on Amex, due to the fact that these mainly was Internet companies not dependent of oil in production. Though, the decrease in the Federal funds rate may have affected the index in a positive way with respect to growth in earnings, where earnings went from negative to positive in late April 2001.

### *Nasdaq Computer*

Nasdaq Computer index level continued to drop as well as its earnings in January. All though the Federal Reserve decreased interest rates, this did not prevent the earnings for the index to fall beneath zero. The falling earnings may have been enhanced by the increase in production costs due to the rise in oil price.

### *Nasdaq Composite*

The index level dropped significantly due to the burst of the bubble. The decrease in earnings had been going on for some time due to the making of the bubble in the sector, but it seems to be enhanced by the increasing oil prices as well as the burst of the bubble. The drop in earnings continues in spite of the decrease in interest rates.

### Sector sum-up

The indices representing the technology market drop significantly in value due to the burst of the bubble. The increase in oil prices have some affect on the technology market in the companies producing components depending on production costs determined by the price of oil. Though, the overall market seemed to be much more affected by the increase in oil price and the slowed production growth in the U.S. economy than the indices representing the technology sector.

### Terrorists Attack World Trade Center and the Pentagon

The decline in the economy is defined by National Bureau of Economical Research (NBER) as a recession in the U.S. starting in March 2001, reinforced by the terrorist attacks on Pentagon September 11<sup>th</sup>. The recession ended in November 2001 (Hall, Feldtstein, Bernanke, Frankel, Gordon, & Zarnowitz, 2001). Trying to limit the economical downturn, Federal Reserve continued to lower interest rates. After the dot-com crash and the subsequent recession, the Federal Reserve cut short-term interest rates to historical levels to just 1 percent.

Table 2 - Percentage change in the rebased index level due to the terrorist attack in September 2001.

Date	Nasdaq Composite		S & P500		Nasdaq Computer		Amex	
	Level	Percentage change	Level	Percentage change	Level	Percentage change	Level	Percentage change
07.09.2001	1688		1086		789		119	
14.09.2001	1695	0,5	1093	0,6	802	1,7	122	2,8
21.09.2001	1423	-16,1	966	-11,6	653	-18,6	102	-17,0
28.09.2001	1499	5,3	1041	7,8	675	3,4	102	0,7
05.10.2001	1605	7,1	1071	2,9	771	14,2	113	10,2

Source: Appendix O, Table 2

### S&P 500

The S&P500 index charted in figure 8 show a three months drop in index value as well as earnings by the time of March 2001, hence the recession. The low interest rates at the time seem

to have a positive effect on the earnings as they again start to rise in mid-2001. In the subsequent weeks after the terrorist attack, the index dropped 11.6 percent in value. November 2001 the index is at its lowest level since first half of 1997, but from there the trend is again changing upwards.

#### *Amex*

Index level continues down reinforced by the terrorist attack with a downturn of 17 percent in the subsequent week. Earnings went straight down and negative after the burst of the bubble and stayed down at levels beneath zero until first quarter 2002.

#### *Nasdaq Computer*

Nasdaq Computer dropped in index value due to the recession and was enhanced further by the terrorist attack in September 2001 with a decrease in index value of 18.6 percent the following week. The drop in earnings went beneath zero, though not as negative as Amex. It took some shorter time for Nasdaq Computer to turn earnings positive compared to the Amex index. Earnings turned positive in the start of January 2002 for the index.

#### *Nasdaq Composite*

The index level dropped rapidly from first week in February 2001 following the bear market in the recession. The terrorist attack in September resulted in a further subsequent drop in index value of 16.1 percent. The earnings went negative early in 2001 reaching the lowest point in December the same year. From this point, it looks like the fiscal stimulus started to work as the loss became sufficiently smaller and in first quarter 2003 earnings are again positive.

#### *Sector sum-up*

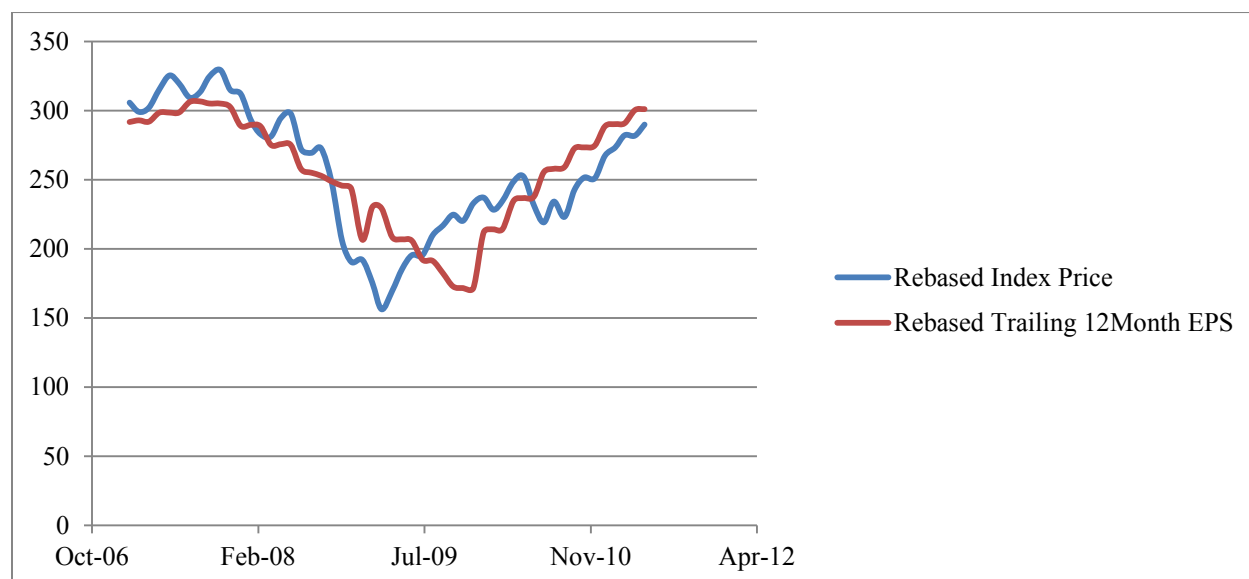
The indices continued down due to the burst of the bubble and the following recession in the U.S. economy. Fed tried to turn the economical development around by further decrease short-term interest rates, but the subsequent terrorist attack drove the markets down even further. The

technology indices suffered larger index losses than the S&P 500 index in the subsequent week after the attack.

### Financial crisis

For the first time in over 4 years Federal Reserve increased the interest rate in 2004 due to recovery in the economy. Despite the increased rates, the S&P500 recovered in a bull market where the index level, as well as earnings, grew rapidly. The difficulties in mid-2007 stemming from bankruptcy in more than 25 subprime lending firms due to increasing defaults on subprime loans ran the stock market into the second bear market since the early 21<sup>st</sup> century. This is reflected in the S&P500 index through a rapid drop in both index price and earnings after reaching the highest levels since 1929 in October 2007. The graph shows the lowest point after the outburst of the financial crisis in March 2009 when the S&P 500 closed at 676 a level last seen in 1997 (see Appendix P).

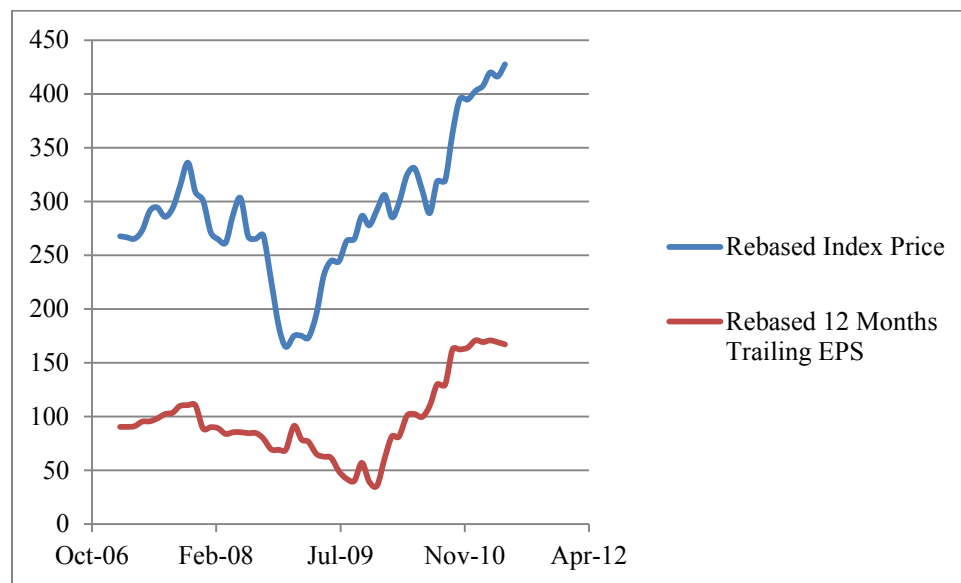
Figure 12 - Price versus Earnings for S&P500 2007-2011



Source: Appendix O, Figure 12

The three technology indices were also characterized by a bull market represented by an increase in index values though with a much lower growth in earnings compared to the S&P500.

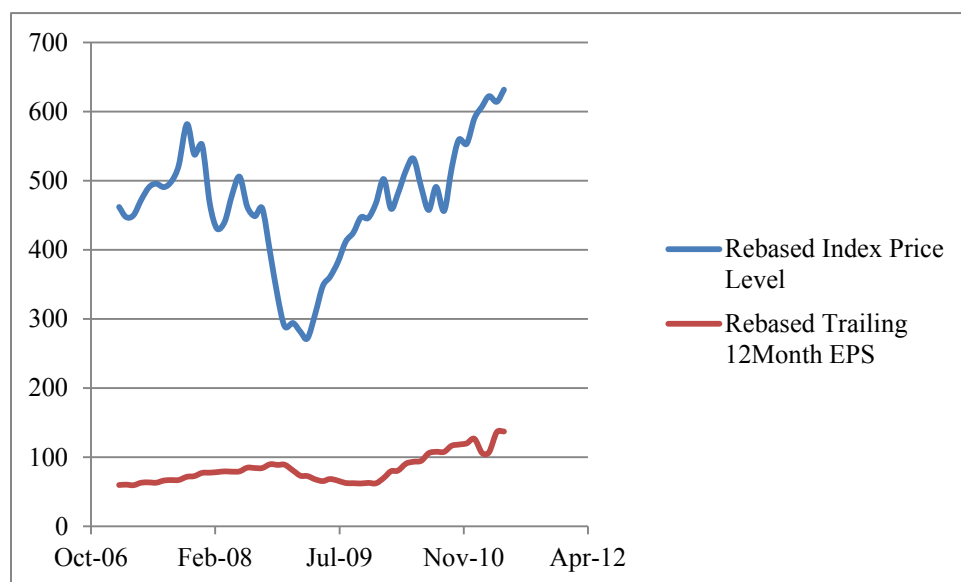
Figure 13 - Price versus Earnings for Amex 2007-2011



Source: Appendix O, Figure 13

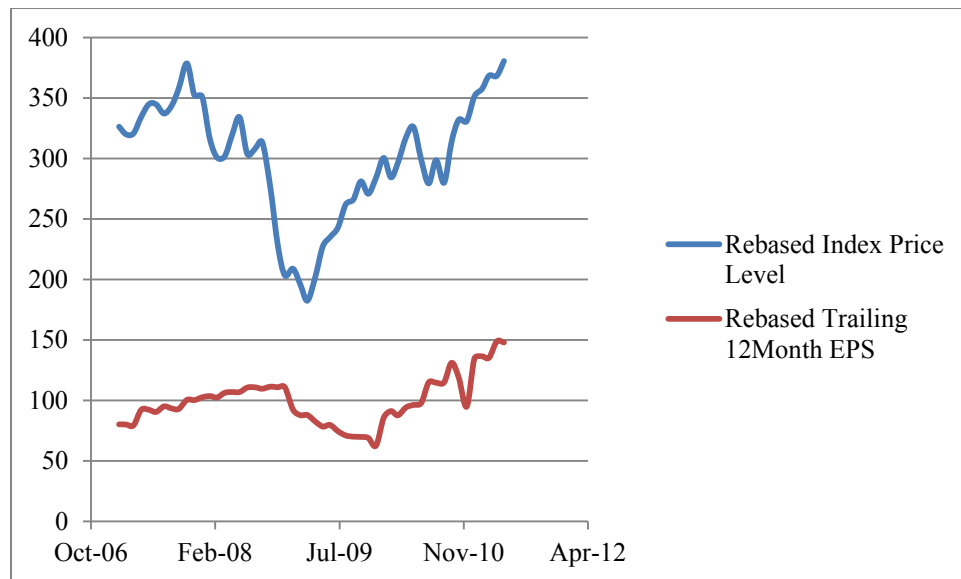
The rapid drop in index prices was, for Amex, the result of the financial crisis in September 2008, and some time earlier for Nasdaq Computer with a one week drop in index value of 15 percent in the last week of January. The subsequent week is followed by the biggest one-day reduction in interest rate on record from 4.25 to 3.5 percent. This stimulated the market for a while, but in September 2008, Nasdaq Computer went down after the announcement of several negative economic events.

Figure 14 - Price versus Earnings for Nasdaq Computer 2007-2011



Source: Appendix O, Figure 14

Figure 15 - Price versus Earnings for Nasdaq Composite 2007-2011



Source: Appendix O, Figure 15



Nasdaq Composite followed the same pattern as S&P500 in late 2007 and early 2008, also affected by the increase in defaults in subprime loans. A difference in the two is that whilst the overall market's earnings also dropped in that period, the earnings in Nasdaq Composite continued to grow until late 2008, the companies listed on the technology index were still making money. The drop in interest rate seems to have a greater stimulus to earnings in companies represented in the Nasdaq Composite index compared to the S&P500.

The steepest drop in the index occurred before September 2008 and was enhanced by the collapse of the financial markets due to lack of confidence in the markets and the bankruptcy of Lehman Brothers triggering a global recession.

#### *From Bear to Bull Market*

In November 2008 Fed announced that it would buy \$800 billion in mortgage-backed securities in an attempt to lower interest rates. The Amex index value continued to grow after its lowest point in November 2008, despite the continuously drop in the other three indices, reflecting a higher confidence in Internet companies. The turn from bear to bull market was in late February 2009 for S&P 500, Nasdaq Composite and Nasdaq Computer, as a result of President Obama signing a \$787 billion stimulus package.

#### *Sector sum-up*

In 2008 the technology indices differ from the rest of the market. Due to the financial crisis, both price and earnings drop rapidly in the overall market, however, for the technology market the price drop but the earnings remain stable. The earnings in the technology industry were not as affected by the financial crises as the rest of the market. We see that these earnings are relatively stable through the whole financial crisis whilst the earnings in the S&P500 index are more volatile and dependent on market events.

Table 3 illustrates the all-time high index values with their corresponding earnings in the dot-com bubble as well as today's current levels.

Table 3 - Compared Earnings and Index Values

Index	Previous dot com bubble		Now	
	Index Value	Corresponding Earnings	Index Value	Corresponding Earnings
S&P 500	1517	53	1363	88
QNET	-	-	239	4,6
Nasdaq Composite	4696	26	2873	118
Nasdaq Computer	2701	40	1468	137
AMEX	621	4,5	326	11

Source: Appendix O, Table 3

Based on these levels we see that the current earnings are sufficiently higher compared to the level presented in the previous bubble. The companies seem to do their business built on sounder business models making them more robust.

### Trends

Looking at the short and long-term rebased moving average for the technology indices after 2008 the charts indicate an uptrend in both price and earnings, though the price trend seems to be steeper, especially for Nasdaq Computer. It is difficult to be precise about QNET due to the short term of data available for the index, but the price has a positive trend. For S&P 500 the trend is also positive. What differs this index from the others is that the trend for earnings is steeper than the price trend.

QNET stands out from the other indices as the long-term trend show a split in price and earnings(See Appendix H). The trend in price is upward sloping whilst the trend in earnings seems to be downward sloping. The problem is that the data available for the index has a short

time horizon, as the index has a short time of existence so the trend may be biased to some extent.

#### *Industry sum-up*

The technology industry are clearly priced much higher than the overall market due to the index's value in relation to its earnings. The earnings follow the same trend as the price, hence there is no clear pattern towards a bubble although the increase in price is steeper relative to earnings.

#### *Technology and Overall Market Response*

##### *Oil Price*

Markets respond differently due to different exposure towards changes in the oil price. There has currently been a great deal of uncertainty due to unrest in oil producing countries and other events. The limited supply for oil, as well as increased uncertainty, has driven the oil price to high levels. Based on the study of how previous events had an impact on the indices, it seems plausible that if this high oil price level continues, this may have a negative impact on especially, the overall market due to increased production costs, but also on some of the index levels in the technology market depending on how much exposure the companies represented in the index has towards this price. Nasdaq Composite and Nasdaq Computer have a larger exposure towards the oil price level due to production costs. The indices containing mostly Internet companies, Amex and QNET, seems to be the two less affected by the price level of the oil price. An increase in oil price is less likely to have a great direct impact on the technology market, especially indices containing a heavy weight of Internet companies.

##### *Outlook from the Financial Crisis*

The effect of the financial crisis has had severe impact on both price and earnings for the overall market, though not as much effect on the earnings in the technology industry as illustrated in the charts by relatively stable earnings. Price and earnings has an upward sloping trend in all indices. Growth in earnings follow the growth in price for the S&P500 index, whilst for the technology

industry the growth rate are more rapid in the price compared to earnings made by the companies listed on these indices. Earnings for Amex have leveled off but the increase in price continues to grow. The same pattern is also seen in the other indices within the technology market, indicating that this market is relatively more attractive for investors at the moment.

### *Interest Rate*

Fed's attempt to control the U.S. economy through fiscal policy seems to have had different effect on the markets through time. The increase and decrease of interest rates seems to have stimulated and slowed the overall economy to a greater extent compared to the technology market. The current interest rate level is very low, making it difficult to use this tool for further stimulus. It is worth to note that if Fed find the growth of the technology market too high in index levels, it will become difficult to slow it down sufficiently without this having a severe influence on the overall market in both earnings and index level.

## 6.2 - Fundamental Analysis

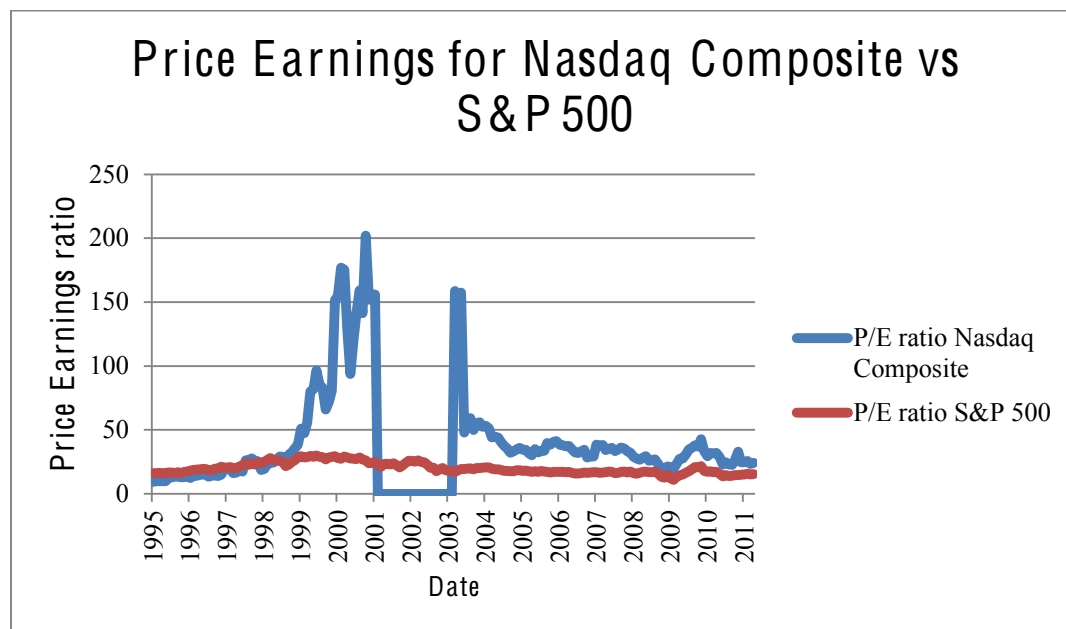
### Price Earnings ratios

The idea behind the Price Earnings (P/E) analysis is to compare the ratios to see if these have a similar pattern to the previous dot-com period indicating a new bubble. The P/E ratio is of interest since it provides an indication of how much the investors are willing to pay for the shares based on the earnings in the respected company. In a hot market the expectations are large, which should be reflected in the ratio through high expectations in relation to increased company value in the future. This is also reflected in the price earnings ratio for the *indices* thereby the expectation of the industry as a whole.

