A Study of the Correlation between Pre-IPO Venture Funds and Founder Characteristics with High-Tech Firm Growth

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ABSTRACT

High-tech firms are among the fastest growing in the United States. The four industries with the most rapid growth – internet, software, semiconductors, and technology hardware – have almost doubled their share of industry output in the United States over the last decade. These firms are not only an important stimulus to the national economy but also have spawned new industries and spearheaded the development of innovative products and services. It is for these reasons that these firms are of particular interests to managers, investors, and academics. By examining these firms, researchers can help managers, investors, and academics better understand the attributes associated with firm growth.

The purpose of this study was to determine whether any correlations existed between the size of the pre-IPO (initial public offering) venture fund and founder characteristics with firm growth. Twenty different high-tech firms were studied. These firms were divided into two different samples. One sample consisted of 10 firms that went public well before the 2000 recession and the other sample consisted of 10 firms that went public close to the 2000 recession. A 5 year time period beyond an IPO was used for calculating the firm's average growth rate.

The results showed a negative correlation between the size of the pre-IPO venture funds and firm growth. No significant correlation between founder age and prior entrepreneurial experience of the founder with firm growth was found. As far as the prior relevant industry experience of the founder is concerned, an average experience of 6+ years was found to be positively correlated with firm growth. Even though, no correlation was found between founder education and firm growth; founders having a masters or a PhD degree outperformed those with a bachelor's or even a high-school degree.

The results serve to provide contextual information to managers, investors, and academics who wish to consider their firm's growth potential or in general invest in high-tech firms. In addition, the study adds to the rich literature on the impact of pre-IPO venture funds and founder characteristics on firm success.

Thesis Supervisor: Prof. Maria C. Yang, Engineering Systems Division

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Biographical Note

I hold a Master of Engineering in Electrical Engineering from Texas A&M University, College Station Texas. I earned the degree in December 2000. I also hold a Bachelor of Science degree in Electrical Engineering from the same institution, where I graduated Cum Laude in December 1998.

Prior to joining the SDM program at MIT, I spent 6 years in Lucent Technologies (now Alcatel-Lucent). I spent the earlier part of the career in the mobile Research & Development group. In the group, my primarily responsibility was to develop advanced mobile communication systems, while generating patents to enhance the IPR portfolio of the company. During the role, I co-authored a patent on "A method of managing non-acknowledgement responses in a CDMA based wireless system (Patent #7200115)". I was awarded the patent in May 2007. I spent the last 5 years in the Government & International affairs group. Here my role was to advance mobile products globally through technology adoption and spectrum negotiations. I was responsible for the front-end business development work for the company.

I have authored numerous articles and papers in the various mobile standards and regulatory bodies. Finally, I have had the privilege to represent Alcatel-Lucent in various industry foras and customer engagements. My areas of expertise are in the mobile and internet industries.

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1 Introduction

High-tech firms are among the fastest growing in the United States. The four industries with the most rapid growth – internet, software, semiconductors, and technology hardware – have almost doubled their share of industry output in the United States over the last decade. These firms are an important stimulus to the national economy. Firms such as Microsoft, Intel, Amazon, and Ebay have spawned new industries and spearheaded the development of innovative products and services. In addition, high-tech firms are energizers of entrepreneurial process that lead to innovation and job growth. It is for this reason that these firms are of particular interests to managers, investors, and academics. By examining these firms, researchers can help managers, investors, and academics better understand the attributes associated with firm growth. It is hoped that the lessons learned can then be applied directly to creating new firms with even higher growth benefiting both the society and the global economy.

Growth is difficult to achieve and maintain. Founders play a critical role in shaping and growing their firms. The relationship between founder characteristics and firm growth is important for at least three reasons (Barringer, Jones, Neubaum 2004). First, founders place a lasting "stamp" on their companies that influences the cultures and behaviors of their firms. Second, investors such as Venture Capitalists, Angel investors, or corporate investors often assess the potential of new ventures by evaluating the attributes of its founders. Third, launching a new firm is a challenging process. As a result, founder attributes such as education, prior industry experience are considered to be critical in successfully launching a new firm.

In addition to the relationship between founder characteristics and firm growth; investors and their funds play an important role in the firm growth. Investors not only provide the critical funding needed for new firms to be formed but they also bring valuable experience to the new firm often mentoring the founders in growing their firm.

The purpose of the study was to determine whether any correlation existed between the size of the pre-IPO (initial public offering) venture fund and founder characteristics with firm growth. Twenty different high-tech US firms were evaluated in the study. By using a quantitative

analysis, this study hopes to draw distinctions in key attributes between founder characteristics, size of pre-IPO venture funding and firm growth. The results serve to provide prescriptive advice to managers, investors, and academics who wish to either increase their firm's growth potential or in general invest in high-tech firms.

1.1 Motivation and Research Questions

The motivation of the study was to determine whether any significant correlation existed between founder characteristics and size of pre-IPO venture funding with firm growth. The reason is that often founder characteristics are attributed directly to the firm's success. In addition, venture capital backing provides legitimacy to the new firms because of the small percentage of firms that gain access to this source of funding (Fried and Hisrich, 1994). Cooper and Gascon argue that "starting with more capital is likely to increase the odds for success" (1992, p. 314). This view is consistent with Stinchcombe's (1965) central argument that new firms are subject to the liabilities of newness; one such liability occurs when capital and cash flow are inadequate to survive cash crises.