### Nasdaq Composite versus S&P 500

As illustrated in the chart we see that the P/E ratios for Nasdaq Composite and S&P 500 are at approximately the same level until the roll-up to the dot-com bubble in mid-1998 when the ratio for Nasdaq Composite has a tremendous increase. We see that Nasdaq Composite has an uptrend, with some swing-lows. There seems to be a clear head-and-shoulders pattern in the charting of the P/E ratio. The low of a P/E value at 93 marks the end of the left shoulder and the beginning of the head, advancing to 202 and a price level of respective 3369. Due to the burst of the bubble, the ratio decline from 202 towards zero due to negative earnings, to an all-time low value of 1320. The bottom represents the beginning of the right shoulder, which has a top-value of a P/E ratio equal to 158 in March 2003 before the shoulder ends in June the same year at a P/E value of 47. During the period until today, the P/E for Nasdaq Composite still is at a relative higher level than S&P500, but P/Es for both indices have been at a relatively more stable level. The higher level for Nasdaq Composite may be due to a higher price relative to earnings based on a higher expectation for future cash flows in the technology market compared to the overall market, or/and a relative lower earnings compared to the price.

Figure 16- Price Earnings for Nasdaq Composite versus S&P 500



Source: Appendix O, Figure 16

The chart provides no indication of a similar pattern to the dot-com bubble looking at today's situation. Neither in the relationship between Nasdaq Composite and S&P 500, nor in the level of the price earnings ratio.

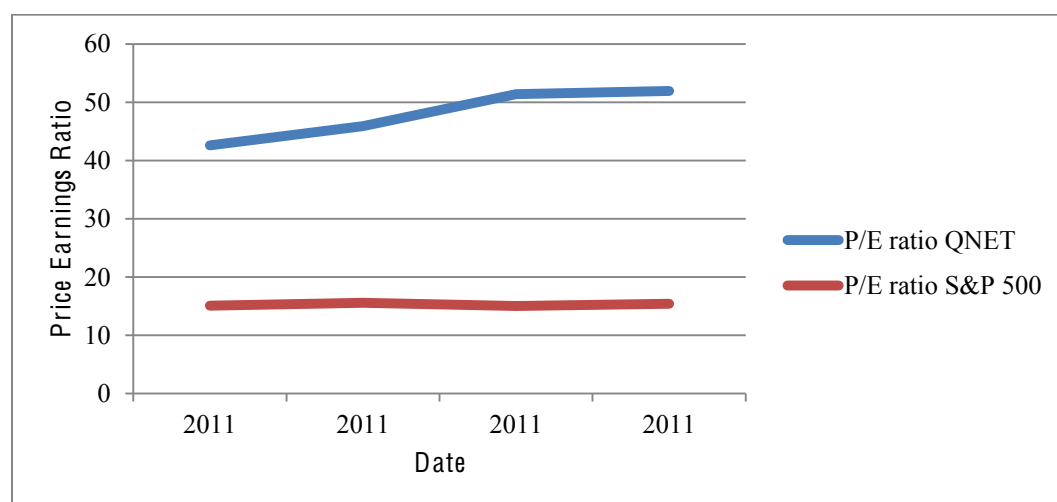
Looking at the short- and long-term trend in Nasdaq Composite, the trends seem to follow each other, hence none of these indicates an increase in Nasdaq Composite compared to the S&P 500.

Comparing the price earnings ratio alone, does not indicate overvalued companies as in a bubble situation. The investors do not seem willing to overpay for the shares listed on Nasdaq Composite in relation to the listed companies' earnings.

#### Nasdaq Internet Index – QNET versus S&P 500

The chart shows that the price earnings ratio for QNET is upward sloping whilst the S&P 500 ratio is approximately flat.

Figure 17 - Price Earnings for Nasdaq Internet Index versus S&P 500.



Source: Appendix O, Figure 17

The difference in the P/E ratio between the two indices indicates larger expectations in the Internet-related business, where the largest and most liquid Internet companies in U.S. are represented with an average P/E ratio of 48 compared to the benchmark ratio of 15.3 for the period. The investors are willing to pay more for these companies relative to the companies in the overall market, at least in the short-term perspective. The question is if the companies are able to deliver in relation to the high ratios or, if not, this may indicate a bubble. It may be difficult to compare this to the previous bubble because of the short time period available for the data, but for this particular technology index signify an abnormal P/E compared to the other indices.

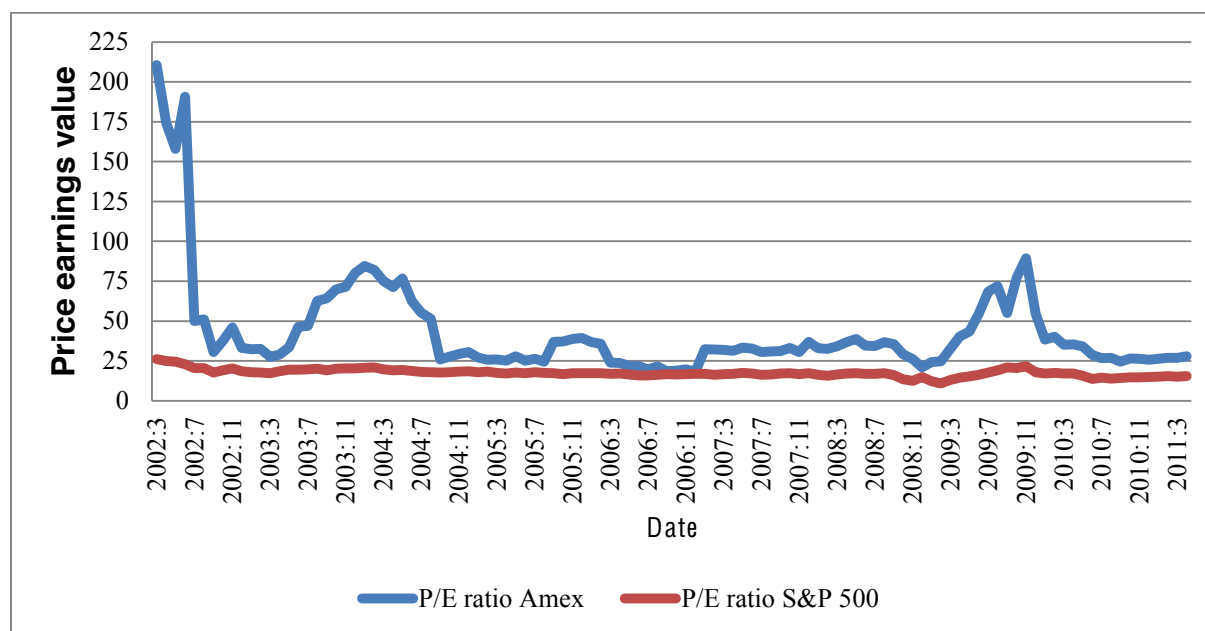
#### AMEX Interactive Week Index versus S&P 500

In order to illustrate the P/E level during the bubble as well as after the dot-com burst we have charted the entire period as well as isolating the period after the burst, respectively 2002 to 2011.

Of all the indices, Amex Interactive Week index (IIX) captures the highest P/E ratio, at an all-time high level of 2581 between March and April 1999 (See Appendix O, Figure L). This extreme case is the result of high demand in a hot market for Internet companies pushing the prices of company shares into artificially high price levels in combination with a lack of earnings.

The chart for the period of 2002-2011 shows a stable PE ratio for S&P 500 just beneath 25. The ratio for Amex is much more volatile moving from up-value 210 to down-value of 20 in relation to the recent financial crisis. For the last 11 months the ratio has stabilized at a level just above 25 and 15 for the S&P 500 index ratio. These levels do not indicate a hot market, especially not when compared to the extreme ratio values seen in the previous bubble.

Figure 18 - Price Earnings for Amex versus S&P 500 from March 2002-2011



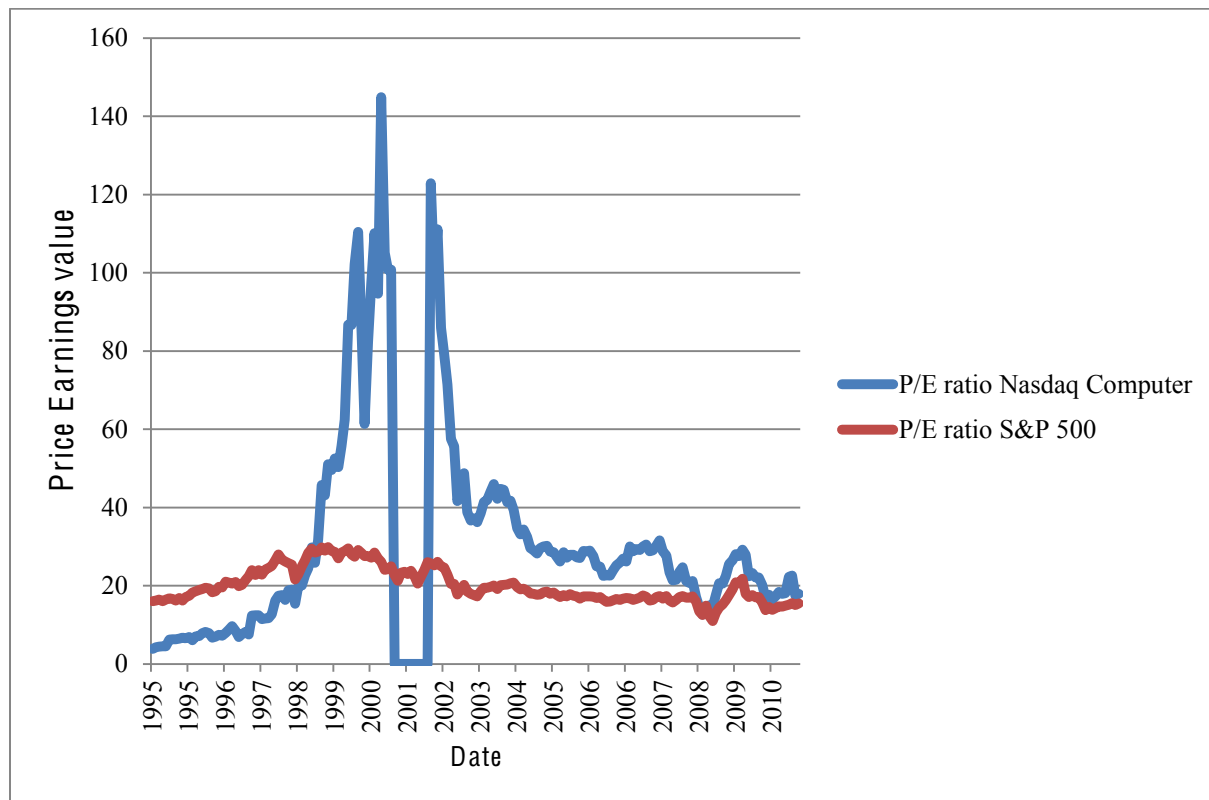
Source: Appendix O, Figure 18

### Nasdaq Computer versus S&P 500

The S&P 500 index ratio is relatively stable compared to the more volatile Nasdaq Computer index ratio. During the bubble the Nasdaq Computer P/E ratio reached an all-time high level of 144 in October before it plunged to zero when the bubble burst four months later. In 2002 the ratio again increased to a relative high level with a top of 121 before it decreased to levels between 44 and 20 between 2003 and the start of the financial crisis in 2008. After the financial crisis the two indices' P/E ratios follow each other more closely, although Nasdaq Computer is still at a relative higher level compared to S&P500.



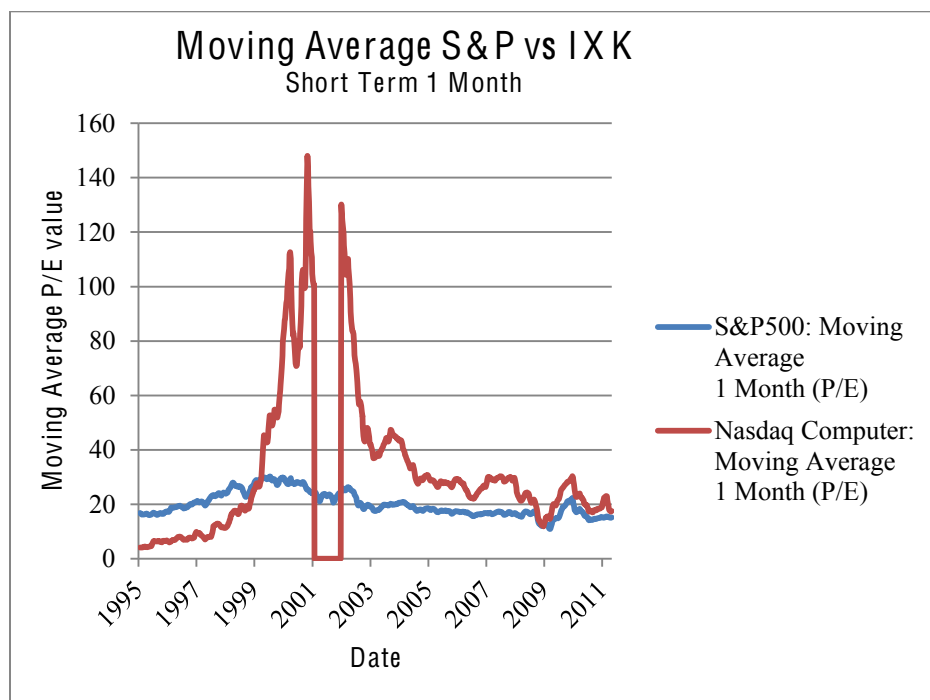
Figure 19 - Price Earnings for Nasdaq Computer versus S&P 500



Source: Appendix O, Figure 19

The long-term moving average indicates the start of an upwards sloping trend, where the slope for Nasdaq Computer is a bit steeper than the benchmark index. The one month short-term moving average indicates a decrease in the Nasdaq Computer index ratio. We see the same trend in the long-term moving average (See Appendix Q).

Figure 20 - Short-term Moving Average Price Earnings for S&P 500 versus Nasdaq Computer



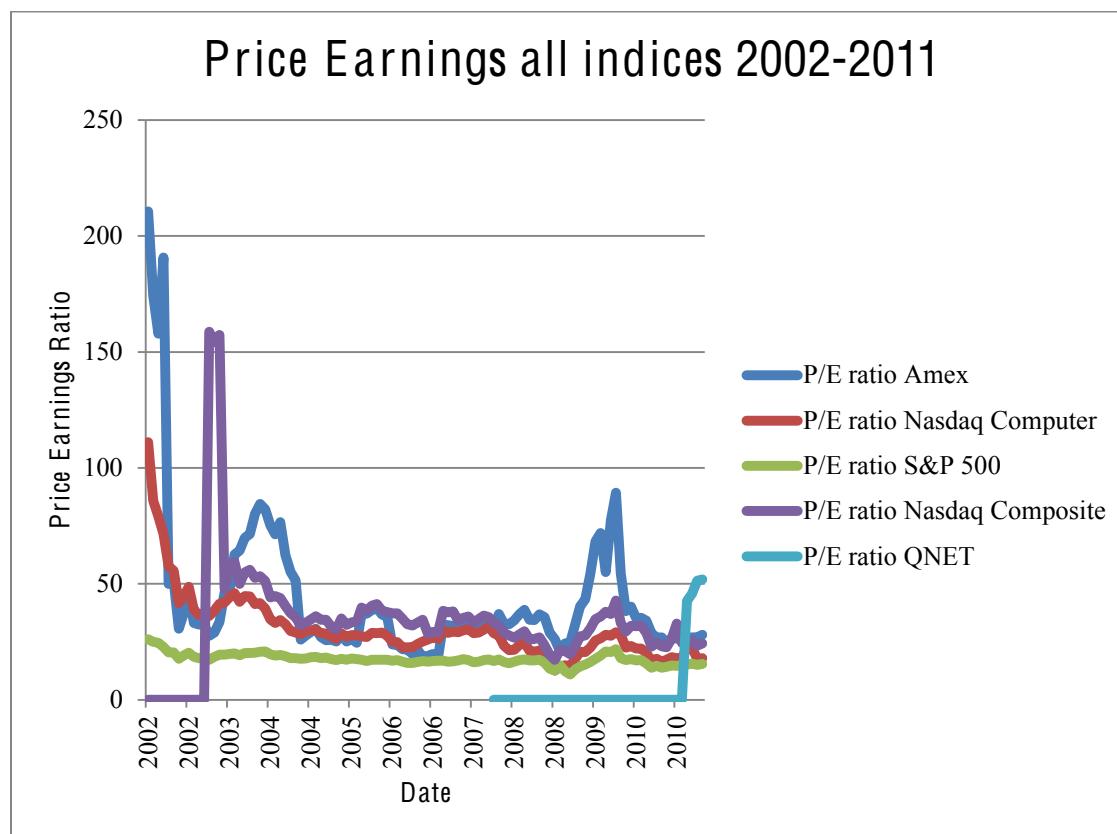
Source: Appendix O, Figure 20

Based on the more normalized level of P/E ratios, as well as the relationship between the Nasdaq Computer and the benchmark ratio representing the overall market, we see no indication of a hot market based solely on this index's ratio.

### Price Earnings for all Indices

Charting all the indices together based on their levels of price earnings show that the four indices have a higher level relative to the benchmark index for most of the time. In recent time, especially the Amex and QNET indices are presented at a higher P/E ratio level compared to the rest. The two indices hold some of the same companies although they are weighted differently, they still may be the source for the relative higher P/E ratios.

Figure 21 - Price Earnings for all Indices 2002 to 2011



Source: Appendix O, Figure 21

## Price Earnings Growth

The PEG ratio provides us with an idea if the P/E is supported by future growth prospects.

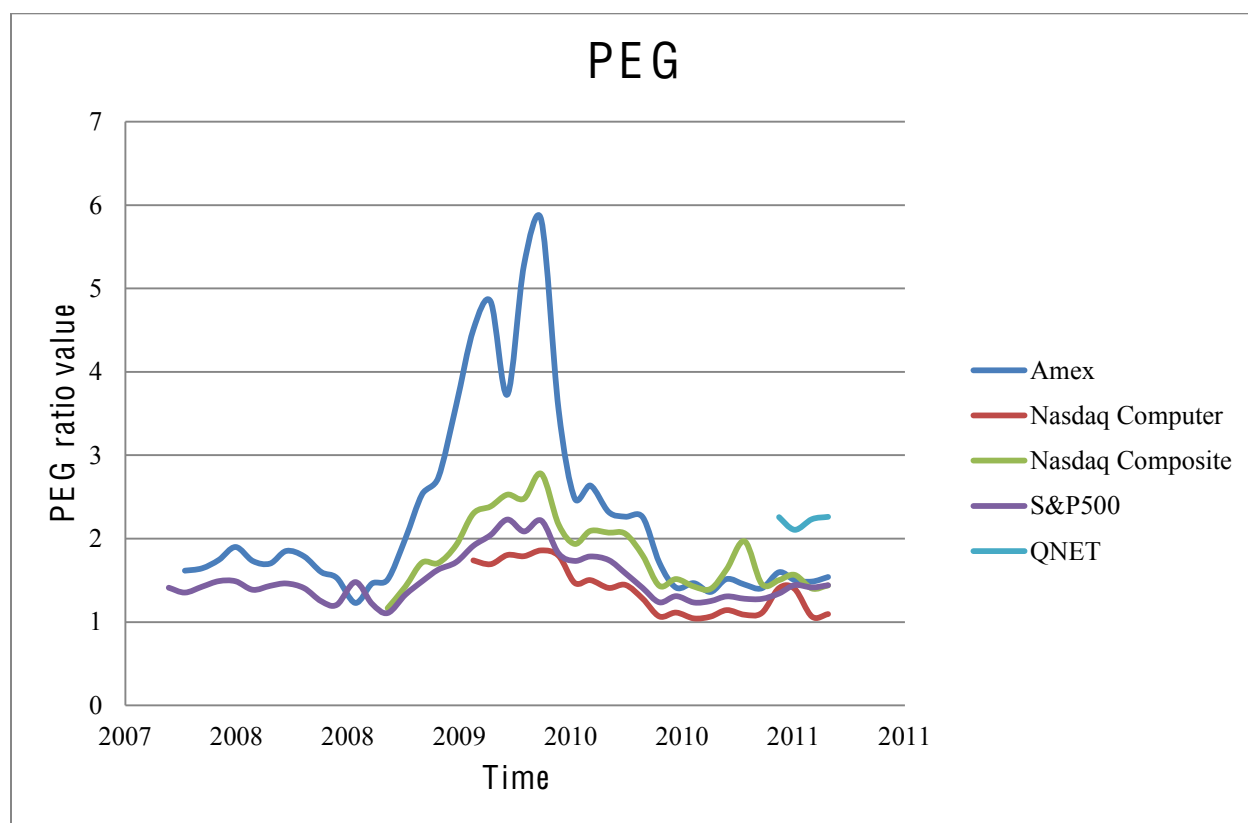
According to theory about over- and under-valuations based on PEG values where;

PEG ratio = 1 → A fair valuation where the stock price is fully reflecting the future growth potential.

PEG ratio > 1 → A possible over-valuation where the shares represented in the index is priced higher than the expected growth in the expected profits.

PEG ratio < 1 → A possible under-valuation where the shares represented in the index is priced too low in relation to the expected growth in the expected profits.

Figure 22 - The PEG ratio for the five indices, based on numbers available in Bloomberg.



Source: Appendix O, Figure 22

To calculate PEG, P/E was divided by Bloomberg's estimated growth in future earnings (see Appendix N). Based on these estimations, none of the five indices are indicated to have been under-valued, but to a great extent, over-valued. Amex is the index which was priced the highest compared to the expected future growth in profits for the index. The ratio was remarkably high during the financial crisis pointing towards a higher investor willingness to pay for the shares represented in this index leading to this high over-valuation. Nasdaq Computer is the index with a PEG ratio closest to 1, indicating a fair valuation based on this ratio. Currently, the two indices containing Internet related companies has a higher PEG ratio compared to the rest, as indicated by the table below.

Table 4 - PEG ratio for the five indices in 2011.

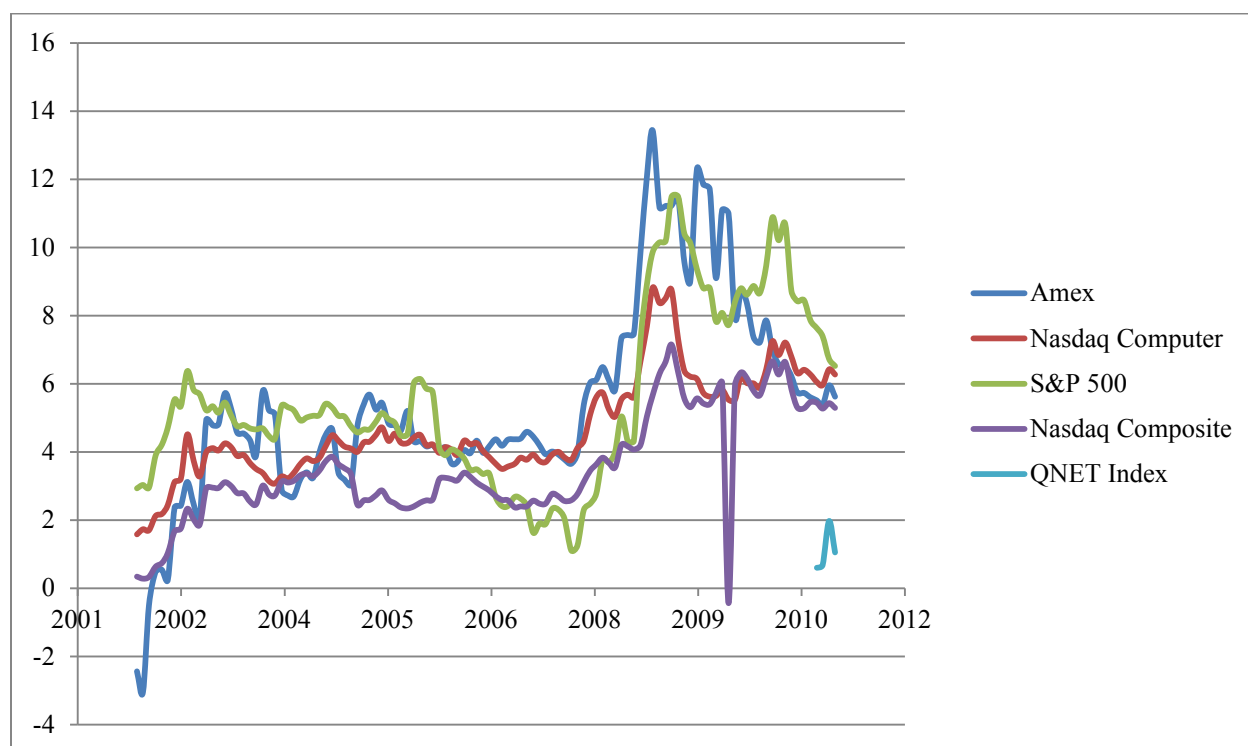
Date	Amex	Nasdaq Computer	Nasdaq Composite	S&P500	QNET
31-01-2011	1,60	1,41	1,50	1,34	2,26
28-02-2011	1,50	1,40	1,57	1,44	2,11
31-03-2011	1,49	1,07	1,40	1,42	2,23
29-04-2011	1,54	1,10	1,44	1,44	2,26

Source: Appendix O, Table 4

## Free Cash Flow Yield

In a bubble, the companies are typically valued high compared to their intrinsic value which is based on the companies' actual cash flows. A good indicator for the intrinsic value is the free cash flow yield that shows how much cash is generated after the investment is taken into account. The technology sector appears as more profitable relative to other industry based on the P/E ratio. Using the Free Cash Flow Yield we are able to see how well the companies in the respected indices generate cash flows from their current operations compared to the benchmark market.

Figure 23 - Free Cash Flow Yield



Source: Appendix O, Figure 23

The interpretation is; the higher the free cash flow yield, the better. The relative high P/E ratios for the technology indices through time imply that the represented companies should generate relatively more cash than the companies represented in S&P500. From the chart, we see that the S&P500 free cash flow yield is at a higher level compared to the rest of the indices after 2009; hence the expectations for the technology indices were not met, at least not in the short-term perspective, which may imply overconfidence in the market for technology.

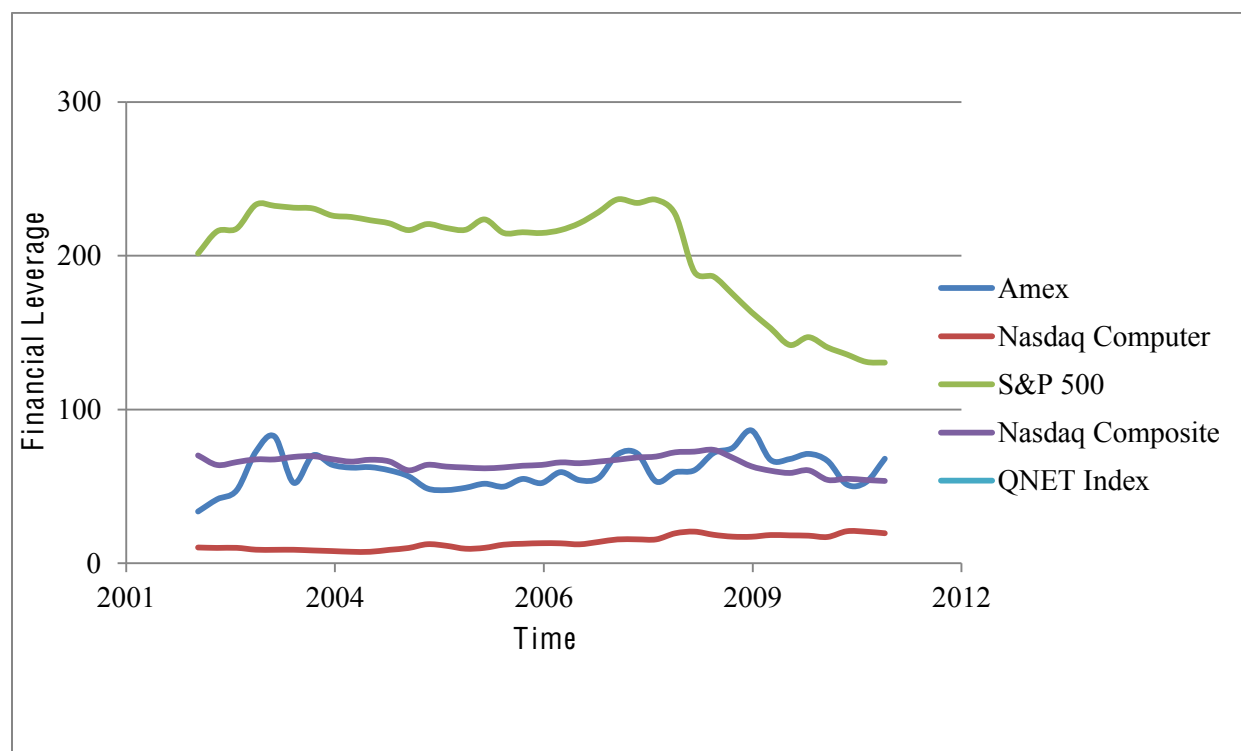
## Financial Leverage Ratio

As mentioned before, technology companies typically are characterized by having solid balance sheets with less debt compared to companies in other industries, making them less directly exposed to different events in the economy. Our thought is to compare financial leverage in the

technology indices to the S&P 500, reflecting how the assets are financed with respect to equity and debt. This may help to justify the higher P/E level in the technology industry compared to other markets and maybe be one of the reasons for the technology sector to be priced at a higher level, also in times with recession in the overall market.

Comparing the technology indices to the benchmark index we see that all the technology indices have a relatively stable debt to equity ratio, though there are some differences with respect to the level of the ratio.

Figure 24 - Financial Leverage for all indices



Source: Appendix O, Figure 24

The table illustrates the average debt to equity ratio where the S&P 500 has a tremendously higher value compared to the indices representing the technology sector.

Table 5 - Average debt-to-equity for all indices from 2002 to 2011

Index	
Amex	60
Nasdaq Computer	14
S&P 500	203
Nasdaq Composite	65
QNET	26

Source: Appendix O, Table 5

The table below illustrates the average debt to equity for each of the indices from 2008.

Table 6 - Average debt-to-equity from 2008 to 2011

Index	
Amex	65
Nasdaq Computer	19
S&P 500	166
Nasdaq Composite	63
QNET	26

Source: Appendix O, Table 6

It is interesting to combine these numbers with the illustration of the price and earnings charts mentioned before. The relatively low debt to equity ratios may contribute to explain why the earnings in the technology sector were not as affected by the financial crisis as the rest of the market due to less exposure to leverage.



## Conclusion of the Data Analysis

The development in the price levels of the indices representing the technology industry are steeper than for the overall market leading to a gap between them, indicating a higher interest for technology stocks compared to the general market. This upward trend may, according to the theory of herd behavior, cause increase in demand for IT stocks. Herding leads to absence of rational investor behavior, whereas the investors often overlook fundamentals and buy stocks based on the constructed hype. This in turn may be leading to a new dot-com bubble.

Taking the corresponding earnings into account, we see that even though the index values are relatively high, the companies represented in them are currently making money. Comparing the earnings in percentage of the index value to the period of the bubble, we see that index earnings are sufficiently higher in all indices, indicating a more solid foundation in the companies represented in them. Based on this reasoning the market does not seem hot, hence there is not a sign of a bubble in the technology indices.

The P/E ratio for the technology market is at a higher level relative to the ratio for the overall market. Investigating the bubble-making based on the level of the P/E ratio, provided no indication of such market condition as the current P/E ratio level is nowhere near the levels seen in the previous bubble. The previous levels were excessive, although a bubble may occur based on relative lower levels, but comparing the relative higher price increase in the technology industry to the overall market, the price levels are at some extent justified by the industry's level of earnings.

The PEG ratio currently shows over-valuations in the technology market as well as in the overall market based on theory. QNET has a PEG ratio equal to 2.26, the highest level of all the ratios, subsequently followed by Amex, Nasdaq Composite, S&P500 and Nasdaq Computer. The high PEG ratio level seems to be acknowledged by the extent of Internet companies listed on the

indices, at least for QNET, Amex and Nasdaq Composite, pointing towards higher over-valuations in the Internet sector compared to others. Comparing the high levels of PEG ratios, shows that P/E for these levels are not supported by an estimated future growth in earnings per shares; hence according to PEG theory, the indices are over-valued.

Our findings show a low debt to equity ratio compared to the general market. This makes Internet companies less influenced by changes in interest rate as well as making them more solid in rough periods in the economy. The relatively lower debt in the technology industry compared to the overall market may, to some extent, partially explain the higher P/E ratio for Internet stocks and why the earnings in the technology sector were not as affected by the financial crisis as the rest of the market due to less exposure to leverage.

The free cash flow yield indicates overconfidence in the technology market compared to the overall market, based on the relatively higher P/E ratio through time. After 2009 the free cash flow yield for the benchmark market is higher relative for the technology market, pointing towards that the market expectations in this market were not met. Although there are some weaknesses to this measurement, regarding investment negatively affecting the yield, this points towards overconfidence in the market for technology.

Taking these relevant ratios into account, we find that there is no sign of a bubble in the stock market representing the technology industry. Although the price indices seemingly have a similar development as in the dot-com bubble, the market has learned something from the last time due to sounder business models providing earnings in relation to the market levels in the indices. An interesting aspect is the indication of overconfidence in the technology market based on the free cash flow yield, but the overall findings support the conclusion that we are not in a new technology bubble, at least not in the listed companies.

It will however be interesting to see how the different markets respond to the forthcoming events related to the development in the oil price and interest rate. An increase in the P/E ratio can occur in two ways—through a more rapid growth in stock prices or a slower growth in earnings. A negative outlook for the stock market may be a combination of these in relation to the making of a bubble where rapid growths in stock prices are combined with slower growth in earnings, as seen in the technology market where earnings have leveled off whilst the price continues to grow.

An increase in oil price is less likely to have a great direct impact on the technology market, especially indices containing a heavy weight of Internet companies. As seen in previous events, the benchmark market responds to increased oil prices negatively by a slowed growth in both earnings and index level. Fed has responded to this by lowering interest rates to stimulate the continuing growth. If oil prices stay high it may be plausible that Fed is forced to keep the interest rate low in an attempt for continuous stimulation of the overall market. This may make it difficult for Fed to limit the rapid growth in stock prices, which may in turn result in a larger gap between the price and earnings, increasing the P/E ratio.

# CHAPTER 7 – MARKET ANALYSIS

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In order to make some prediction of the evolvement in the market for technology, we use this chapter to take a look at today's situation in relation to a variety of companies within the Software sector based on the indicators emphasized on subsequently.

Based on the definition of a market going from the state of a bull market to a bubble, we try to look at the technology market with respect to some indicators of relevance. These may be important for enabling us to see if the development in stock prices and volume are based on solid fundamentals and intrinsic value, or if there are indicators pointing in the direction of overvaluation and bubble tendencies.

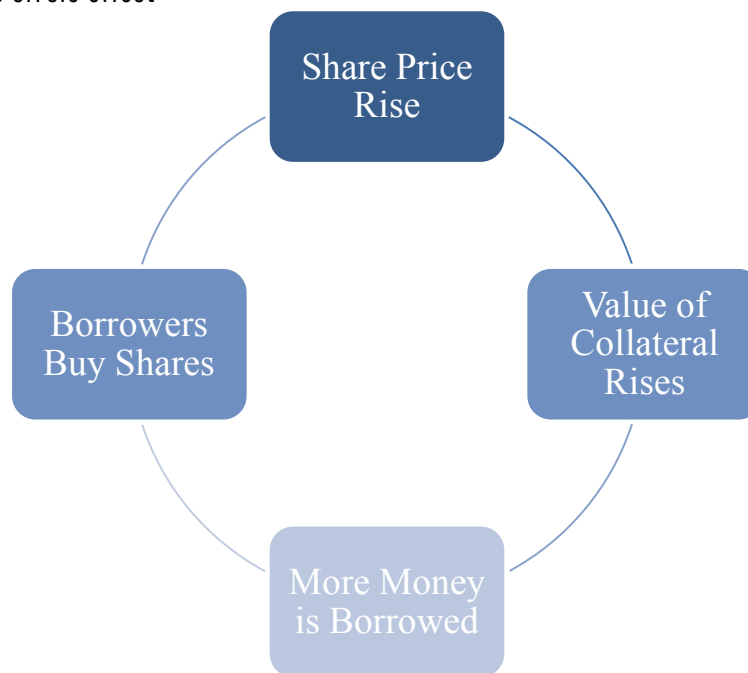
## 7.1 Today's Situation

### FED – Low interest rates

Fed lowered interest rates as a result of the financial crisis. The current target range for the Fed Funds rate is 0.00 – 0.25 percent, and has been since December 16<sup>th</sup> 2008. Due to limitations regarding further stimulations using the interest rate as a monetary policy tool, the US central bank use quantitative easing. This enables Fed to aid the stock market by increasing money supply through buying government bonds and other financial assets. This increased demand raises asset prices and lower the bond yield. The decreased bond yields provide the consumers a reason to buy stocks instead of bonds, in turn leading to more non-professional investors into the stock market, which according to Kindleberger turn the investment activity away from rational towards irrational behavior and in turn leading to bubbles (Kindleberger C. P., 1989).

Overconfident investors may be tempted to buy on margin when interest rates are low. Investors loaning money to buy additional shares are often one feature that characterize a bubble. Shares may be taken as collateral for further lending enabling the investors to buy additional shares making prices rise in an overconfident market. This, again, leads to an increase in collateral value which may enable the investor to loan for additional buying of shares, making this process circular (Redhead, 2008).

Figure 25 - The circle effect



Source: (Redhead, 2008).

### The Role of the Media-Celebrity stocks

Best (2005) explains the enthusiasm for Internet stocks in the dot-com bubble in relation to that Internet companies were promoted as celebrities by the media as one of the factors. Internet investing was promoted, and like with celebrities, investors became emotionally attached to these stocks. Today we see some incidents where social network companies are promoted as celebrities. The story of Facebook was even shown in movie theaters, Groupon and Twitter are mentioned in the media again and again. In relation to the dot-com bubble the familiarity bias are stressed by Best (2005) when Internet stocks were associated with the Internet itself. People felt

familiarity to the Internet stocks based on their knowledge of the usage of the Internet. This new and exciting thing led users and investors to think of the Internet stocks had huge upside potential. In the current situation, people are more and more familiar with the usage of social network sites. Social networking is emerging and may be, as with the Internet, the start of a new era; the social network age. Implementing this with Best's (2005) findings, may lead to investments in social network stocks being an extension of the investor's personal attachment to the social network where the investor feel that this association helps to describe them as individuals and becomes more than just financial investments.

### Non-Professional Investors

As indicated by the low interest rates, more and more people move their investments into the stock market. If a wide spread assumption is made of existing trends will continue growing at the same rate as recently observed this may lead to herd behavior. Non-professional investors entering the market buying stocks based on beliefs that the market will continue to grow. This in turn pushes prices further up leading to euphoria and even more manic buying. With these rising prices the role of the media may further enhance the interest in the social network sector spreading the excitement attracting even more people to invest. A market consisting of euphoria may be characterized by price levels losing touch with reality and even institutional investors starting rationalizing the levels based on the argumentation that it is different this time.

### Initial Public Offerings

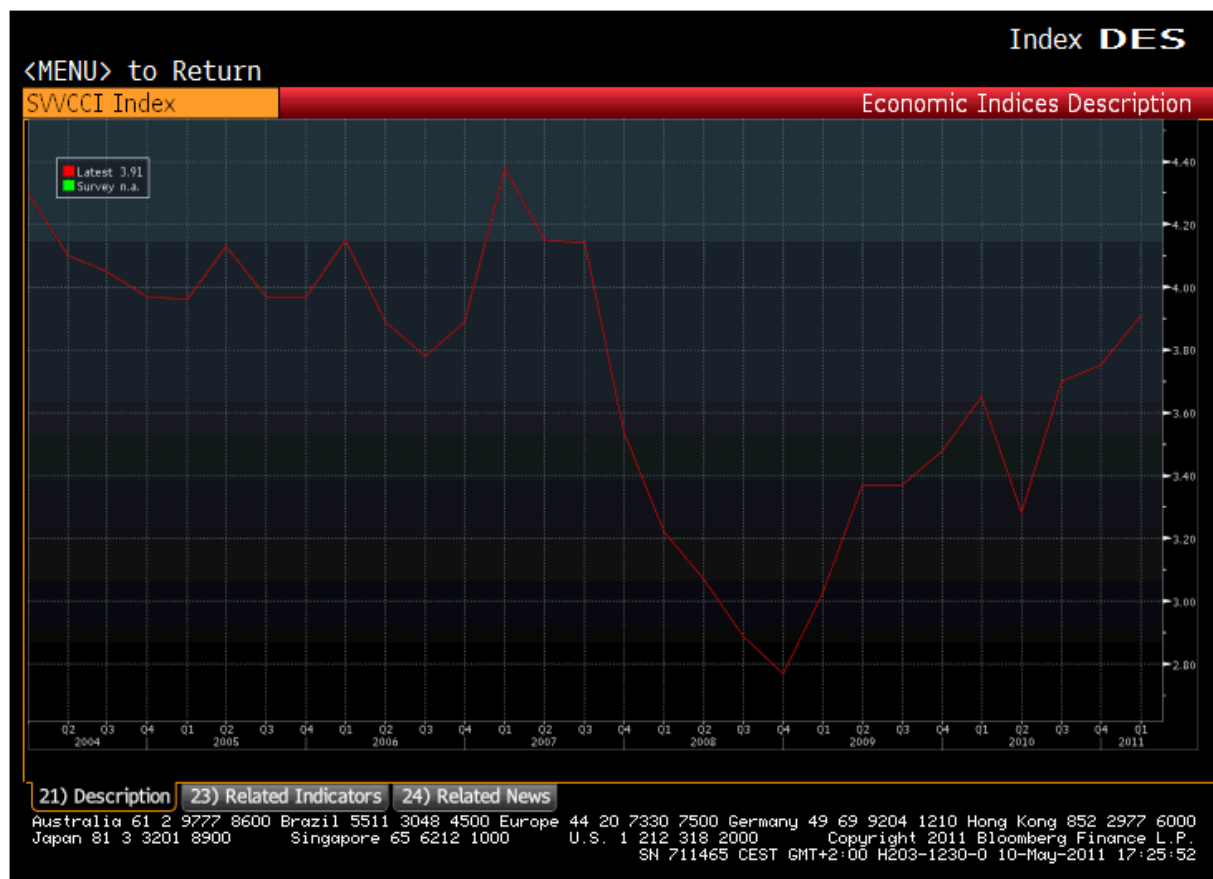
The increase in the IPO market will play a significant role for the future of the technology market and for growth within market segments. As indicators for the growth in the IPO market we take a look at the development in venture capitalist backed deals as well as for private equity deals in the technology market.