The investigation of conditions and factors that facilitate and influence the founding and growth of entrepreneurial firms has been an important theme in the entrepreneurial literature in recent years (Coven, Slevin, and Covin 1990; Davidson 1987; Florin 2005; Katz and Gartner 1998; Reynolds and Miller 1992; Roberts 1991). This study examines various factors, such as founder characteristics and venture funds, specifically on high-tech firms within the four industries mentioned above. In addition, the study compares the effect on firm growth for two different time periods, one in which high-tech was booming and the other a period of recession, to determine whether any significant correlations hold true in the two time periods evaluated. The Founder characteristics that were analyzed included attributes such as education, prior relevant industry experience, prior entrepreneurial experience, and age. The size of venture funding is the total amount of funds used by the founder(s) before taking the company public, i.e. Initial Public Offering (IPO). The study evaluated the following questions.

1. Are there any correlations between the size of the pre IPO venture funding and the growth of the firm beyond an IPO? That is, does a higher size fund, an indication of a high growth venture, necessarily lead to a higher firm growth?
2. Are there any correlations between the founder's age and the growth of their firm beyond an IPO?
3. Are there any correlations between the founder's prior relevant industry experience and the growth of their firm beyond an IPO?
4. Are there any correlations between the founder's prior entrepreneurial experience and the growth of their firm beyond an IPO?
5. Are there any correlations between the founder's education and the growth of their firm beyond an IPO?

The study proceeds in the following manner. First, the methodology used to evaluate the above questions is presented, including a discussion of the sample. Second, the method of analysis used to determine firm growth and various correlations are presented. In addition, the assumptions used in the study are also highlighted. Third, the results of the study are discussed. Finally, I present the study's major conclusions, related observations, and the future work.

2 Methodology

2.1 Procedure

The methodology employed in the study consisted of selecting an appropriate sample of high-tech firms that were founded by an individual(s). The high-tech firms were limited to the internet, software, semiconductors, and technology hardware industries. Twenty different high-tech industries were selected and this initial set of firms was divided into two categories. One set, termed sample set I, consisted of 10 firms that went public (IPO), at least five years before the 2000 recession. The other set, termed sample set II, consisted of firms that went public (IPO) close to the 2000 recession, i.e. the year 2000 fell within the 5 years after the firm went public. The time period around the 2000 recession was selected because of the devastating impact it had on the growth of several high-tech firms in the US. It also provided a means for validating the results by comparing them in two different time periods with different

macroeconomic and market conditions, i.e. one in which high-tech was booming (sample set I) and the other a time of recession (sample set II). A 5 year time period beyond an IPO was used to calculate the average growth of the firms.

The initial list of high-tech firms within the four industries identified above were collected from the Forbes Global 2000 Report[1]. The firms were then separated into the two sets discussed above based on the dates the firms filed for their respective IPO (see Tables 1 and 2 below). Founder characteristics such as education, prior relevant industry experience, prior entrepreneurial experience, and age were collected from various databases such as Hoover's database[2], Wikipedia[3], and the firm's corporate site. Data on different founder characteristics was not easily available or present in one particular database. Therefore a number of different databases were consulted to obtain the relevant data. This also provided a means for confirming the same data, founder age for instance, that was present in multiple databases, thereby increasing the confidence in data. For firms that were founded by a team the data on founder characteristics was averaged before using it in the study. The total size of the pre-IPO venture funding was obtained from MIT's VentureXpert database[4]. This database details the total number of venture financing transactions, associated dates, stages of financing, number of participating investors, and the currency amount used by the firm before filing for an IPO. The total size of the pre-IPO fund used in the study is calculated by summing the total number of venture financing transactions by the firm before going public.

A 5-year average growth rate of each of the twenty high-tech firm was computed by measuring the monthly return on the stock of each firm after it went public. Sixty different monthly stock return values, corresponding to 5 years, were collected. In addition, the corresponding monthly return rate of the overall stock market in which the firm's stock (security) traded was also

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[1] Forbes Global 2000 Report: http://www.forbes.com/lists/2007/18/biz_07forbes2000_The-Global-2000-United-States_10IndName.html

[2] Hoovers Database: http://premium.hoovers.com.libproxy.mit.edu/subscribe/

[3] Wikiepedia: http://www.wikipedia.org

[4] MIT VentureXpert: http://libraries.mit.edu/access/venturxpert.html

collected. The difference between the two corresponding values (firm's monthly stock return and overall monthly market return) was calculated and summed over the 5-year period. The resulting sum was then averaged to determine the firm's 5-year average growth rate used in the study to evaluate firm growth beyond an IPO. Wharton's Research Database, in particular the Center for Research in Security Prices (CRSP)[5], was utilized to collect data on the firm's and market monthly return rates. All of the firm data collected corresponding to monthly stock and market performance can be found in Appendix 1 through 20.