## Venture Capital

Venture capitalists look for ventures with exceptional high growth opportunities to invest in.

This makes it a possible indicator for the current and expected state of the technology sector. The venture capitalists usually exit the investment within an average of 2-6 years, whereas the most profitable exit strategy is through an IPO. Based on this strategy, we find it likely that an increase in VC deals in the sector also increase the expected number of IPOs for the VCs to cash in profits.

Figure 26 - Venture Capitalists confidence index quarter 1



Source: Retrieved from Bloomberg – 10-May-2011

The latest confidence description shows a confidence measurement of 3.91 pointing upwards towards relatively high confidence compared to the peak in second quarter in 2010. This

signifies relatively high expectations of growth in the venture environment based on the ratio between 1 and 5.

#### *Investments by Sequence of Financing*

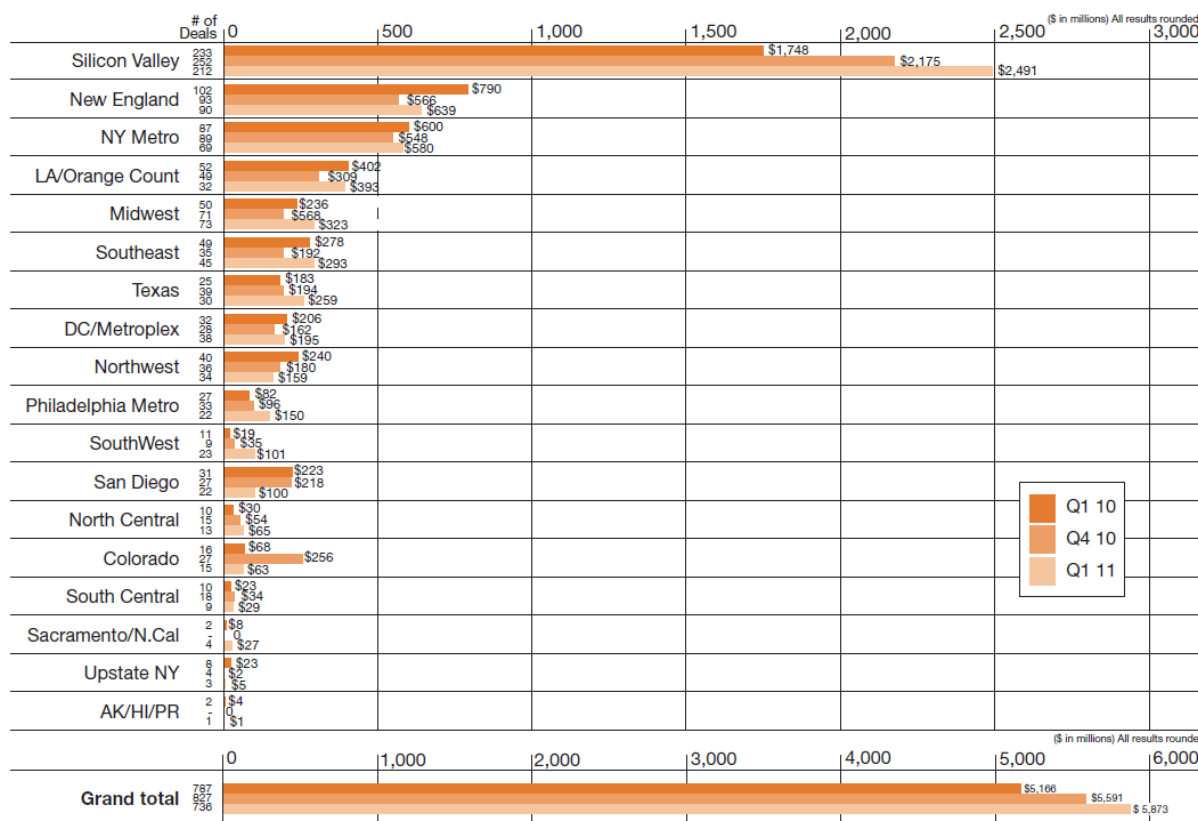
A rush of venture capitalists may be a factor characterizing a hot market or the start of a bubble. To investigate this, we base our findings on the MoneyTree report based on cooperation between PricewaterhouseCoopers and the National Venture Capitalist Association. Compared to the last quarter in 2010, the first-time financing companies had a 12 percent increase in dollar amounts in first quarter 2011 and account for 17 percent of total dollar amounts invested by venture capitalists. The number of deals decreased by 9 percent for the same period, resulting in 221 first-time financing deals in total, this amounts to 30 percent of total venture capitalist investments. Companies in the Software, Media & Entertainment, and IT Services industries received 61 percent of the first-time financing dollars and accounts for 75 percent of the deals (PriceWaterhouseCoopers & National Venture Capital Association, 2011). This point towards a race for me-too-investments in businesses, trying to capture imitations of popular Web companies that may turn out to be the next big thing. This continues in the second quarter where the first time financing appreciates with 22 percent in number of deals and amounting to 20 percent of the total amount invested compared to 17 percent in the first quarter. The same industries receive the highest first-time funding in the second quarter as in the first.

#### *Investments by Region*

Considering that Silicon Valley represents a large part of the technology market in the U.S. it may be insightful to see how much of the venture capitalists' dollars are going in to this region. From the chart we see that Silicon Valley captures 42 percent of the \$5.9 billion invested in the U.S. by venture capitalists for the first quarter of 2011, a 3.5 percentage point increase from last quarter 2010 and a 14 percentage point increase from first quarter 2010 (PriceWaterhouseCoopers & National Venture Capital Association, 2011). The technology industry is clearly desirable from a venture capitalist's point of view; hence the growth expectations are high relative to other industries (Chachere, Peterson, & Mendell, 2011).



Figure 27 - Investment by region.



Source: PriceWaterhouseCoopers & National Venture Capital Association (2011)

### Investments by Development

In hot issue markets, venture capitalists are more eager to invest in later-stage companies in order to exit quickly. In the second quarter of 2011, the later stage investments are dominating by 242 deals amounting to \$2.784 Billion followed by the expansion stage with total investments of \$2.339 distributed on 69 deals, the early stage investments with \$2.017 Billion in 347 deals and the start-up stage with total investments of \$375 million in 117 deals.

Within each stage, the Silicon Valley is the region receiving the largest part of the total invested in terms of amount and number of deals, except from the start-up stage of development where it is the second largest region. For the early stage of development Silicon Valley receive \$951 million, a 47.16 percentage of the total amount invested in this stage, distributed on 130 deals

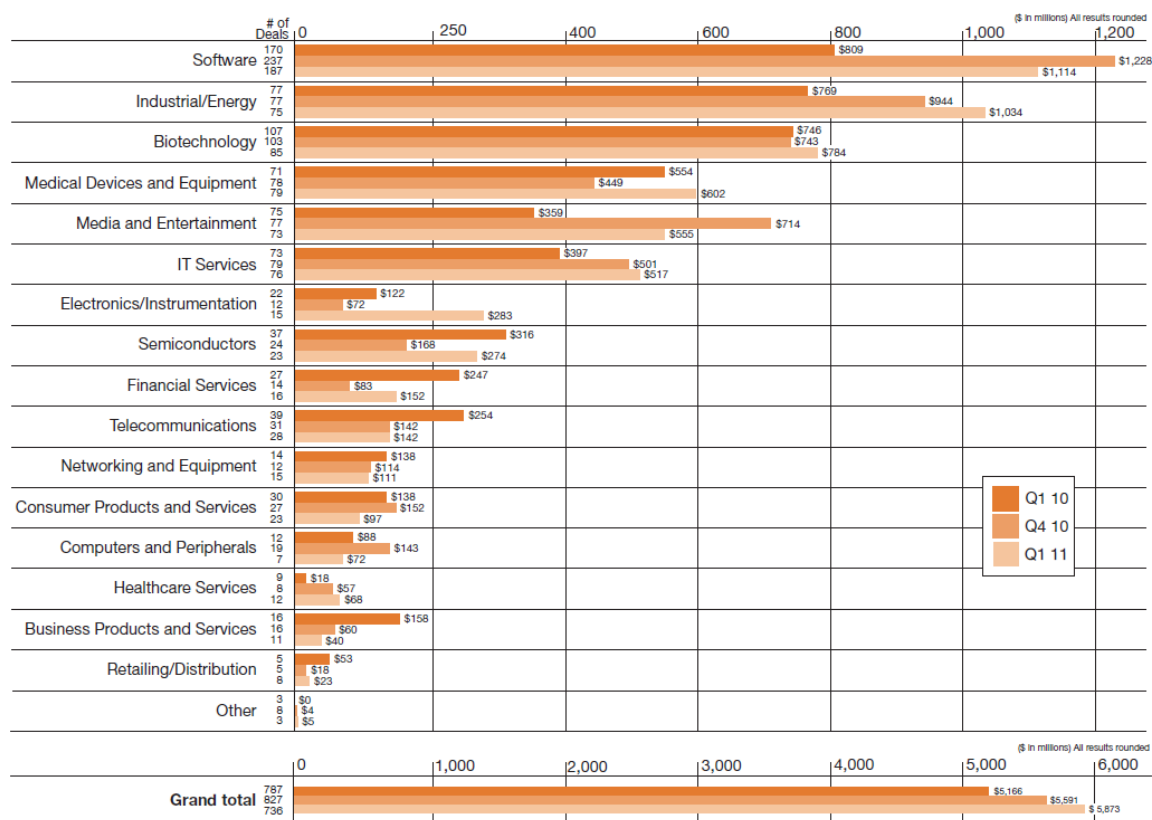
made. In the expansion stage, the venture capitalists invested \$984 million into the Silicon Valley region, 42.08 percentage of total invested in the stage, in 76 deals made. In the later stage investments made by venture capitalists amounts to \$920 million, a 33.05 of total investments made, and 69 deals.

Taking the region of Silicon Valley as a representative for technology, we see that venture capitalists are eager to invest in later stages of development, here represented by the expansion stage and the later stage, as is typical in hot issue markets (PricewaterhouseCoopers; National Venture Capital Association, 2011).

#### *Investments by Industry*

The Software industry received the largest investment in both number of deals and total amount invested by venture capitalists in the first quarter of 2011. The first quarter investment was about \$1.1 billion distributed on 187 deals, even though this is the industry with the largest amount and number of deals; this is a decrease of 9 percent in amount and 21 percent in deals from last quarter 2010. The Internet specific companies received \$1.2 billion going into 171 deals in the first quarter, also a decrease from the previous quarter, amounting to 19 percent in dollars and 18 percent in number of deals (PriceWaterhouseCoopers & National Venture Capital Association, 2011).

Figure 28 - Investment by Industry



Definitions of the Industry categories can be found on the MoneyTree™ Report web site at [www.pwcmoneytree.com](http://www.pwcmoneytree.com)

Source: (PriceWaterhouseCoopers & National Venture Capital Association, 2011).

According to Dow Jones VentureSource VCs have shown more interest in enterprise technologies leading to an increase in the Software sector. The companies in the Software sector amounted for 72 percent of deals backed by venture capitalists in the IT sector and 46 percent of the dollar amount. The Consumer industry, Social Media, Gaming and Online Shopping companies claimed most of the venture capital raised in the first quarter in both amount and number of deals (Dow Jones, 2011).

According to the second quarter Moneytree report, the Software industry continues to receive the largest investments made by VCs, a 35 percent increase in dollars and 25 percent in deals made compared to the first quarter, amounting to \$1.5 billion (Chachere, Peterson, & Mendell, 2011).

In the second quarter of 2011, the VC investments rise 19 percent to a total of \$7.5 billion in 966 deals. The quarter is the highest total since the second quarter of 2008 and the first half of 2011 provides nearly the same number of deals as 2010 but the amount is 12 percent higher, signaling a belief in stronger exit markets and future disinvestment opportunities.

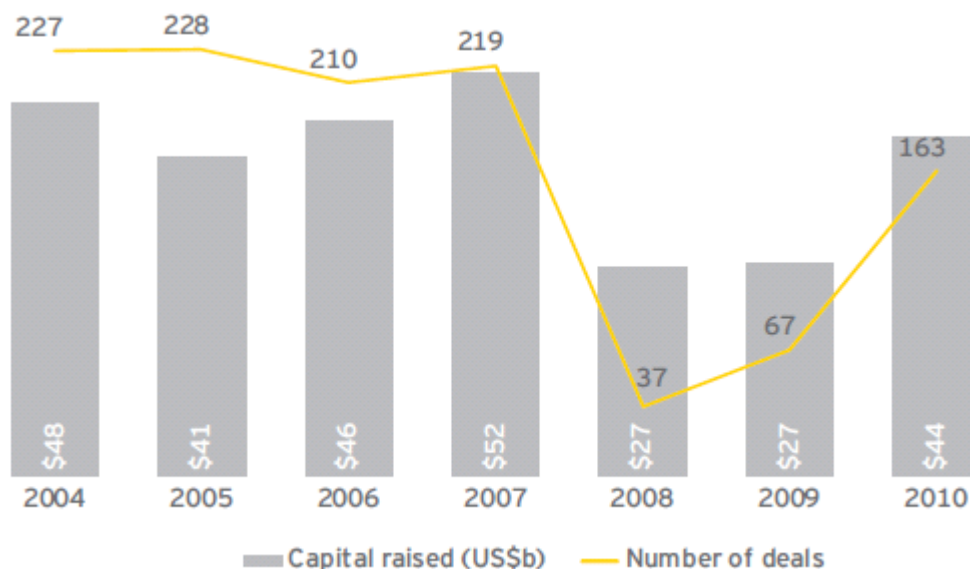
The Internet specific companies stand out in the second quarter as investments had a tremendously increase to levels last seen in 2001. The increase was represented by a 72 percent raise in dollars and 46 percent in number of deals. According the MoneyTree report (Chachere, Peterson, & Mendell, 2011), five of the top 10 deals this quarter are Internet specific investments, where these also were the top two. The recent high valuations, especially for the social networking companies, in the IPO market, are a possible driver for the increased activity.

### Private Equity

The volatile market in 2009 to 2010 due to the financial crisis are likely to have led to a considerable shadow pipeline of private equity backed companies, implying that a number of private equity backed companies withdrew the IPO based on negative market conditions, or have waited out the unstable market and are yet to file an IPO. This means that private equity firms seek to exit some of the largest deal transactions from the period of 2005 to 2007.

Due to figures in Appendix I, 2005 to 2007 represents the largest number of deals as well as amounting values for the US private equity backed deals. As seen from figure 29, there were only 37 and 67 exits through IPOs in 2008 and 2009 compared to 219 in 2007. Many of the private equity backed companies that did not exit due to bad market conditions are likely to seek exit during the near future, hence even exceed the 2007 level of IPO deals when \$52 billion was raised (Ernst & Young, 2011).

Figure 29 - US IPO activity by year.



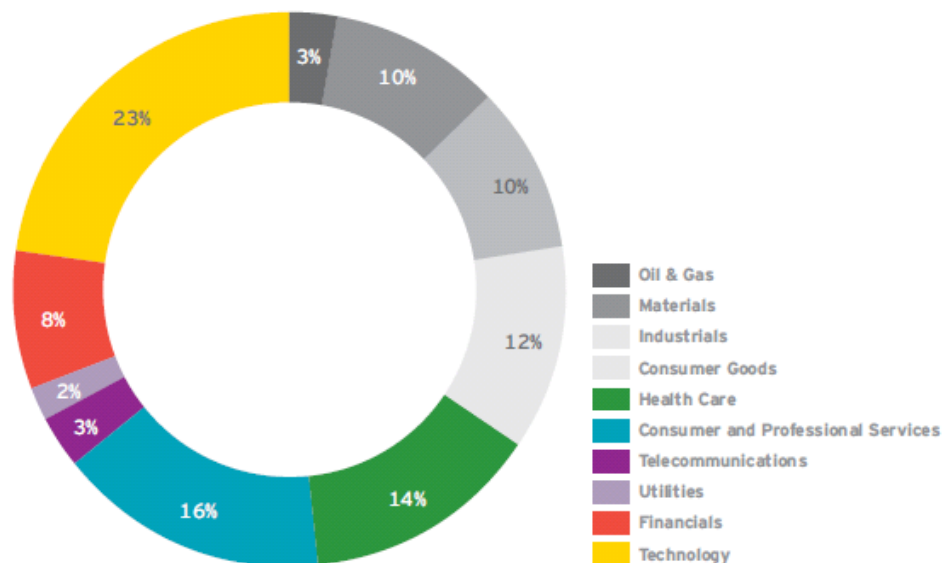
Source: (Ernst & Young, 2009)

#### *Listings by Private Equity Companies*

An amount of \$35 billion was raised by 155 private equity firms in 2010, more than twice the amount in 2009 and three times the amount in 2008 during the recession. Even so, the amount is still below the levels of 2007 when the cycle peaked. In 2010, 71 percent of private equity backed IPOs closed above their offering price by the year end in the aftermarket. The increased activity shows that the market is becoming more attractive for raising capital through IPOs (Ernst & Young, 2011).

### *Technology deals nearly a quarter of PE-backed issuance in 2010*

Figure 30 - Private Equity backed IPO sector breakdown 2010.



Source; (Ernst & Young, 2011)

Figure 30 shows that almost a quarter of private equity backed IPOs are represented by the technology sector in 2010. Compared to the 10 deals made in 2009 the IPO number and value more than tripled in 2010 amounting 35 deals raising more than \$8.4 billion (Ernst & Young, 2011).

### **Outlook for Coming IPOs due to Venture Capitalist and Private Equity Activity**

For 2011 an increase in the IPO activity can be expected based on higher valuations associated with the recent performance of stock markets. Bullish index levels show increased investment willingness and thereby increased holding periods. Venture capitalists have shown an increased interest towards investments in the technology sector measured in both amounts and number of deals, especially towards the Software sector. We see an increase in deal sizes associated with approved financing and liquidity. Investments in Internet specific companies increased tremendously reaching levels last seen in 2001. If the current pace in VC investing continues,

2011 can be the sixth most active year in the history of VC financing of \$26 billion (Chachere, Peterson, & Mendell, 2011). Improved operating results for the companies as well as the need to return cash to limited partners will thrive towards widen the IPO window.

#### Valuation Confidence Index Today

As discussed in chapter 3 we saw from figure 5, that at the end of 1999 that the confidence for both individual and institutional investors was at its lowest, explaining that 70 percent believed the market was overvalued. By shifting the focus on today's situation we see that the trend in the individual investors' confidence is downward sloping, indicating that more people are considering the market as overvalued. From almost 70 percent believing that the market was not overvalued to approximately 60 percent in 2011, may indicate that the individual investors are a bit concern with the creating of hot markets in the dot-com sector. However looking at the institutional investors we see that the confidence is almost 75 percent, which is in line with the strong confidence that was discovered within the venture capitalists.

It may seem that the individual investors, with the lack of the professional knowledge is being influenced by the media's writing about a new bubble, as for the professional investors they seem confident that the market is not overvalued, though it is in their interest that the overall market view point towards non-overvaluations for them to be able to profit by their exit strategies through an IPO.

## 7.2 UNLISTED COMPANIES

### Introduction

Chapter 7 is meant to illustrate the movements in the Internet sector, and to provide numbers based on estimates done by others. The main point is to illustrate the increased interest in Internet companies, by spending some attention on a few companies that have been considered pioneers and big players within the social network industry.

Based on the increased appetite for Internet related companies, we will in this sub-chapter take a look at some of the companies who newly listed, filed or have upcoming IPOs within the sector of software and consumer goods. In hot markets, taking a company public provides the companies' shareholders with great profits, though underwriters underpricing the shares may result in losses for the initial shareholders by money left on the table. The companies we look at are relatively well known in the media, which may have an impact on demand for the shares when listed, affecting the share price positively, also leading to money left on the table.

The price to sales ratio may give us an indication towards the value of the stock using the estimated market capitalization for each of the companies investigated. As these are Internet related companies, we choose to use the Amex IIX index as benchmark related to the price to sales ratio. On the basis of that social networking companies are relatively new, we chose the average benchmark from the industry based on the time from when networking companies have been rising and when LinkedIn was founded. The benchmark ratio is computed as an average of the time period 2003 to 2011 using data retrieved from Bloomberg, resulting in a benchmark price to sales ratio of 3.11 (See Appendix O, Table 7). Along with this ratio, the P/E ratio will also be considered when available for the newly listed companies.

### LinkedIn



LinkedIn is a venture backed company, founded by Reid Hoffmann from his living room in 2002, and the service launched in 2003. LinkedIn is a platform aiming to connect people based on their professional graph, and is today the largest professional network with over 100 million members. LinkedIn is more a community to store your business contacts, than an assembly for friends. An important key success factor for the success of LinkedIn is the focus towards work situation, as well as the use in job recruiting. LinkedIn is also classified as a social networking site, where the aim is to connect people.

On the 19<sup>th</sup> of May 2011, LinkedIn went public on New York Stock Exchange (NYSE) with an IPO price of \$45, achieving an intraday high price of \$122.7, a 173 percent increase. LinkedIn issued a low float IPO where only 7.84 million of 94.5 million, 8.3 percent of shares were offered to the public (SEC-1, 2011). The proposed maximum offering was assumed to be of \$35 per share, amounting to a \$3.3 billion valuation. After first day trading, the stock price surged 109 percent, to a closing price of \$94.5 (See Appendix J) and a valuation of approximately \$8.9 billion. This gap in valuations leads to more than \$388 million money left on the table, based on the difference between opening and closing price the first trading day multiplied by the number of outstanding shares. This means that the transferred value of \$388 million from LinkedIn's existing shareholders to the new investors. This is in line with findings made by Ritter, that many technology companies, especially venture capital backed, are underpriced, leaving money on the table when going public. Whereas there may be numerous reasons for this; underwriter compensation, a low price attract more investors and the effect of celebrity shares. It may be a mixture of these reasons, but first of all, it is very difficult to price a company such as LinkedIn. Social Networking companies are relatively new, making it hard to value as there are not many to compare with, as well as valuations of technology companies are complex, based on intangible assets and goodwill which is hard to quantify. As LinkedIn is one of the first major social network companies going public, it may be used as a benchmark for valuation of subsequent companies within the sector when listing for IPOs.

The reported revenue for first quarter in 2011 for LinkedIn is approximately \$93.9 million, assuming that LinkedIn will be able to keep first quarter revenue for the next 3 quarters, the estimated revenue will be approximately \$375.7 million. Based on this estimated revenue, the price to sales ratio for LinkedIn is 23.69 meaning that the company trades at over 23 times its estimated revenues, which is sufficiently higher than for the industry average of 3.11. The high expected growth rate is already priced into the stock price, which may limit upside potential and have more potential downside risk if the company cannot generate a significant profit on sales.

Expected future growth for LinkedIn is massive, and is reflected in the company's P/E ratio of 1346, way above the industry average (P/E Ratio for LinkedIn retrieved from Bloomberg). This in turn, enlarges the IPO window, contributing to the average P/E industry ratio showing the market that it is lucrative to enter now. This ratio level is reminiscent of what last seen in the dot-com bubble, led by a high valuation in the IPO market as well as a high demand from investors wishing to participate in the new social network milestone.



## LinkedIn

- 2003
  - Founded.
  - Receive series A funding of \$4.7 million.
- 2004
  - Receive series B funding of \$10 million.
  - Reaches 1.6 million users.
- 2005
  - "LinkedIn Jobs" are launched.
- 2007
  - Raises series C funding of \$12.8 million.
- 2008
  - Raises series D funding of \$53 million.
  - Raising a further funding of \$22.7 million, leading to a company valuation of \$1 Billion.
- 2011
  - LinkedIn goes public with an initiated stock price of \$45
  - Three days later the stock is traded at \$100 per share.
  - Profit is about \$12 million per year.
- Current Status
  - Annual Revenue: \$375 million
  - Recent Valuation: \$8.9 Billion
  - Multiple: 23.7 x Revenue.

## Groupon

Groupon, a venture backed Palo Alto based company founded by Andrew Mason, is another company that has received a lot of media attention. Groupon had its launch in November 2008, and is today operating in 44 countries with 1500 employees (Groupon.com, 2011). The concept of Groupon is to provide customers to Groupons clients, and in return be able to give a discount to the customer purchasing the Groupon deal. The customers then purchase a coupon at Groupon, and Groupon subsequently pays the client a percentage of the amount customer paid, providing shop owners with more customers and the customers with good deals.

Two weeks after the IPO of LinkedIn, Groupon filed for an IPO, targeting to collect \$750 million. Based on their S-1 filing with SEC, a valuation between \$13.2 and \$14.2 billion was set by neXtup (NeXtup-2, 2011). With estimated revenue for 2011 set to \$2.8 billion, this gives Groupon a price to sales ratio of approximately 4.9 which is closer to the industry average of 3.11. Groupon had massive growth in revenue, with growth rates equal to 2,241 percent from 2009 to 2010 (NeXtup-2, 2011). Most of this revenue came from acquisitions and reporting methods. Intermediate companies may have misleading ways of reporting sales, since their real sales are depending on commissions based on transactions processed over their site, while this may look like the company makes more money than it actually does. This leads to a more reasonable price to sales ratio by pumping up the sales part of the ratio based on misleading sales information.

Google tried to acquire Groupon for \$6 billion, but the offer was declined (MacMillan, 2011). After the bid from Google the competition has started growing rapidly, especially within the local deals market. The site, localdealsites.com shows a current list of 167 local deal sites in the U.S. illustrating the competitive forces within this business. Low entry barriers, competition from players in other markets and low consumer retention may be some of the factors contributing to this relatively low price to sales ratio. Groupon's business model is easy to copy and after the company entered, over 600 have emerged worldwide and 167 in the U.S. alone. Competitors like LivingSocial has expanded to cities where Groupon is offering deals, also large players like Facebook and Google could pose future competition based on their already existing relationships with local companies. In the case of the IPO, investors may be positive to Groupon, as it is the leader of the local deals market. The deceptive ratio may lead investors to think of Groupon as underpriced, or more reasonably priced, compared to the other social networking companies about to enter the market.



## GROUPON


- 2008
  - Launched in November.
  - Series A funding of \$4.8 million.
- 2009
  - Services available in 26 cities.
  - Series B funding of \$30 million.
- 2010
  - Series C funding of \$135 million.
  - Estimated value of \$1.3 Billion.
  - Revenue is about \$760 million.
  - Groupon turns down a \$6 Billion buyout offer from Google.
- 2011
  - Series D funding of \$950 million leading to a company valuation of \$4.75 Billion.
  - Groupon prepares for an IPO of \$25 Billion.
- Current Status
  - Annual Revenue: \$2.8 Billion
  - Recent Valuation: \$13.2-\$14.2 Billion
  - Multiple: 4.9 x Revenue.

## Twitter

Twitter is a social network and a micro blogging service where users are sharing information by using 140 characters or less. Twitter is a service where the user can decide to contribute actively by tweeting, sharing information with other users, or just follow people in order to stay updated on topics of interest. The service was founded by Jack Dorsey, Biz Stone and Evan Williams in March 2006, and was available to people four months later (Crunchbase, 2011). Twitter has become an important way of gathering and providing information, and is used by 200 million people (NeXtup-4, 2011).

According to neXtup, Twitter has estimated revenue of \$158 million and according to Sharespost the implied valuation of Twitter is approximately \$8.4 billion (See Appendix K). Based on the estimated numbers, Twitter's price to sales ratio is equal to 53.16, sufficiently larger than the industry average of 3.11.

A possible explanation of the high price to sales ratio is based on research done by neXtup which reveals a belief that micro blogging is still in its early stages of evolution and that its full potential is yet to be realized. Twitter has become an important way for media and public persons to publish and discover news, giving the company a positive upside potential for future business. Twitter being the largest micro blogging service in the market, may attract investors even though the company's revenue model is yet to be tested.



Twitter

- 2006
  - Founded
- 2010
  - Revenue about \$45 million.
  - Raises \$200 million leading to a company valuation of \$3.7 Billion, more than 80 x revenue.
- Current Status
  - Annual Revenue: \$158 million
  - Recent Valuation: \$8.4 Billion
  - Multiple: 53.16 x Revenue.

## Facebook

Mark Zuckerberg founded thefacebook.com in 2004 from his dorm at Harvard.

Thefacebook.com was rebranded to Facebook.com in 2005, and the service turned from being a nationwide college networking website to be a social networking site aiming to connect people all over the world (Myers, 2011). Facebook enables people communicate with their family,

coworkers and friends, develops technologies that ensure sharing of information, and it is a free service where everyone above 13 years old can create a profile (Facebook.com-1). The user database of Facebook is large, reported to approach 687 million users (Su, 2011), and in March 2010 Facebook surpassed Google as the most visited website in the U.S. (Dougherty, 2010). Over 500 000 applications currently operates on the platform and additionally 1 million actively developing on top of the Facebook platform (NeXtup-1, 2011a).

Facebook's shares are priced at \$34.5 per share in the second market. Sharepost.com calculate the company value based on estimated fully diluted capitalization of roughly 2.35 billion outstanding shares, giving Facebook an estimated value of approximately \$82 billion (See Appendix L).

Since Facebook was founded, it has received \$2.3 billion of funding, with the latest investment of \$1 billion from Goldman Sachs. The Securities and Exchange Commission (SEC) state that companies with number of shareholders in excess of 500 must disclose their financials, resulting in companies often going public. According to NeXtup, Facebook is expected to file for an IPO during April 2012 (NeXtup-1, 2011a).

According to research done by NeXtup (2011a), Facebook is estimated to double 2010 revenue from \$2 to \$4 billion in 2011. Based on this and the estimated valuation of \$82 billion, the price to sales ratio for Facebook amounts to approximately 27.33, which means that Facebook trades at over 27 times their estimated revenue, sufficiently higher than the benchmark of 3.11.

Basing the evaluation of Facebook's company value on theory, the high ratio point towards a low upside potential compared to a company with a relatively lower ratio, implying more downside risk. The high pricing of Facebook, may act as a leading indicator towards investors' willingness to pay for upcoming companies within the social networking industry. The success story of a

seven year old social network company with an estimated valuation of \$82 billion, may lead to a rush of similar companies trying to become the next Facebook, entering the public market. This massive company valuation takes Facebook beyond companies like Walt Disney Company (\$72.48 billion), Hewlett-Packard Co (\$72.55 billion) and Goldman Sachs Group Inc. Facebook will then be listed as the 32<sup>nd</sup> biggest company in America based on market capitalization (247wallst.com, 2011).



#### Facebook

- 2004
  - Founded
- 2006
  - Turns down \$1 Billion buyout from Yahoo.
  - Revenues \$100 million.
- 2007
  - Microsoft buys a 1.6% stake for Facebook for \$240 million, valuing Facebook to \$15 Billion.
  - Revenue stays between \$100-\$150 million.
- 2009
  - Revenue about \$700-\$800 million.
- 2010
  - 500 million users. Revenue \$2 Billion.
- 2011
  - Valuations reach \$82.5 Billion
- Current Status
  - Annual Revenue: \$2-\$4 Billion
  - Recent Valuation: \$82 Billion
  - Multiple: 27.3 x Revenue.

## Zynga

Zynga is a social network game developer, founded in 2007 with its base in San Francisco. Social games are played on social platforms, allowing players to play with others all over the world. In order to succeed, the access to large social platforms are crucial for the company. Facebook is the largest social platform that Zynga operates on. Zynga's top games launched on Facebook since 2007 are; Poker in 2007, Mafia Wars in 2008, and Farm Ville in 2009 which was the first game on Facebook reaching 10 million daily active users. Currently, Zynga's games are



played by more than 280 million people every month. Revenue is generated based on virtual goods that may be purchased in the game, for example in Farm Ville such a product may be a tractor making farming faster (Zynga-1, 2011). Zynga also get six percent of their revenue from advertising done on their game sites on Facebook. Facebook takes a 30 percent cut of the company's revenue, and has been important for Zynga's success of getting the early customers (Media Post, 2011). Their reliance on Facebook has made Zynga's success depending on social networks exposing the company towards the development in this industry.

Along with using the Facebook platform, a major factor contributing to Zynga's growth is their ability to build core strategies based on buying talent in technology and software through acquisitions. This has given them a competitive edge leading Zynga to be larger than the next 15 largest gaming companies together (Cohan, 2011).

Sharespost inc. value Zynga's market capitalization to \$11.23-\$11.42 billion based on a estimated revenue of \$1.2 billion in 2011, giving the company a price to sales ratio of 9.44. This is higher than the industry average of 3.11, and also for the more specialized industry average for home entertainment software of 2.2. How the market will respond to the IPO is yet to be seen, but Zynga may take advantage of the hysteria right now in the market for social networking. Zynga filed for an IPO 1<sup>st</sup> of July (NeXtup-3, 2011), aiming for a low-floated IPO, issuing a relatively small number of shares for the public market (Galante & Levy, 2011). As the tendencies in the market for technology stocks point towards high demand, especially for this type of company a low-floated IPO may lead to a high increase in share price.



## Zynga

- 2007
  - Founded
  - Poker is released on Facebook.
- 2008
  - Receive series A funding of \$10 million.
  - Zynga launches Mafia Wars on Facebook.
  - Receives a nother round of funding, a series B funding of \$29 million.
- 2009
  - Poker reach No 1 with 10 million active users.
  - Zynga is No 1 Facebook app developer with 40 million monthly active users.
  - FarmeVill is released on Facebook, being the first game on Facebook reaching 10 million daily active users.
  - Zynga raises \$180 million.
- 2010
  - International offices opened in India.
  - Zynga aquires Unoh, one of Japan's leading social game companies.
  - Revenue of \$597.5 million.
- 2011
  - Zynga files for an IPO with intention of raising \$1 Billion.
  - Revenue for first quarter reached \$235.4 million and are estimated by the company to be over \$1 Billion in total this year.
- Current Status
  - Annual Revenue: \$1.2 Billion
  - Recent Valuation: \$11.33 Billion
  - Revenue Multiple: 9.44 x Revenue.

## Conclusion for the Companies

From what we have seen in relation to Internet related companies, especially for the social network industry, the respected valuations and growth in share prices grow together. This is in line with Ritter's (1984) definition of hot markets where investing in this sector provides higher returns compared to other sectors. This is further supported by the increase in funding within this

sector done by venture capitalists, showing tendencies of hot market situations, creating an increased window for further exit strategies through IPOs in the near future.

The social networking companies are attractive based on numerous reasons. They have unlimited upside potential, in the sense of the non-limitation of opening hours and low fixed costs. They can essentially make money 24 hours a day at a sufficiently lower fixed cost compared to traditional companies. They are able to target their marketing and advertisement efforts based on access to personalized information, giving them an advantage. They attract a lot of users based on the user's opportunity to communicate with others and state their opinions. The growth potential is very high in this industry, and in the current situation of the financial crisis, there are not many other industries that are able to show for the same expected growth rates. The social media is only in the beginning, with a lot of expected new companies to arise, though depending on the interest from consumers.

The price to sales ratio is an indication on the value of the stock, where the five respectively companies has higher ratios compared to the industry average price to sales ratio. LinkedIn is the first of these companies that went public, leading the way for the subsequent companies to follow. The price to sales ratio for LinkedIn is at a substantial higher level than for the industry average at 23.69 compared to 3.11. The company's tremendously high P/E ratio level shows that LinkedIn's shares traded at a price 1346 times their earnings. This extreme level was a result of demand for social network companies, which the subsequent companies may take advantage of by going public whilst the market is still hungry for these companies, taking a piece of the high investor willingness that appears at this time.

Groupon, which filed for an IPO in early June this year, has the lowest price to sales ratio of the five companies at a ratio level of 4.9, much closer to the industry average, though this may be a misleading ratio level due to accounting processes. Although the sales appear to be great, the earnings are not much to speak of. Groupon is the leader of the local deals market, but faces

large competition, high cost regarding marketing and low entry barriers, as well as an unproven business model. It will be interesting to see what investors emphasize when the company does an IPO.

The four-year-old company Zynga, filed for an IPO 1<sup>st</sup> of July, aiming for a low floated IPO. Issuing a low amount of shares to the public similar to LinkedIn, this may put an even higher pressure on the share price in an already hot market, driving prices further. Zynga has a price to sales ratio of 9.44, showing investors' large appetite for the company. Based on observations from earlier IPOs done in the sector, it is likely that the eager to become an early investor when the company goes public will put pressure on the share price, like when LinkedIn went public and the price surged 109 percent on the first day. Zynga is, like many of the high profiled companies filing for IPOs, using underwriters very well known by investors, which also may contribute to an increased investor willingness based on beliefs that this is a company with a bright future in terms of growth. It will be very interesting to see how much money this IPO will leave on the table, and how the underwriters will price the stock based on the pressure that was put on LinkedIn's share price.

Twitter has the highest price to sales ratio of all, at a level of 53.16. The company has not yet filed for an IPO, but rumors are that they will by 2011/2012. This is based on growth expectations yet to be realized within micro blogging, providing Twitter, as a leading company, with a great upside potential in this early stage. All though, the business model is yet to be proved, it may be able to target ads based on user data making it attractive for advertising and subsequently increased earnings.

Facebook is the social networking company with the highest valuation. The company is rumored to go public in April 2012 based on their obligated investor count in the year-end. The company is currently estimated to have a price to sales ratio of 27.3, reflecting a sufficiently higher belief in Facebook compared to the average of the companies trading in the benchmark. A reasonable

assumption is that the demand for Facebook shares due to an IPO will be even higher than for LinkedIn, since Facebook is the dominant social network company in most geographic areas. It will be interesting to see if the IPO of Facebook will further trigger several more companies within the sector, especially those directly and indirectly related to Facebook, to do an IPO as well. Based on Facebook's high valuation, it will be noteworthy to see how it will affect the overall market for social networking.

Since many of these companies are set to use the same underwriters as LinkedIn did, may it then be the case for these IPOs as well to be underpriced? Or, might it be the effect of other factors attributed to the high demand leading to increased share prices when entering the public market. The effect of celebrity shares may be attributable for the four remaining companies entering the public market, as these are well-known companies providing services that investors already might use and adopt, in turn attract non-professional investors to this market. The unfamiliarity toward valuing companies within this relatively new sector of social networking companies may lead to underpricing of stocks when entering the market, in a market which is already hot. This makes the stock price to be pinned on other things than fundamental values; the stock price appreciates at a higher rate than for fundamental values, as for speculations in the market. Herd behavior is often underpinned on great profit making in the stock market, even though fundamentals are indicating overvaluations, the investors continue to trade, as there are sufficiently demand for the stocks.

# CHAPTER 8 - CONCLUSION

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This paper explores the making of a bubble within the stock market segment of technology as well as for the companies which is expected to enter through an IPO. Due to high growth rates on average in the technology industry, these companies are on average, priced higher by the market compared to the overall stock market. From the fundamental analysis, the P/E ratio is higher for the technology companies compared to the overall market, but compared to the levels in the last bubble, these are nowhere near. One of the important factors for the more justifiable P/E levels is that the listed companies are currently making money, which was not the case for a lot of the high valued companies in the dot-com bubble. Due to sounder business models, earnings tend to have the same trend as the corresponding stock price, though the S&P 500 has a closer relationship between price and earnings than the indices representing the technology industry.

The PEG ratio indicates overvalued companies represented in the indices, especially for Amex and QNET. This leads to a plausible assumption that companies within the sector of Internet related companies are in general more overpriced than other companies within the sector of technology. This is further supported by the free cash flow yield which indicates over confidence in the market based on the free cash flow compared to the share price.

Comparing our findings of the current market situation to the previous dot-com bubble, the analysis gives no convincing evidence of a bubble in making in the stock market, based on the ratios used.

As the market for technology is recovering from the financial crisis and seems more bullish, it is plausible to assume that there will be an increase in exits through IPOs affecting this market further. The increased IPO window is a combination of the lack of profitable exit opportunities due to the financial crisis, and the increase in deals in private equity backed companies in 2005

to 2007 which is yet to be disinvested. In 2010 technology represented nearly a quarter of private equity backed issuance in the IPO market, more than tripled from the year before, with more to come.

Venture capitalists show increased interest within the technology industry, especially for software and Internet related companies. If the investments made by venture capitalists continue in the same pace as for the recent time, the tremendous growth in investor willingness within the sector of Internet related companies may reach levels last seen in 2001, and become the sixth most active year in history for venture capital. Due to approved market conditions in financing and liquidity, an increase in IPO activity is expected enabling venture capitalists to exit their investments with profit.