2.2 Sample

The sample for the study consists of a set of twenty high-tech firms within the internet, software, semiconductors, and technology hardware industries. Ten high-tech firms went public at least 5 years before the 2000 recession. The other ten high-tech firms went public close to the 2000 recession. The sample is an appropriate mix of high-tech firms that have spawned new industries and spearheaded the development of innovative products and services. In addition, sufficient financial data to compute a 5-year average growth rate is readily available. Furthermore, ample data on the founder(s) and the size of the pre-IPO venture funds is also available. Table 1 is a list of the ten high-tech firms that went public at least 5 years before the year 2000 (sample set I). The table also lists each firm's industry, business description, and founding and the IPO dates. Table 2 is a list of the other ten high-tech firms that went public close to 2000 recession. The table also lists each firm's industry, business description, and founding and the IPO dates.

[5] Wharton's Research Database: https://wrds.wharton.upenn.edu/wrdsauth/members.cgi?URI=/home/index.shtml

Company Name	Industry	Company Business Description	Founding Date	IPO Date
Intel Corporation	Semiconductors	Manufactures advanced semiconductor memory systems for computer applications and microprocessors. Introduced a Solid State Disk, a large memory system containing up to 72m characters of semiconductor storage that can be used in place of a rotation disk memory to enhance the performance of large computer systems. Other products include a single board computer, a magnetic bubble memory board, peripheral controllers for NMOs or CMOs semiconductors, and a real-time operating system for microcomputer OEMs.	Jan. 7th, 1968	Oct. 13th, 1971
Intuit Inc.	Software	Develops and publishes personal finance software, small business accounting software, and personal and professional income tax preparation software for personal computers. The Company offers other software that includes industry-specific accounting and management applications for construction, public sector, real estate, retail, and wholesale distribution organizations. Intuit also provides payroll services, financial supplies, and software for professional tax preparation and information technology asset management.	Jan. 1st, 1983	Mar. 12th, 1993

Analog Devices	Semiconductors	Manufactures precision integrated circuits used in analog and digital signal processing applications. The Company supplies precision analog and digital electronic components and related products that are employed in measurement and control applications within the avionics, industrial automation, medical and test equipment portions of the instrumentation market. The Company's products include CMOs and bipolar integrated circuit packages and chips, hybrid integrated circuits, converters, multiplexers, and input/output subsystems.	Jan. 1st, 1965	April 3rd, 1979
Microsoft	Software & Internet & Technology Hardware	Develops business and professional systems and applications software. The Company manufactures microcomputer software for business and professional use. Microsoft's products include operating systems, computer language products in six computer languages, and business applications products that provide word-processing, spreadsheet, file management, graphics, communications, and project management capabilities. The system software products include Microsoft MS-DOS, a 16-bit microcomputer operating system, used on IBM PCs and IBM compatibles. The Company is also developing CD-ROM applications and retrieval software used for referencing books. Active X was developed for building software components. Denali, in beta version, is a set of	Jan. 1st, 1975	Mar. 13th, 1986

		Active X technologies that should allow easy, browser-neutral Web development in virtually all scripting languages.		
Oracle Systems	Software	Produces software products used for database management, applications development, and decision support. The Company's principal product is the Oracle relational database management system. Oracle was designed and written to be adaptable to minicomputers manufactured by a broad range of companies including IBM, DEC, Data General, Hewlett-Packard, and AT&T. The system also runs on mainframes and microcomputers manufactured by IBM. Develops products including Designer/2000, Discover/2000, application development tools, Power Objects tools.	Jan. 6th, 1977	August, 1986
Adobe Systems	Software	Develops systems software for desktop video editing. The software allows users to combine video footage, audio recordings, animation, still images, and graphics. It is suited for making corporate videos and multimedia presentations where video never leaves computer.	Jan. 12th, 1982	Aug.13th, 1986
Apple Computer	Technology Hardware & Software & Internet	Develops and manufactures microprocessor-based computers for use in the home, small business and educational markets. The Company offers a range of personal computing products including desktop and	Jan. 1st, 1977	Dec. 12th, 1980

		notebook personal computers, related devices and peripherals, networking and connectivity products and various third-party hardware products. The Group also designs, develops and markets a line of portable digital music players along with related accessories and services, including the online sale of third-party audio and video products. The customers of the Group include educators, creative professionals, consumer and business markets. The Group sells its products through its online stores, direct sales force, third-party wholesalers and resellers and its own retail stores. It has its operations in the United States, Europe, Japan and Asia Pacific. As on 31-Jan-2007, the Group operated 170 stores.		
EMC Corporation	Technology Hardware & Software	Develops information storage systems, software, networks, and services. The Company also sells a line of network attached storage (NAS) file servers. It also has a wide array of software designed to manage, protect, and share data. EMC sells its products directly and through distributors and manufacturers.	Jan. 1st, 1979	Mar.22nd, 1988
Sun Microsystems	Technology Hardware & Software	Manufactures 32-bit workstations with applications including computer-aided design (CAD), engineering (CAE), publishing (CAP) and software engineering (CASE); automated testing; artificial intelligence; and university and scientific research. The Company's network	Jan. 2nd, 1982	Mar. 4th, 1986

		file system software enables networks of machines from different vendors, which use different operating systems to share files and data transparently. Sun Microsystems' products conform to the open system interconnection (OSI), manufacturing automation (MAP), and technical office (TOP) protocols. One of the products, Java, is the defacto standard language for programming over the Internet and intranets. Java Computing devices focus on the transition of desktop centric and network centric computing. And also released Solaris 2.5 operating systems allow users to navigate the Web, create Hypertext Markup Language-based information and Web content, and access corporate intranets.		
Electronic Arts	Software	Manufactures disk-based entertainment and educational software. The Company's products have been developed for 8-bit and 16-bit floppy disk-based computers such as the IBM PC and compatibles, Commodore 64 and Amiga and Apple II and Macintosh. The Company's products include adventure and fantasy programs; action and sports programs; creativity programs, such as painting, music, and video construction; productivity programs, such as word processing and spreadsheets; and strategy programs.	Jan 1st, 1982	Sept.20th, 1989

Table 1: First Sample Set (I) of 10 High-Tech Firms

Company Name	Industry	Company Business Description	Founding Date	IPO Date
Broadcom Corporation	Semiconductors	Provides silicon solutions for broadband digital transmission of voice, video and data. The Company designs, develops and supplies integrated circuits for communications market, including cable set-top boxes, cable modems, high-speed local, metropolitan and wide area networks, home networking, Voice over Internet Protocol (VoIP), residential broadband gateways, direct broadcast satellite and terrestrial digital broadcast, optical networking, digital subscriber lines (xDSL) and wireless communications.	Jan. 8th, 1991	April 16th, 1998
NVidia	Software & Technology Hardware	Designs, develops and markets 3D graphics processors and related software that provide interactive 3D graphics to the mainstream PC market. The Companys products enhance the end-user experience on consumer and professional computing devices. NVIDIA graphics processing units (GPUs), media and communications processors (MCPs), and wireless media processors (WMPs) have broad market reach and are incorporated	Jan. 4th, 1993	Jan. 22nd, 1999

		into a variety of platforms, including consumer and enterprise PCs, notebooks, workstations, PDAs, mobile phones, and video game consoles.		
Yahoo Inc.	Software & Internet	Develops Internet navigational services. The Company Web-wide searches as well as utilizing the Web as an advertising medium. Yahoo! also develops an avenue for services on the World Wide Web. Its site features a search engine and directory to help users navigate the Web. With 25 international sites in 13 languages, The Company aggregates content from news, financial information, and streaming media sources, and offers registered users personalized Web pages, e-mail, chat rooms, and message boards. Most sales come from advertising; the company charges fees for additional mailbox space, personal ads, and other services. Yahoo! also provides Internet access through a deal with SBC Communications.	Jan. 4th, 1994	Apr. 12th, 1996
Akamai Technologies	Software & Internet	Provides Web content distribution services. The Company provides global service for accelerating content and business processes online. It serves 1,900 organizations by maximizing the performance of their online businesses.	Jan. 8th, 1998	Oct. 28th, 1999
Red Hat	Software	Develops and manages Linux and open source solutions for Internet infrastructure, ranging from small embedded devices to high availability clusters and secure web servers. The Company dominates the market for Linux, the open-source computer operating system that is the	Mar. 1st, 1993	Aug. 11th 1999

		chief rival to Microsoft's Windows operating systems. In addition to its Red Hat Linux OS, the company's product line includes database, content, and collaboration management applications; server and embedded operating systems; and software development tools. Red Hat also provides technical support and training. Computer makers, including Dell, Hewlett-Packard, and IBM, bundle Red Hat Linux with low-cost servers and PCs.		
Juniper Networks	Technology Hardware	Manufactures switches and routers for Internet Service Providers. The Company provides routers that are specifically designed for service provider networks. Juniper has outsourced manufacturing, repair, and the majority of its supply chain management.	Jan. 2nd, 1996	Jun. 25th, 1999
SanDisk Corporation	Semiconductor	Develops high-density erasable programmable memory systems. The Company develops memory systems based upon proprietary, high density, non-volatile (flash EEPROM) semiconductor technology. Its design is suited for mass storage applications.	Jan. 6th, 1988	Nov. 7th, 1995
Network Appliance Corporation	Technology Hardware & Software	Develops unified storage solutions for data-intensive enterprises. The Company's NetCache Web caching appliances help enterprises and service providers deliver content by storing information physically closer to users. It also offers a line of disk-based devices designed for	Jan. 1st, 1992	Nov.21st, 1995

		backup and archiving (NearStore), as well as data management and content delivery software.		
EBay Inc.	Internet	Provides auction services through the Internet. The Company provides a person-to-person trading community on the Internet available 24 hours a day, 7 days a week. On this site, buyers and sellers are brought together on an auction format buying and selling items such as antiques, coins, collectibles, computers, memorabilia, stamps and toys.	Jan 9th, 1995	Sept.24th, 1998
Amazon Inc.	Internet	Owns and operates a web site that sells books, CD's, DVD's and videos. Amazon.com's main site offers millions of books, CDs, DVDS, and videos (which still account for most of its sales), as well as toys, tools, electronics, health and beauty products, prescription drugs, and services such as film processing. The company is linking its virtual stores to the bricks-and-mortar kind; it runs both the Toys "R" Us Web site and the online operations of rival bookseller Borders. In 2002 Amazon.com re-launched CDnow's music retailing Web site; Amazon handles all Web site operations including inventory management, customer service, and shipping. Additional syndicated store programs include Virgin Group's virginmega.com and the UK's Waterstones Web site.	Jan 1st, 1994	May 15th, 1997

Table 2: Second Sample Set (II) of 10 High-Tech Firms

2.3 Method of Analysis

The first step consisted of evaluating the correlations between the size of the pre-IPO venture fund and founder characteristics with firm growth for the two different sets of firms. In the next step, similar correlations obtained from the two sample sets were compared to determine whether any significant differences or similarities existed between the correlations. If correlations were similar in the two sets, a significant result was deemed to have been found. Alternatively, if correlations were different, no significant result was deemed appropriate.