From the investigation of investor appetite towards technology, we find that this appetite is large for private equity companies and venture capitalists. The investor willingness is especially high for companies within the software industry, and particularly for Internet related companies. The increased demand and deals made, especially in later stage investments made by venture capitalists, the pipeline shadow of private equity about to be resolved, combined with increased IPO window, has contributed to a hotter market for the Internet related companies.

Based on valuations of companies which plan to file, have filed or newly did an IPO, support the conclusion towards a hotter market for Internet related companies, in this case, the social networking companies. The price to sales ratio shows remarkable higher ratios for those entering the publicly traded market compared to the industry average. Based on these findings, there seem to be a bubble in the private market, so a crucial question is what will happen when these companies enter the public market. These companies have massive growth over only a few years of existence, though high growth does not equal profitability.

There are many factors which may have direct and indirect impact on the market under investigation. Based on previous economic events, we find that especially two of these factors seem to be applicable for the time to come; the oil price and the interest rate. From earlier events, the data provides us with an overview that leads us to the assumption that the growth in Internet related companies will not be slowed down due to high oil prices, this also applies to the interest rate. It is reasonable to conclude that an increase in interest rates will not affect the Internet related companies much, due to their low debt to equity ratio. Continuing low interest rates, may lead to more non-professional investors entering the stock market. This also shift demand from bond market towards the stock market, whereas these Internet related stocks already appears attractive, leading to further demand from investors wishing to participate in these growth opportunities of a lifetime through herd behavior, as these growth stocks appears to be.

Social networks seem to make as much hope and optimism at the stock exchanges now, as when the Internet was launched under the previous bubble. Listed and unlisted companies are valued at high levels, even compared to more solid companies like Google. Based on the theory of Dr. Rodrigue the Social network segment seems to meet the requirements fulfilling the phase of Mania after the subsequent reasoning;

Large positions in the Software segment have been done by venture capitalists as well as private equity firms, characterizing the stealth phase. Especially we see large investments in social networks, consumer and mobile applications and cloud.

Investors start to see the potential profit in the industry as illustrated by the awareness phase, where later stage investors put additional money in the market and thereby push prices up as in the software market. The investments made in, amongst others, Facebook is one example of this. The Russian investment company DST invested \$200 million in Facebook when the company was valued to about \$10 billion in 2009. In 2011 DST along with Goldman Sachs made a further investment of \$500 million when Facebook was valued at \$50 billion. Venture capitalists



continue to invest giving them greater positions in companies in this particular segment. After numerous discussions in technology blogs regarding the massive valuations in the industry, this topic of discussion got the attention from the general business through serious economic press, such as The Economist, CNN and many others.

Stocks increasing 109 percent after first day of trading makes the technology sector attractive and indicate a high demand for a stock leaving \$388 million on the table for LinkedIn. This signifies an irrational demand for technology IPOs, and is one of the characteristics of the mania phase. Justifications of the tremendous high valuations of companies within the software sector are made based on that this time it is different and that the market has learned something from the previous dot-com bubble. The argumentation is that it was very difficult to value Internet companies since this industry was new and nothing like it had been seen before, leading to artificial valuations of Internet companies. The companies in the current software sector, especially the social networks, consumer and mobile applications and cloud companies are reinventing commerce. With no appropriate benchmark for comparison these new types of companies are very difficult to value. The market seems to have “accepted” that they have tremendous valuations, but no earnings to speak of. They are expected to have hundreds of millions of customers, exceptional growth in revenue and profits. Even so these companies have not earned their tremendously high valuations, yet, and the question is if they ever will.

Based on this reasoning, we conclude that the market for Internet related companies are fulfilling the characteristics for the mania phase at this time. From our analysis we find that there is not a bubble in the public stock market for technology, but there are tendencies pointing towards a hot market and a making of a bubble in the companies entering the public market for social networking companies. There appears to be a bubble in the private market, the question is; what will happen when these companies enter the public market?

# Recommendations for Further Research

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For further research within this field, multiple elements which are probable to affect the market for technology may be interesting to further investigate.

Large technology companies from China and Russia has been listed on American stock exchanges for some time now. Great deals of these companies are copies of American companies, such as Yandex, the Russian “Google” and Baidu, the Chinese “Google”. Further investigations of interest, on how these listings from other countries contribute to a possible bubble, and how these affect the valuations of the upcoming companies within the sector, may be of relevance.

The outlook of the global economy is very uncertain due to large issues such as, amongst others, the debt situation in the U.S. Although we found that the companies in the technology industry on average were less affected by shifts in interest rates etc. due to their debt situation, this may not be holding up in the years to come, depending on the overall economy in the U.S. and the rest of the world. Further investigation towards the shift between the bond market and the stock market may result in interesting findings.

Paying attention to several Internet related companies that are getting listed, and following them over time to see if there is a pattern amongst a large sample of these “hot” companies, which again can be a strong indicator for a potential new bubble. It will be exciting to see if the companies that follows the five that we have investigated, will be as high priced, and if the low-floated IPOs will maintain.

As the technology industry, and especially the Internet related companies, is operating largely in a global market, a question of relevance is if an upcoming bubble in the respected sector to a

larger extend will be global this time. A further investigation in markets outside the U.S. will then be crucial to examine.

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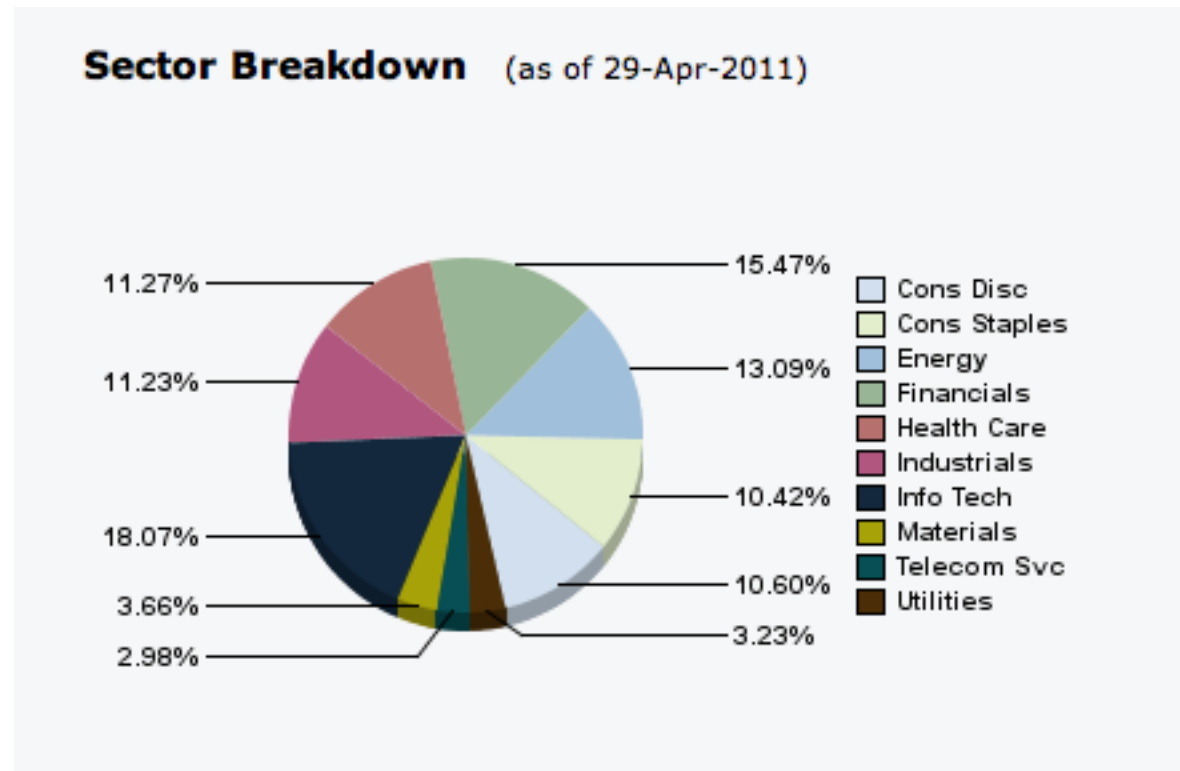
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# APPENDICES

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## APPENDIX A – Sector Breakdown



Source: (Standard & Poor's - Indices, 2011)

## APPENDIX B - Index components Amex Interactive Week Index

Index Components as of: 04/29/11			<a href="#">Back</a>
Company Name	Symbol	% Weighting	
Google Inc'a'	GOOG	7.07%	
Cisco Systems	CSCO	6.46%	
Qualcomm Inc	QCOM	6.22%	
Amazon.cominc	AMZN	5.90%	
ebay Inc	EBAY	4.54%	
Time Warner	TWX	4.21%	
Baiducom Inc	BIDU	3.48%	
Tibco Software	TIBX	3.38%	
priceline.com Inc	PCLN	3.22%	
Right Management Consultants Inc.	RHT	3.22%	
Expedia Inc	EXPE	3.12%	
Check Point Software Tech	CHKP	3.11%	
Symantec Corp	SYMC	3.09%	
Intuit Inc	INTU	3.07%	
Yahoo Inc	YHOO	3.00%	
Netflix Inc	NFLX	2.92%	
Bmc Software	BMC	2.86%	
Verisign Inc	VRSN	2.84%	
E*TRADE Financial Corp.	ETFC	2.76%	
Akamai Technologies	AKAM	2.64%	
Research in Motion	RIMM	2.59%	
F5 Networks	FFIV	2.55%	
Juniper Networks	JNPR	2.45%	
Broadcom Corp'a'	BRCM	2.43%	
WebMD Health Corp (Cl A)	WBMD	2.35%	
Iac/interactive Corp	IACI	2.18%	
Ciena Corp	CIEN	1.83%	
N.A.	MWW	1.46%	
Valueclick Inc	VCLK	0.93%	
j2 Global Communications	JCOM	0.92%	
Digital River	DRIV	0.87%	
Websense Inc	WBSN	0.72%	
Earthlink Inc	ELNK	0.61%	
United Online	UNTD	0.40%	
Realnetworks Inc	RNWK	0.34%	
S1 Corp	SONE	0.25%	

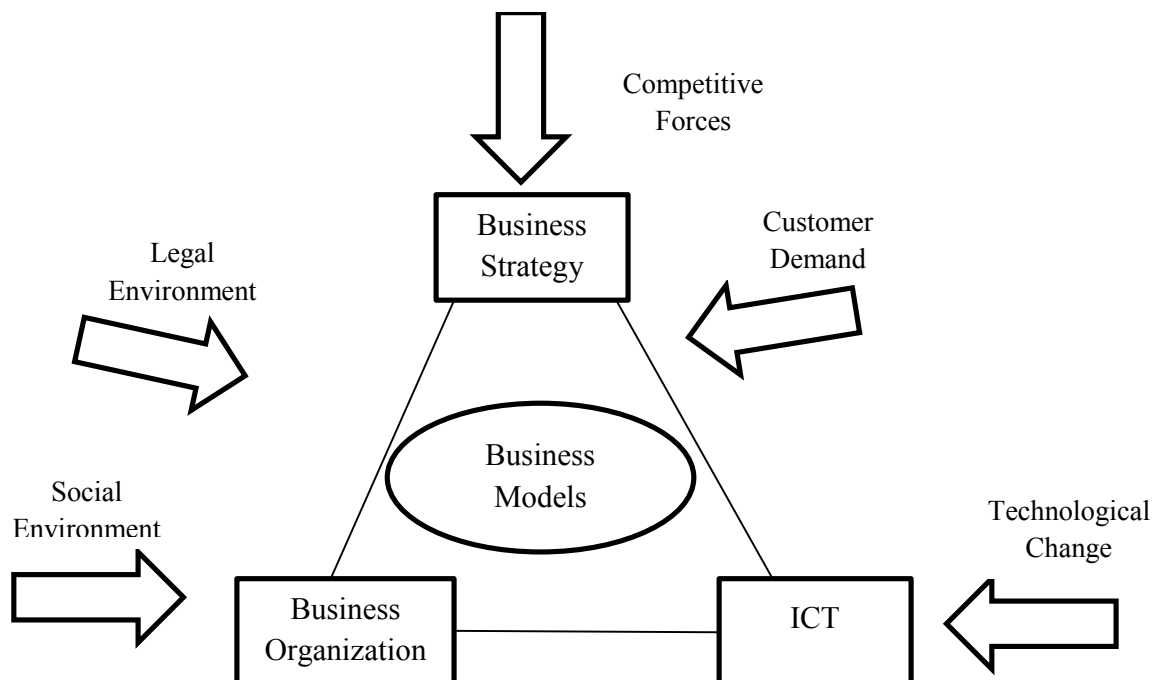
Source: (Amex.com - IIX, 2011)

## APPENDIX C – Business models is more than just revenue and profits

Business model ontology	Stähler 2001	Weill and Vitale 2001	Petrovic, Kittl et al.	Gordijn 2002	Afuah and Tucci 2003	Tapscott, Ticoll et al. 2000	Linder and Cantrell 2000
Value Proposition	value proposition	Value Proposition, strategic objective	Value Model	Value offering	Customer Value		value proposition
Target Customer		Customer Segments		Market Segment	Scope		
Distribution Channel		Channels	Customer relations model				channel model
Customer Relationship			Customer relations model				commerce relationship
Value Configuration	Architecture		Production Mode	e3-value configuration	connected activities, value configuration	b-webs	commerce process model
Capability		Core competencies, CSF	Resource Model		capabilities		
Partnership	Architecture	e-business schematics		Actors	sustainability (team-up strategy)	b-webs	
Cost Structure				Value exchange	cost structure		
Revenue Model	Revenue Model	Source of revenue	Revenue Model	value exchange	pricing, revenue source		pricing model, revenue model

*Adapted from (Osterwalder, Pigneur, & Tucci, 2005)*

## Appendix D – External factors influence the business triangle



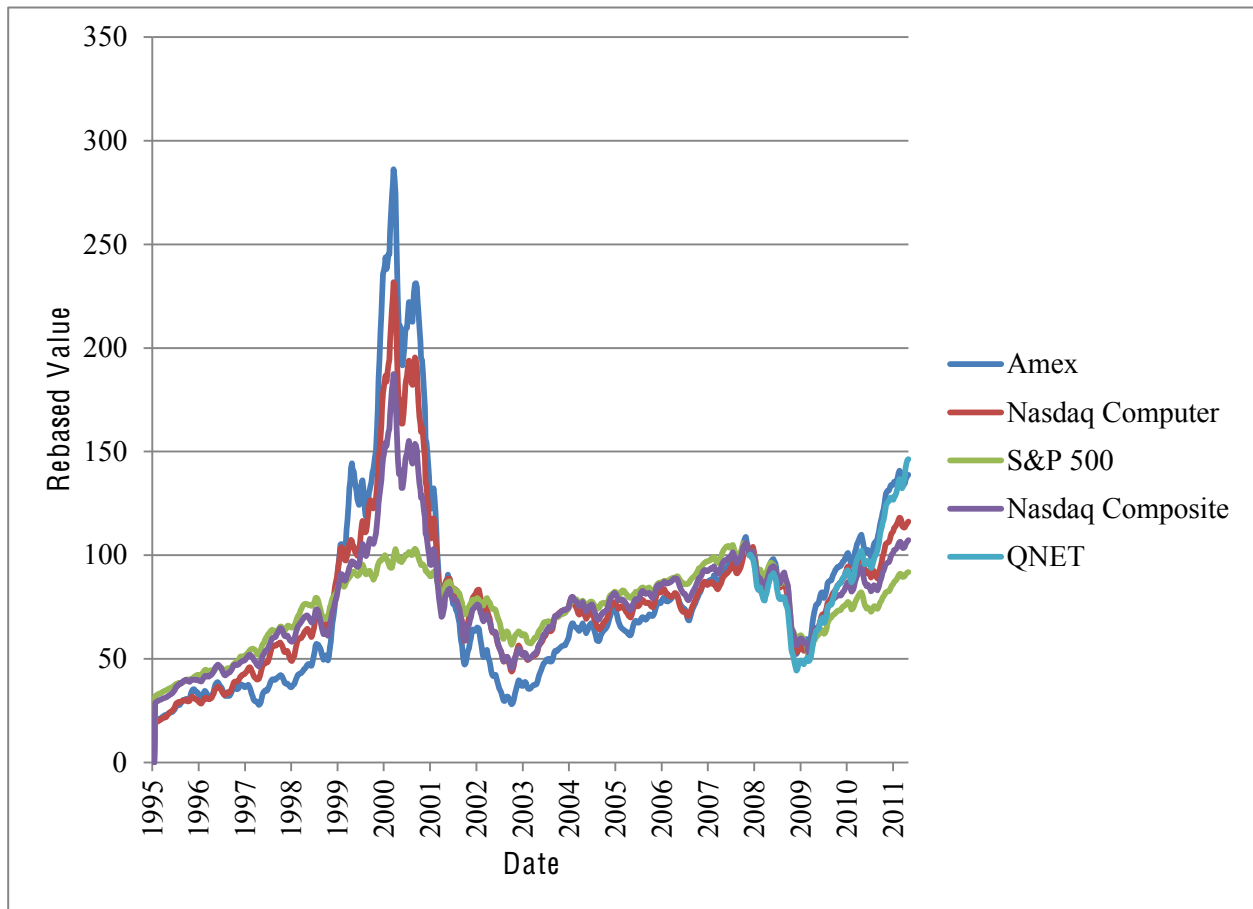
Source; Osterwalder, Pigneur, & Tucci (2005)

## Appendix E – Historical Prices for Nasdaq Composite

Date	Open	High	Low	Close	Volume	Adj Close
3/1/2000	4732.82	4796.9	4732.82	4784.08	2232340000	4784.08
3/2/2000	4816.81	4829.01	4705.45	4754.51	2137080000	4754.51
3/3/2000	4846.01	4914.79	4813.82	4914.79	2136530000	4914.79
3/6/2000	4935.65	4980.15	4887.88	4904.85	2015580000	4904.85
3/7/2000	4991.97	5006.78	4829.88	4847.84	2156410000	4847.84
3/8/2000	4920.86	4923.14	4722.14	4897.26	2020130000	4897.26
3/9/2000	4913.08	5047.96	4857.57	5046.86	2006810000	5046.86
3/10/2000	5060.34	5132.52	5039.35	5048.62	1992170000	5048.62
3/13/2000	4879.03	5027.73	4839.26	4907.24	1736270000	4907.24
3/14/2000	4997.31	5013.49	4706.61	4706.63	1977820000	4706.63
3/15/2000	4758.44	4758.44	4553.92	4582.62	1937800000	4582.62
3/16/2000	4658.44	4717.76	4455.1	4717.39	2041510000	4717.39
3/17/2000	4702.03	4805.94	4702.03	4798.13	1691530000	4798.13
3/20/2000	4812.14	4822.7	4610	4610	1539860000	4610
3/21/2000	4589.52	4712.24	4467.53	4711.68	1753310000	4711.68
3/22/2000	4750.54	4900.42	4736.9	4864.75	1769510000	4864.75
3/23/2000	4874.17	4975.66	4865.1	4940.61	1714160000	4940.61
3/24/2000	4986.54	5078.86	4902.83	4963.03	1688970000	4963.03
3/27/2000	4994.42	5022.23	4946.61	4958.56	1380380000	4958.56
3/28/2000	4939.05	4952.93	4833.89	4833.89	1490090000	4833.89
3/29/2000	4860.02	4860.02	4641.01	4644.67	1738270000	4644.67
3/30/2000	4540.44	4683.88	4355.69	4457.89	1925860000	4457.89

Source: (Yahoo Finance - IXIC Historical Prices)