The study's method of analysis consisted of plotting the data on the various founder characteristics with the respective firm's 5-year average growth rate. The different plots corresponding to different founder attributes in the two sample sets were then compared to determine whether any similarities or differences exist between the two. For example, plot corresponding to founder age and firm growth obtained from sample set I was compared with the plot corresponding to founder age and firm growth obtained from sample set II. If the correlation of the two plots were similar, a significant result was deemed to have been found and key conclusions were made. Alternatively, if correlation was not similar, no significant conclusion was deemed appropriate

Similarly, a plot of the total size of the pre-IPO venture funds with the firm growth was prepared for each firm in both samples. These plots were then compared with each other to determine whether any similarities or differences exist. If correlations were similar in the two sets, a significant result was deemed to have been found and key conclusions were made. Alternatively, if correlations were different, no significant conclusion was deemed appropriate.

2.4 Assumptions

A number of different assumptions were made in the study. The assumptions are listed below.

1. Pre-IPO venture funding did not distinguish between venture capital, angel funding, and any other type of investor financing.
2. Firm average growth rate was calculated for a total of 5 years beyond an IPO.

3. The study did not take into account the time period between the firms's founding and the IPO date.
4. The experience level of the founder(s), both entrepreneurial and relevant industry, included all experience accumulated up till the founding of the firm.
5. Entrepreneurial experience, if in the same industry as the new firms industry, is counted towards both entrepreneurial and relevant industry experiences.
6. For firms that were founded by a team, the total experience of the founders, both entrepreneurial and relevant industry, were averaged.
7. For firms that were founded by a team, the total ages of the founders were averaged. The age of the founder(s) used in the study was at the time of the firm's founding.
8. For firms that were founded by a team, the education level of the founder(s) with the highest degree was used in the study.

3 Study Results & Discussions

This section presents the results of the study. Throughout the study I was interested in determining whether any significant correlation existed between the size of the pre-IPO venture funds and various founder characteristics with firm growth. The results of the study were carefully analyzed by comparing the firm's average growth rate with the firm's specific attribute studied for each of the two samples of 10 high-tech firms. For the attributes that were similar in the two sets of 10 high-tech firms, significant correlations were determined to be present. Consequently, for attributes that were dissimilar for the two sets of 10 high-tech firms, no significant correlations were determined to be present. As a result, key conclusions and observations were then made.

3.1 3.1 Pre-IPO Venture Funds and Firm Growth

Tables 3 and 4 lists the firm's average growth rate, the total size of the pre-IPO venture funds, and investment efficiencies corresponding to firms in the two sample sets. The investment efficiency of a firm is the ratio between the firm's average growth rate and the average size of the pre-IPO venture funds. This ratio is useful in distinguishing firms within the same sample that demonstrated greater efficiencies in terms of the use of the pre-IPO funds. Figure 1

provides a comparison between the size of the pre-IPO venture funds and the firm's average growth rate for sample set I. Similarly, Figure 2 provides a comparison between the size of the pre-IPO venture funds and the firm's average growth rate for sample set II.

Company Name	Size of Pre-IPO Venture Fund	Average Firm Growth Rate	Investment Efficiency
EMC Corporation	$0.21M	2.07%	49.3%
Analog Devices	$0.42M	2.83%	33.7%
Adobe Systems	$5.35M	5.22%	4.87%
Oracle Systems	$5.51M	3.73%	3.38%
Microsoft Corporation	$6.56M	4.5%	3.43%
Intel Corporation	$7.64M	4.91%	3.212%
Apple	$9.7M	-0.77%	-0.3969%
Electronic Arts	$12.88M	0.04%	0.0151%
Intuit Inc.	$17.96M	1.8%	0.5011%
Sun Microsystems	$39.66M	1.13%	0.1425%

Table 3: Pre-IPO venture funds and Firm Growth - Sample Set I

Company Name	Size of Pre-IPO Venture Fund	Average Firm Growth Rate	Investment Efficiency
EBay Inc.	$6.55 M	6.96%	5.309%
Amazon	$10.65 M	7.53%	3.535%
Network Appliance	$12.74 M	6.57%	2.578%
Red Hat	$13.4 M	2.22%	0.828%
NVidia	$19.85 M	6.05%	1.523%
SanDisk	$63.41 M	4.29%	0.338%
Broadcom	$74.29 M	5.11%	0.343%
Yahoo Inc.	$77.96 M	6.06%	0.388%
Juniper Networks	$113.16 M	5.02%	0.2216%
Akamai	$116.76 M	1.91%	0.0817%

Table 4: Pre-IPO venture funds and Firm Growth - Sample Set II

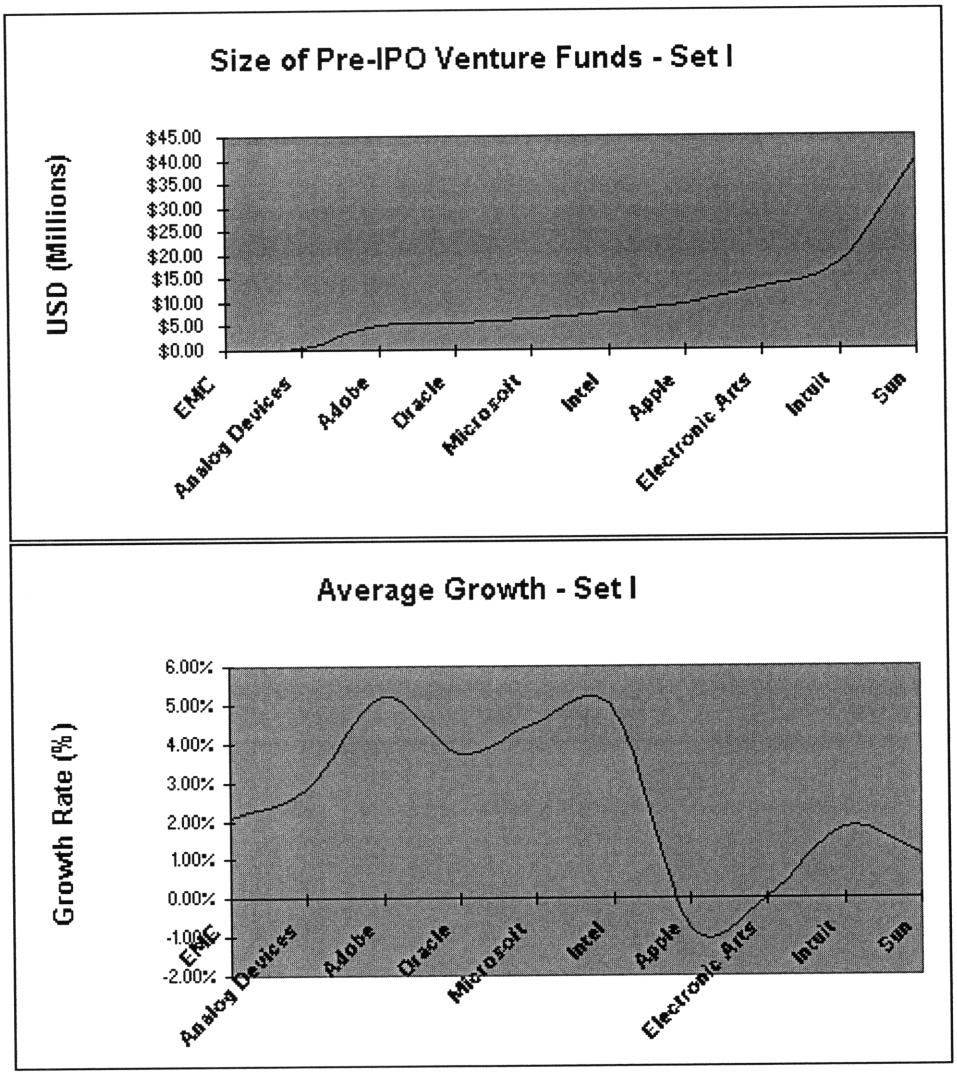

Figure 1: Comparison of Venture Funds and Growth - Sample Set I

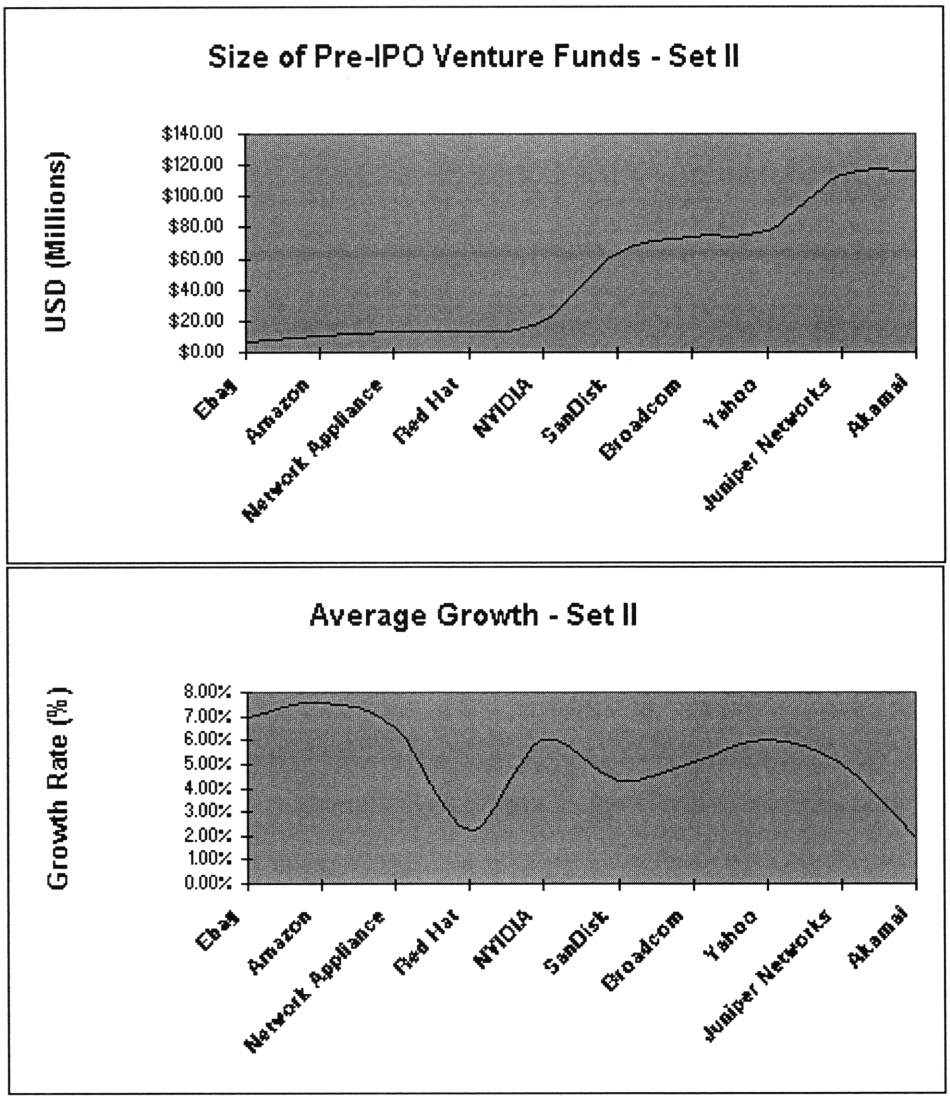

Figure 2: Comparison of Venture Funds and Growth - Sample Set II

As can be seen from Figures 1 and 2, a tendency towards a "negative correlation" between the size of the pre-IPO venture fund and average firm growth rate is observed. The correlation is similar for the two sets of the 10 high-tech firms studied. Among the firms that comprised sample set I, Apple, Electronic Arts, Intuit, and Sun exhibited slower growth rates (investment efficiency rates), while their founders consumed more funds, compared to other firms in the sample. It can be reasoned that since Apple's and Sun's primary products were hardware, the founders used more funds to prototype, build, and test compared to other firms in the sample whose primary products were software or internet related. The reasoning behind Electronic Arts and Intuit, whose primary products were software, is not clear. It is possible that these firms faced some difficult challenges in terms of starting their venture. The challenges could have been

in recruiting talent, retaining key people, or other market related problems such as fierce competition or lack of mainstream customers. An interesting point to note here is that the founders of both Intuit and Electronic Arts founded the companies as a single person. This could also explain why these founders may have used more pre-IPO funds initially starting their venture and building a team.

Among the firms that comprised sample set II, SanDisk, Broadcom, Yahoo, Juniper Networks, and Akamai exhibited slower investment efficiency rates compared to other firms in the same sample. SanDisk's and Broadcom's primary products were semiconductor chips while Juniper network's primary products were hardware. The founders of these firms may have consumed more funds due to the nature of their firm's products. That is, since these products required more funds to build and test compared to software products it is possible that the founders used more resources compared to other firms in the sample whose primary products were software or internet related. Particularly, to note is that the manufacturing of semiconductor chips requires large sums of investment for process improvement purposes. Another interesting difference can be found in the semiconductor firms in set