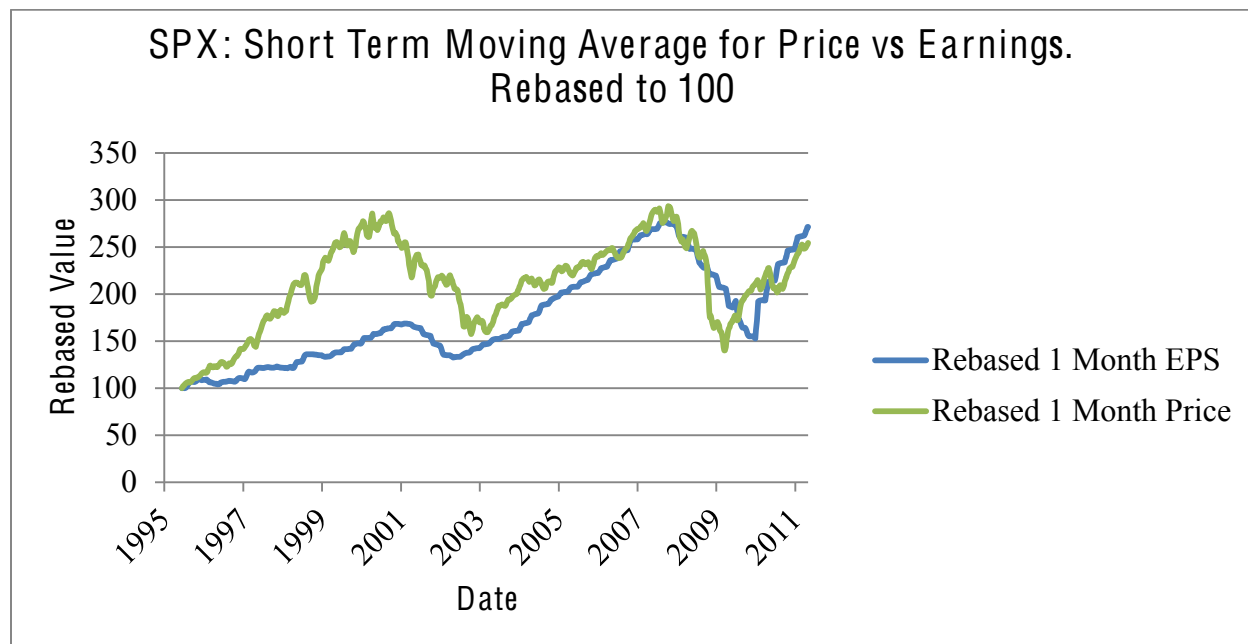
## Appendix F – Short-Term Moving Average Price Index for five indices



Source: Appendix O, Appendix F

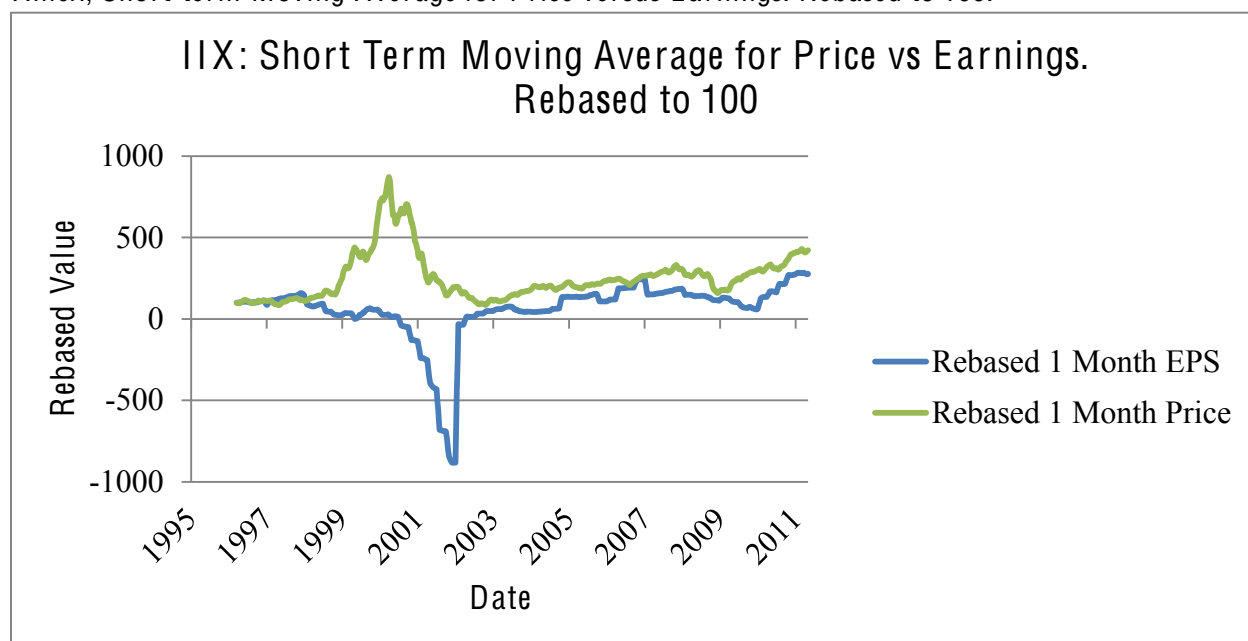
## Appendix G – Short Term Moving Average for Price vs Earnings

S&P 500; Short-term Moving Average for Price versus Earnings. Rebased to 100



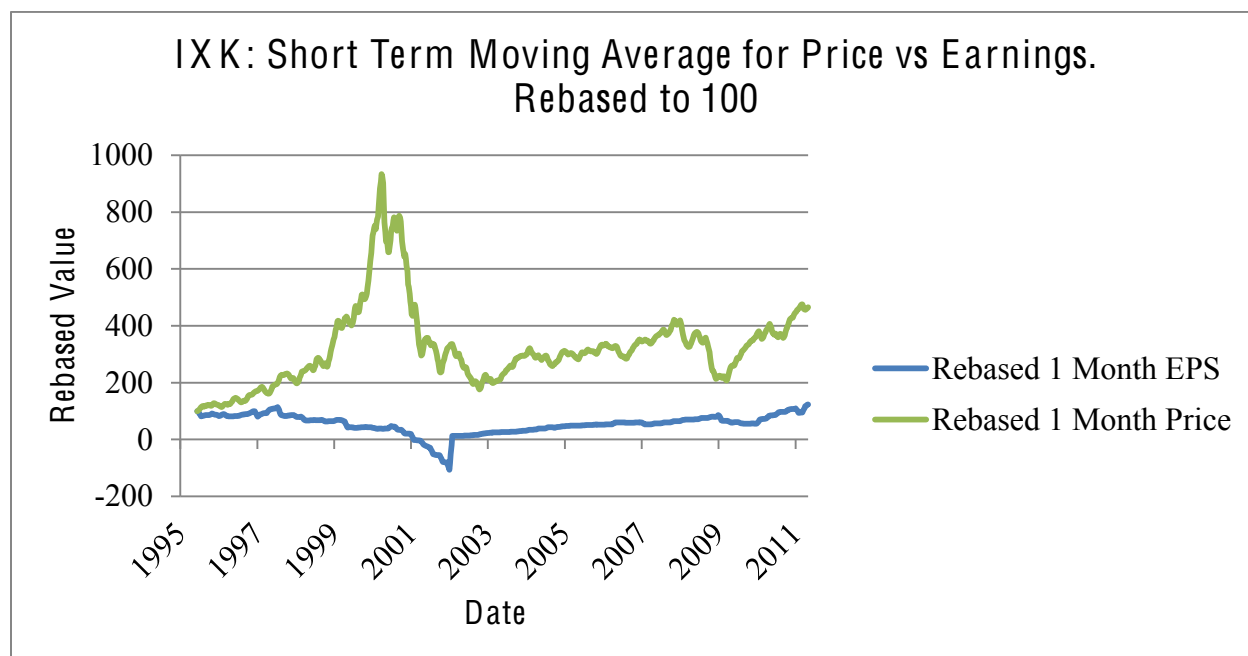
Source: Appendix O, Appendix G

Amex; Short-term Moving Average for Price versus Earnings. Rebased to 100.



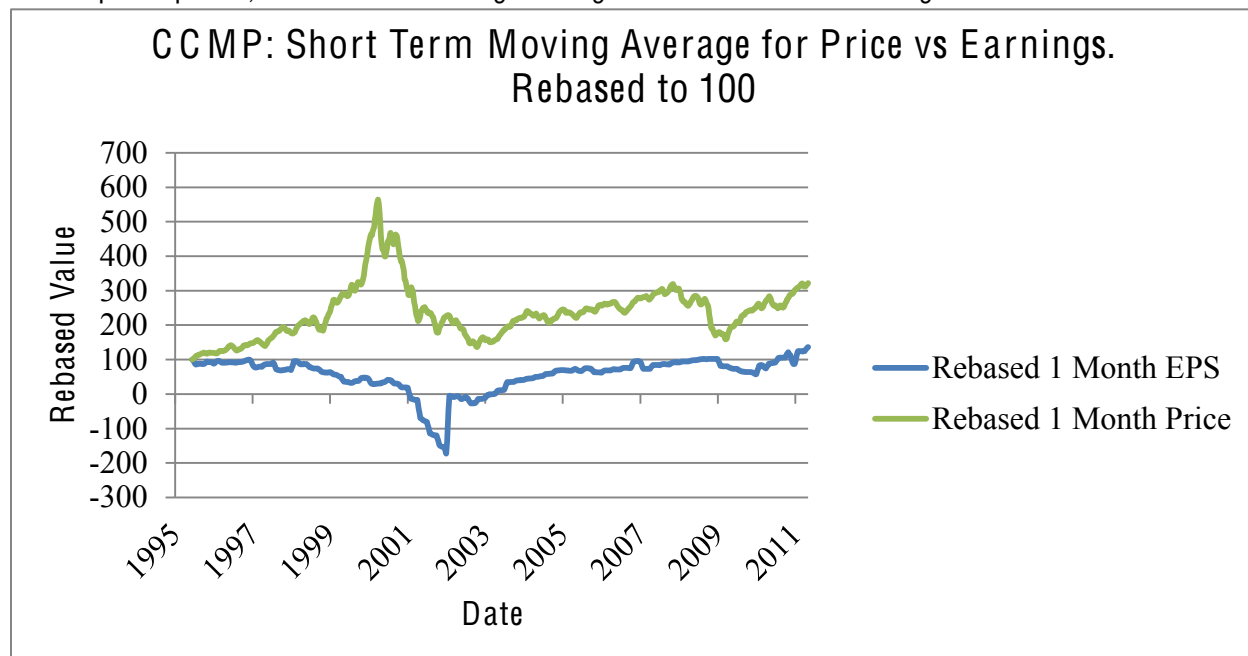
Source: Appendix O, Appendix H

Nasdaq Computer; Short-term Moving Average for Price versus Earnings. Rebased to 100.



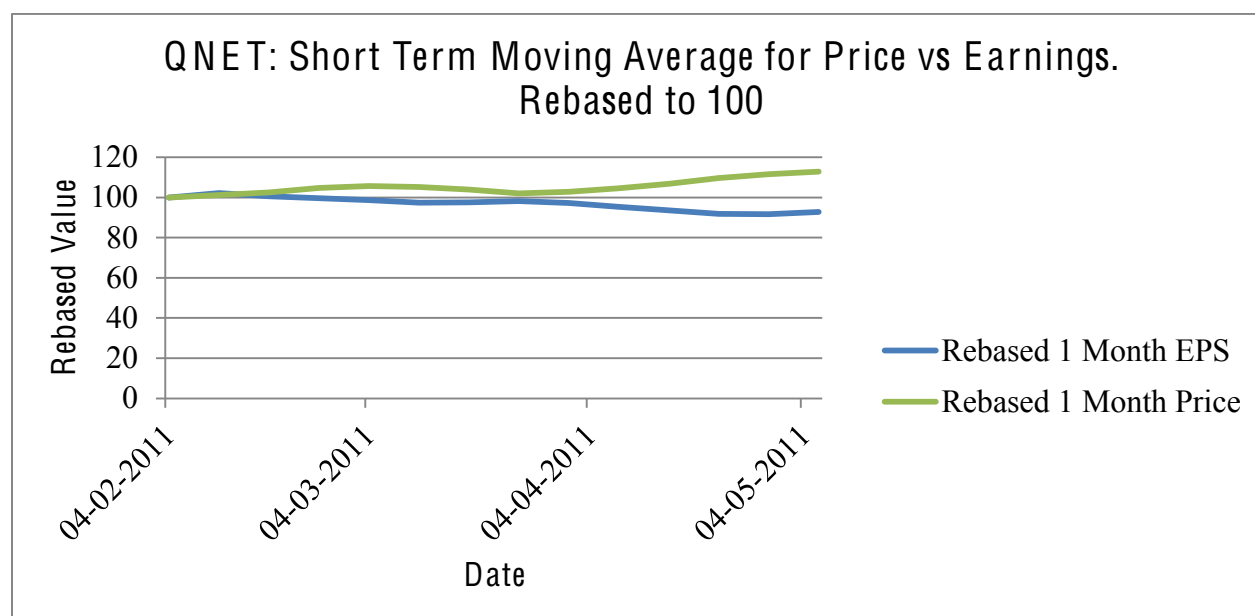
Source: Appendix O, Appendix I

Nasdaq Composite; Short-term Moving Average for Price versus Earnings. Rebased to 100.



Source: Appendix O, Appendix J

QNET; Short-term Moving Average for Price versus Earnings. Rebased to 100.

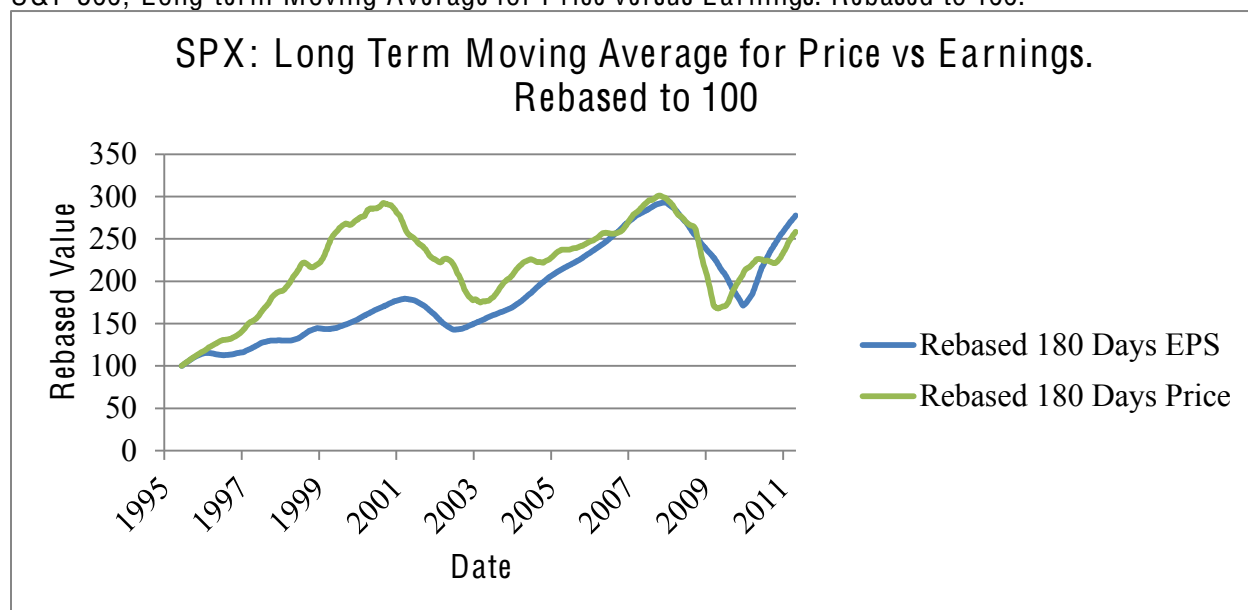


Source: Appendix O, Appendix K



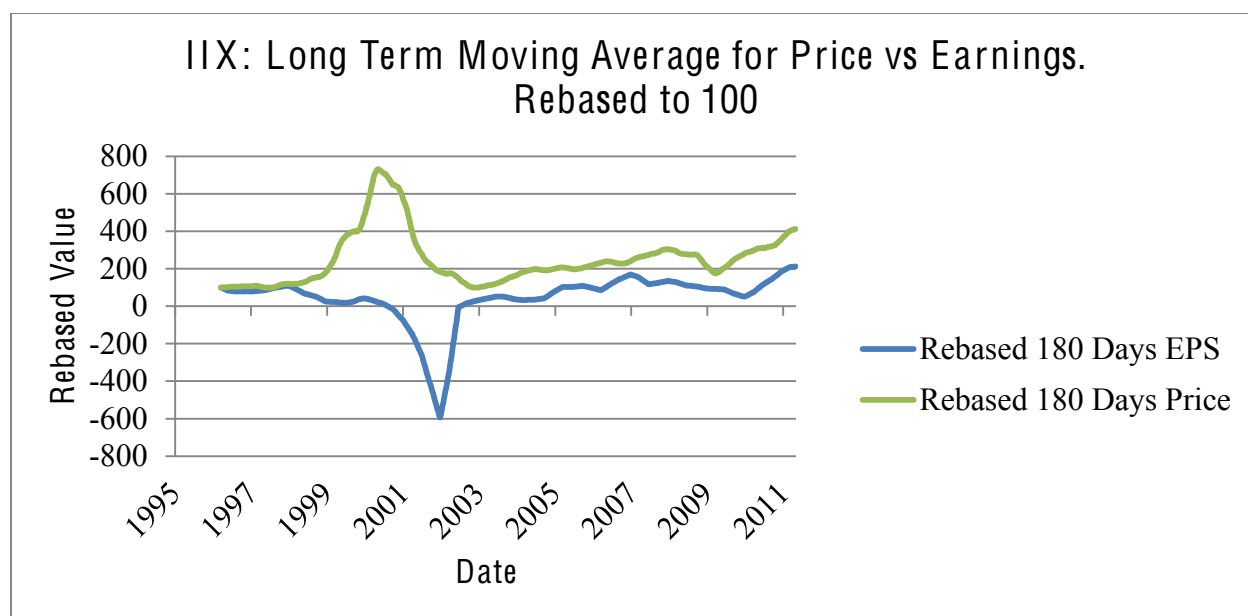
## Appendix H – Short Term Moving Average for Price vs Earnings

S&P 500; Long-term Moving Average for Price versus Earnings. Rebased to 100.



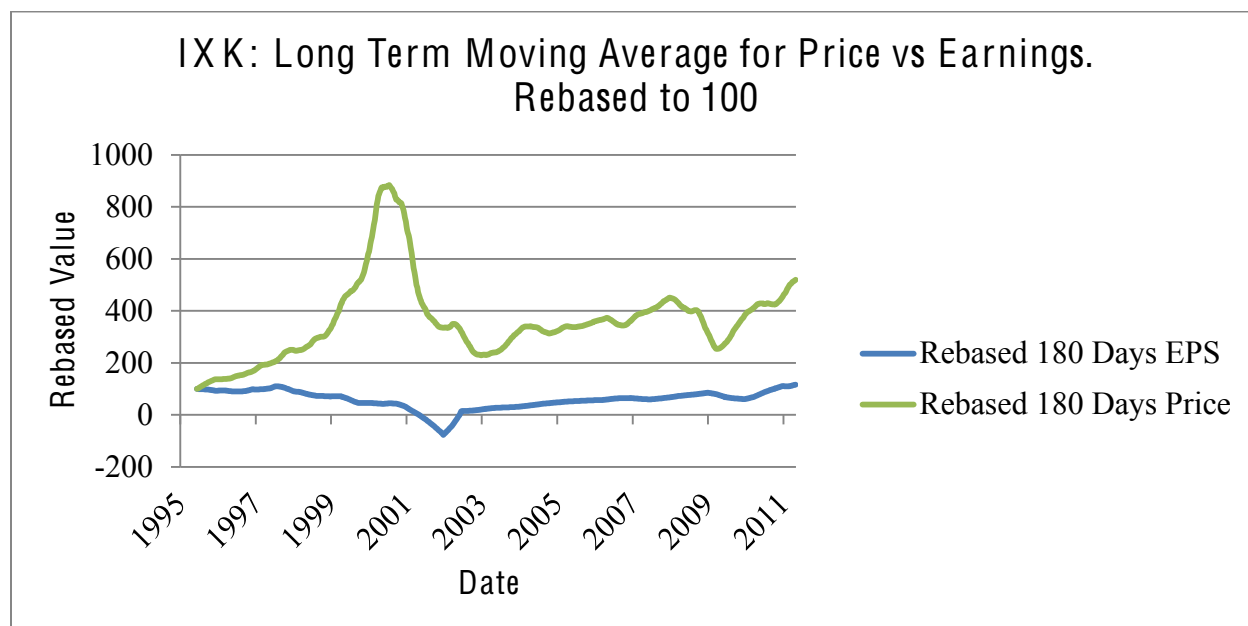
Source: Appendix O, Appendix G

Amex; Long-term Moving Average for Price versus Earnings. Rebased to 100.