I, namely Intel and Analog Devices, and between SanDisk and Broadcom. Intel and Analog Devices did not exhibit slower investment efficiency rates compared with that of SanDisk and Broadcom. A possible reason could be that these firms went public in the 70's when the market for such products was ripe and competition was less intense, particularly from low cost manufacturers in the Asia Pacific.

The reasoning behind Akamai's and Yahoo's slower investment efficiency rates, whose primary products were software and internet, was not clear. A possible reasoning can be attributed to the market conditions surrounding their products when the firms went public. Particularly, the 2000 recession may have had an impact on the growth of these firms. Both Akamai and Yahoo were founded by a team, so the argument that was made for Intuit and Electronic Arts above is not applicable in this case. It is also possible that both Akamai and Yahoo consumed a large amount of funds in R&D or in other investments related activity, such as purchase of related hardware or equipment before bringing their products to market.

In summary, a somewhat "negative correlation" between the size of the pre-IPO venture funds and average firm growth was observed. The reasoning behind this behavior might be attributed to a variety of different factors, such as market conditions, nature of products, recruiting, or individual vs. team founders. For these firms, higher level of resource endowments did not seem to affect post-IPO performance for the venture or its investors (Florin, 2003). It appears that the amount of initial financing depends on the prospects of a firm's success, especially as seen by the investors. Perhaps initial capital does not actually influence success but is merely symptomatic of a company's chances of success, as influenced by others (Roberts, 1991 pg.266).

It is therefore concluded that that investor backing is related to higher levels of funding up to the IPO, but not related to the venture's ability to grow and be profitable after the offering. This finding is intriguing and points to an interesting question for future research: Do investor-backed firms get too much funding early on that leads them to behave more like large organizations and less like cash-strapped entrepreneurs, squandering part of their wealth in unworthy or very risky opportunities? Or is it that VC-backed ventures are more aggressive in pursuing growth after IPO, as called for by Florin in his study.