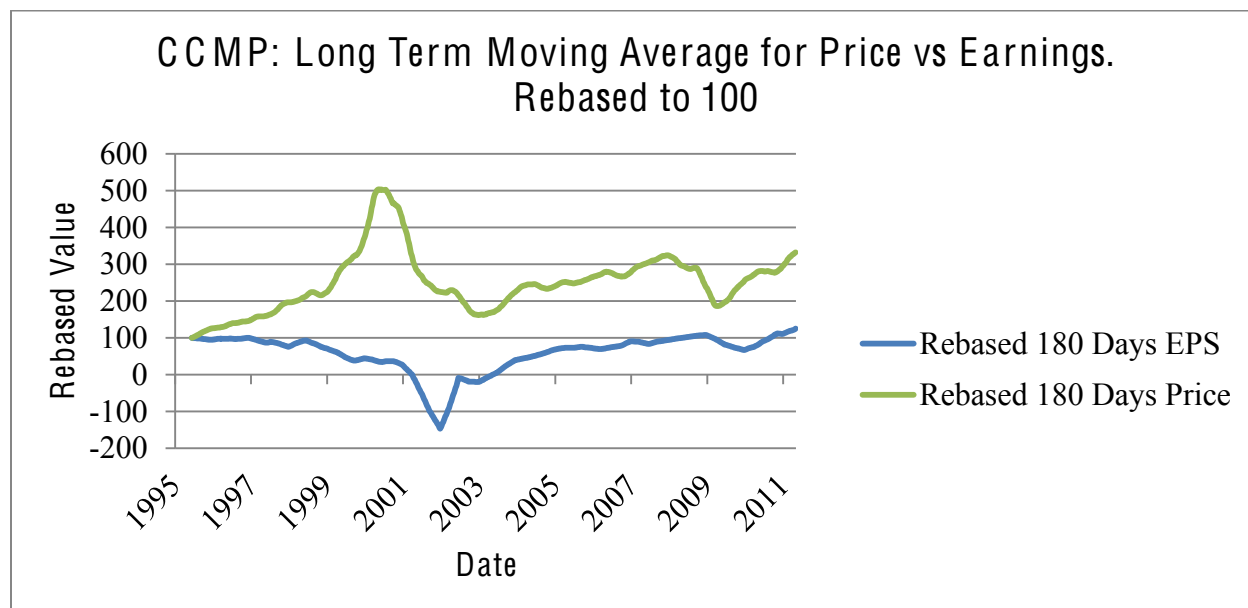
Source: Appendix O, Appendix H

Nasdaq Computer; Long-term Moving Average for Price versus Earnings. Rebased to 100.



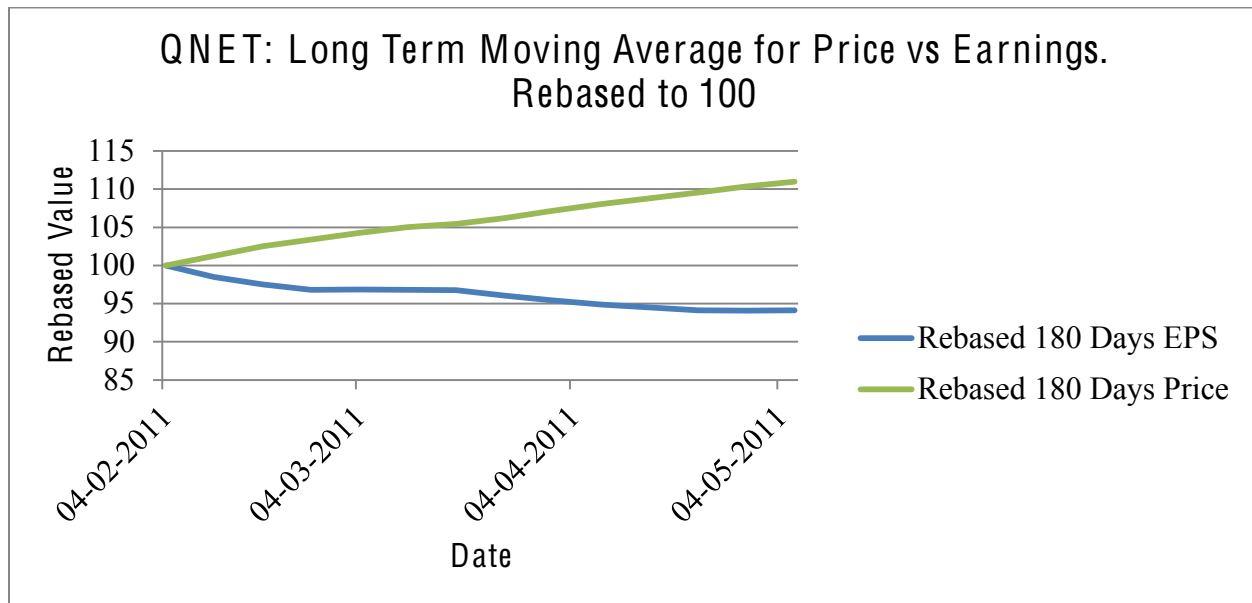
Source: Appendix O, Appendix I

Nasdaq Composite; Long-term Moving Average for Price versus Earnings. Rebased to 100.



Source: Appendix O, Appendix J

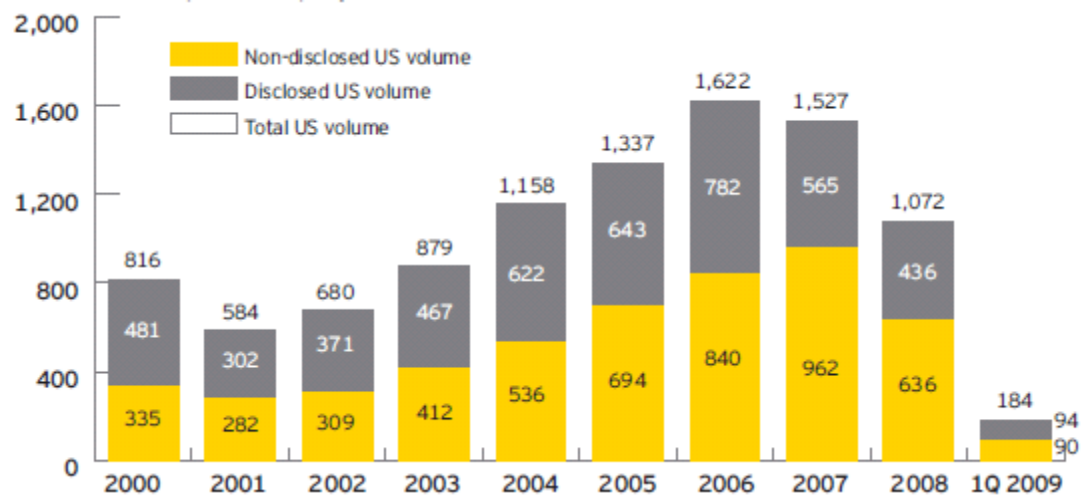
QNET; Long-term Moving Average for Price versus Earnings. Rebased to 100.



Source: Appendix N, Appendix K

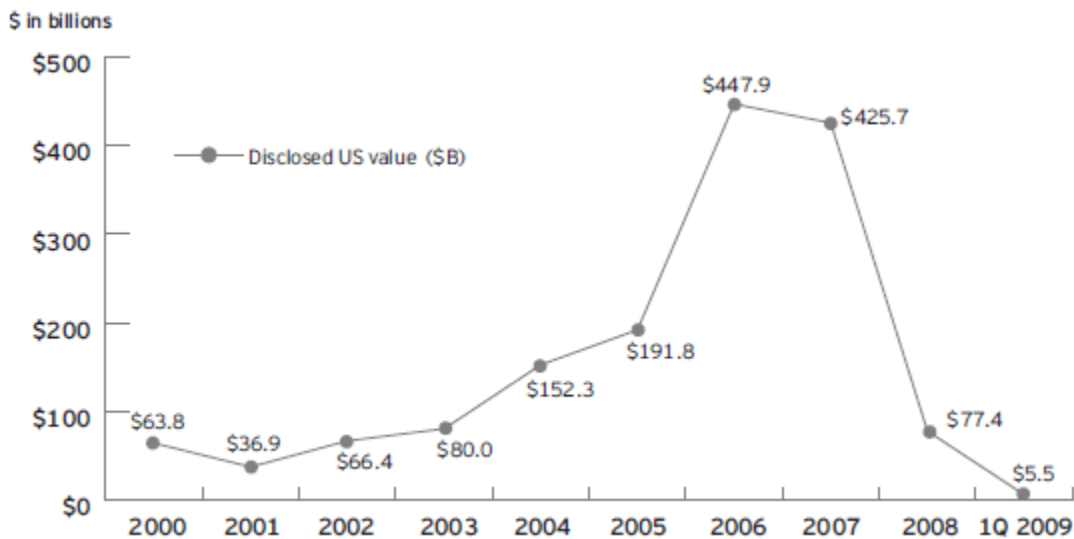
## Appendix I – US Private Equity deal volume and value

**Announced US Private Equity deal volume.**



Source; Ernst & Young (2009)

**Announced US Private Equity deal value.**



Source; Ernst & Young (2009)

## Appendix J – LinkedIn first IPO day

LINKEDIN					
Date	PE_RATIO	PRICE	PRICE HIGH	% Change Using Close Price	% Change Using Intraday High
18-May-11	642.86	45			
19-May-11	1346.43	94.25	122.7	109%	173%
20-May-11	1329.86	93.09	107.0	-1%	14%

Source: Retrieved from DataStream Advance

## Appendix K – Twitter Valuation

### TWITTER VALUATION

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#### RECENT CONTRACTS

PRICE	 IMPLIED VALUATION	TYPE	DATE
\$34.50	\$8,359,350,000	Series B Preferred	06/14/11
\$34.50	\$8,359,350,000	Series B Preferred	06/13/11
\$34.50	\$8,359,350,000	Series B Preferred	06/12/11
\$34.50	\$8,359,350,000	Series B Preferred	06/10/11
\$32.00	\$7,753,600,000	Series B Preferred	06/10/11

Twitter valuation according to Sharespost on 14/06-2011 - (Sharespost-2, 2011)

## Appendix L – Facebook Valuation

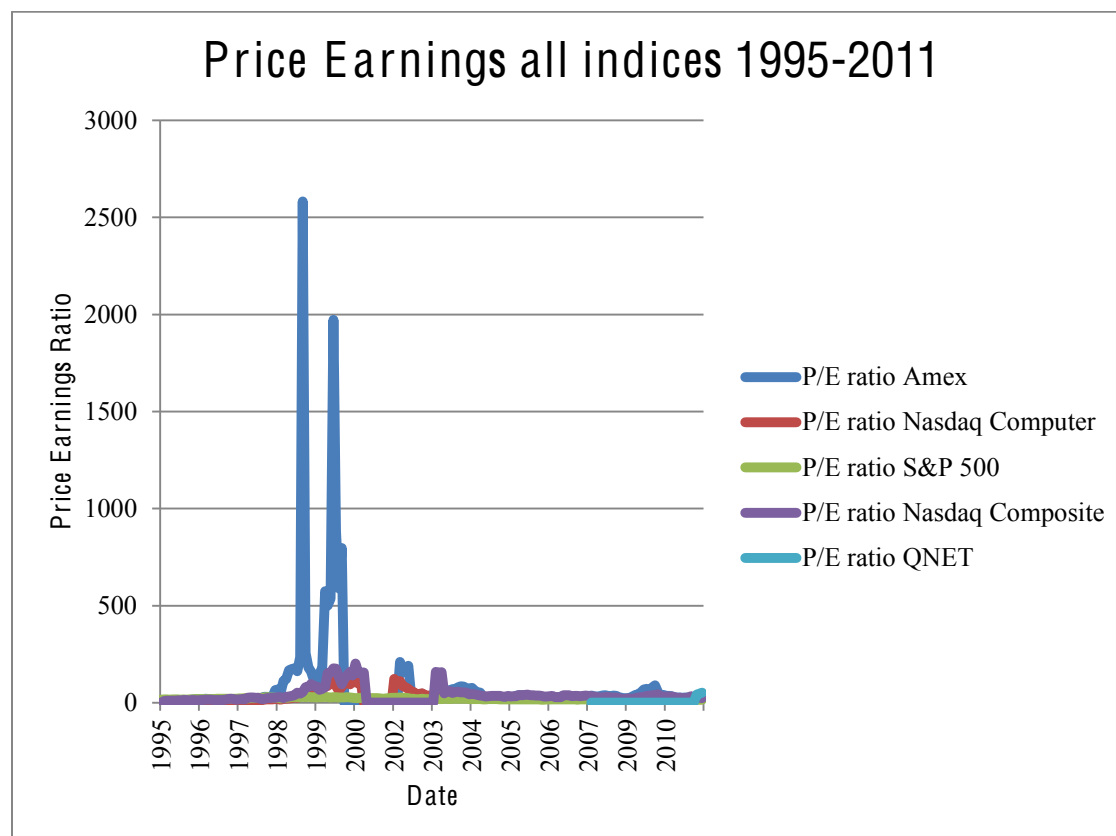
### FACEBOOK VALUATION

#### RECENT CONTRACTS

PRICE	IMPLIED VALUATION	TYPE	DATE
\$34.50	\$81,195,750,000	Common	06/13/11
\$33.00	\$77,665,500,000	Common	06/10/11
\$33.00	\$77,665,500,000	Common	06/10/11
\$33.00	\$77,665,500,000	Common	06/06/11
\$33.00	\$77,665,500,000	Common	06/01/11

Facebook valuation according to Sharepost on 13/06/11 - (Sharespost-1, 2011)

## Appendix M – P/E All Indices



Source: Appendix O, Appendix L

## Appendix N – How Bloomberg calculates the ratios

### Price-Earnings

Bloomberg computes the price earnings ratio based on the current price divided by the trailing weighted earnings per share.

### Price-Earnings Growth

The PEG is estimated based on P/E from Bloomberg as well as the estimated long term growth rate for earnings per share (EPS) for each of the indices. The estimated index long term growth rate of earnings per share is a weighted average of underlying members' estimated long term growth. Long term growth forecasts generally represent an expected annual increase in operating earnings over the company's next full business cycle. In general, these forecasts refer to a period of between three to five years. Calculated by summing all members multiplied by percent weight in the index, adjusted for equity coverage.

### Free Cash Flow Yield

Bloomberg computes the Free Cash Flow Yield as an average for all members of the index.

### Price versus Earnings

The data material is collected from Bloomberg. The earnings are represented by the trailing 12 month earnings per Share (EPS) for the periodicity selected, which are monthly observations from 1995 to 2011. The Price is the closing price for the index. The indices were rebased to 100 to be able to compare them

### Debt to Equity ratio

Bloomberg calculate the debt to equity ratio for the indices as total debt to total equity. These are based on the sum of short term and long term borrowings divided by total shareholder's equity (Bloomberg).

### Price to Sales Ratio

Bloomberg calculates the Price to Sales ratio as the closing price divided by the trailing 12 month sales per share. The price to sales ratio is calculated on the index.

# Electronic Appendices:

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## APPENDIX O – Dataset

Figure 6 – Analysis.xls – Sheet: Price - weekly chart

Figure 7 – Analysis.xls – Sheet: Moving Average Price Indices

Appendix F – Analysis.xls – Sheet: Moving Average Price Indices

Figure 8 – Analysis.xls – Sheet: Price vs EPS S&P500 - rebased

Figure 9 – Analysis.xls – Sheet: Price vs EPS AMEX - rebased

Figure 10 – Analysis.xls – Sheet: Price vs EPS Nasdaq Computer

Figure 11 – Analysis.xls – Sheet: CCMP - PI VS EPS - rebased

Figure 12 – Analysis.xls – Sheet: Price vs EPS S&P500 - rebased

Figure 13 – Analysis.xls – Sheet: Price vs EPS AMEX - rebased

Figure 14 – Analysis.xls – Sheet: Price vs EPS Nasdaq Computer

Figure 15 – Analysis.xls – Sheet: CCMP - PI VS EPS - rebased

Appendix G – Analysis.xls – Sheet: Moving Aver Price vs EPS-S&P500

Appendix H – Analysis.xls – Sheet: Moving Aver Price vs EPS-Amex

Appendix I – Analysis.xls – Sheet: Mov Aver PI vs EPS-N Computer

Appendix J – Analysis.xls – Sheet: Moving Aver Price vs EPS-N Comp

Appendix K – Analysis.xls – Sheet: Moving Aver Price vs EPS-QNET

Figure 16 – Analysis.xls – Sheet: PE - S&P vs Nasdaq Composite

Figure 17 – Analysis.xls – Sheet: PE - S&P vs QNET

Figure 18 – Analysis.xls – Sheet: PE - S&P vs Amex

Figure 19 – Analysis.xls – Sheet: PE - S&P vs Nasdaq Computer

Figure 20 – Analysis.xls – Sheet: MAV - SPX vs IXK PE

Figure 21 – Analysis.xls – Sheet: PE - All Indices

Figure 22 – Analysis.xls – Sheet: Chart PEG



Figure 23 – Analysis.xls – Sheet: Free Cash Flow Yield Chart

Figure 24 – Analysis.xls – Sheet: Financial Leverage Chart

Appendix L – Analysis.xls – Sheet: PE - All Indexes

Appendix M – Analysis.xls – Sheet: MAV - SPX vs IXK PE

Table 2 – Analysis.xls – Sheet: Change due to terrorist attack

Table 3 – Analysis.xls – Sheet: All time high index values

Table 4 – Analysis.xls – Sheet: Financial Leverage Data

Table 5 – Analysis.xls – Sheet: Financial Leverage Data

Table 6 – Analysis.xls – Sheet: Financial Leverage Data

Table 7 – Analysis.xls – Sheet: Industry Average PSR 2003-2011

## Appendix P – S&P Price Level 2009

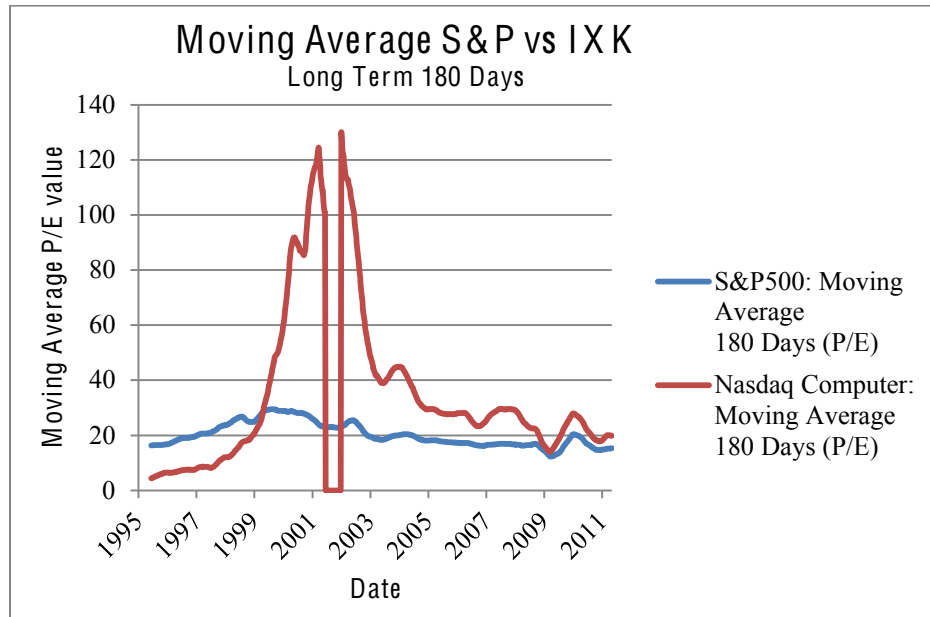
The S&P 500 closed at 676 in March 2009, a level last seen in 1997.

Show: <a href="#">Daily</a>   <a href="#">Weekly</a>				Mar 1, 2009	- Apr 1, 2009
Date	Open	High	Low	Close	
Apr 2, 2009	814.53	845.61	814.53	834.38	
Apr 1, 2009	793.59	813.62	783.32	811.08	
Mar 31, 2009	790.88	810.48	790.88	797.87	
Mar 30, 2009	809.07	809.07	779.81	787.53	
Mar 27, 2009	828.68	828.68	813.43	815.94	
Mar 26, 2009	814.06	832.98	814.06	832.86	
Mar 25, 2009	806.81	826.78	791.37	813.88	
Mar 24, 2009	820.60	823.65	805.48	806.25	
Mar 23, 2009	772.31	823.37	772.31	822.92	
Mar 20, 2009	784.58	788.91	766.20	768.54	
Mar 19, 2009	797.92	803.24	781.82	784.04	
Mar 18, 2009	776.01	803.04	765.64	794.35	
Mar 17, 2009	753.88	778.12	749.93	778.12	
Mar 16, 2009	758.84	774.53	753.37	753.89	
Mar 13, 2009	751.97	758.29	742.46	756.55	
Mar 12, 2009	720.89	752.63	714.76	750.74	
Mar 11, 2009	719.59	731.92	713.85	721.36	
Mar 10, 2009	679.28	719.60	679.28	719.60	
Mar 9, 2009	680.76	695.27	672.88	676.53	
Mar 6, 2009	684.04	699.09	666.79	683.38	
Mar 5, 2009	708.27	708.27	677.93	682.55	
Mar 4, 2009	698.60	724.12	698.60	712.87	
Mar 3, 2009	704.44	711.67	692.30	696.33	
Mar 2, 2009	729.57	729.57	699.70	700.82	

Source: (Google Finance, 2011)

## Appendix Q – Long-Term Moving Average Price Earnings for S&P vs Nasdaq Computer

Long-term Moving Average Price Earnings for S&P 500 versus Nasdaq Computer



Source: Appendix O, Appendix M