3.2 Founder Characteristics

The second set of factors examined for their connection to firm growth was aspects of founders themselves. These included the age of the founders at the time of founding the firm, any relevant prior industry experience, any prior entrepreneurial experience, and education.

The relationship between founder characteristics and firm growth is important for at least three reasons. First, it is widely believed that founders place a lasting "stamp" on their firms that influences the cultures and behaviors of their firms (Mullins, 1996). For example, for years after the death of Walt Disney, Disney executives, when confronted with an important decision, would often ask "What would Walt do?" (Collins and Porras, 1994). Second, investors and others often assess the potential of the new venture by evaluating the attributes of the founder. One of the most important criteria used by investors in deciding whether to fund a firm is their perception of the founder's or team of founder's ability to successfully launch the venture. Third, launching a

new firm is a challenging process. As a result, founder characteristics have in many instances shown to be critical in successfully launching a new firm.

The following sections present the results of the study on the correlation of various founder characteristics with firm growth for the two sets of 10 high-tech firms.

3.2.1 Founder Age

The age of the founders corresponding to firms in the two sets of 10 high-tech firms were plotted against their respective firm's average growth rate. Where firms were founded by a team, the age used in the study was averaged across the founder ages. Tables 5 and 6, list the average ages of the founders at the time of founding their firms and Figures 3 and 4 plots these ages against the firm's respective average growth rate.

Company Name	Founder(s)	Average Age of Founders	Growth Rate
EMC Corporation	Richard Egan, Roger Marino	41.5	2.07%
Analog Devices	Ray Stata, Matthew Lorber	31.5	2.83%
Adobe Systems	John Warnock, Charles Geschke	42.5	5.22%
Oracle Systems	Larry Ellison	33	3.73%
Microsoft Corporation	Bill Gates, Paul Allen	21	4.5%
Intel Corporation	Gordon E. Moore, Robert Noyce	40	4.91%
Apple	Steve Jobs, Steve Wozniak	24.5	-0.77%
Electronic Arts	Trip Hawkins	28	0.04%
Intuit Inc.	Scott Cook, Tom Proulx	31	1.8%
Sun Microsystems	Andy Bechtolsheim, Vinod Khosla, Scott McNealy, Bill Joy	26.5	1.13%

Table 5: Average Founder Age - Sample Set I

Company Name	Founder(s)	Average Age of Founders	Growth Rate
EBay Inc.	Pierre Omidyar	27	6.96%

Amazon	Jeff Bezos	30	7.53%
Network Appliance	David Hitz, James K. Lau	31	6.57%
Red Hat	Bob Young, Marc Ewing	30.5	2.22%
NVidia	Jen-Hsun Huang, Chris Malachowsky	31	6.05%
SanDisk	Eli Harari, Sanjay Mehrotra	36.5	4.29%
Broadcom	Dr. Henry Nicolas, Dr. Henry Samueli	33.5	5.11%
Yahoo Inc.	Jerry Yang, David Filo	26	6.06%
Juniper Networks	Pradeep Sindhu, Dennis Ferguson, Bjorn Liencres	42	5.02%
Akamai	Daniel Lewis, Prof. Thomas Leighton	26.5	1.91%

Table 6: Average Founder Age - Sample Set II

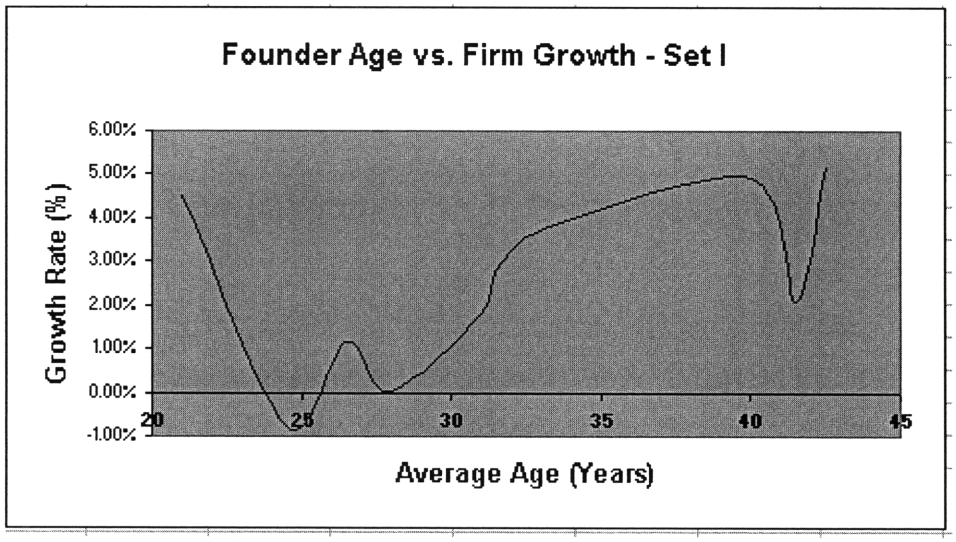

Figure 3: Founder Age vs. Growth - Sample Set I

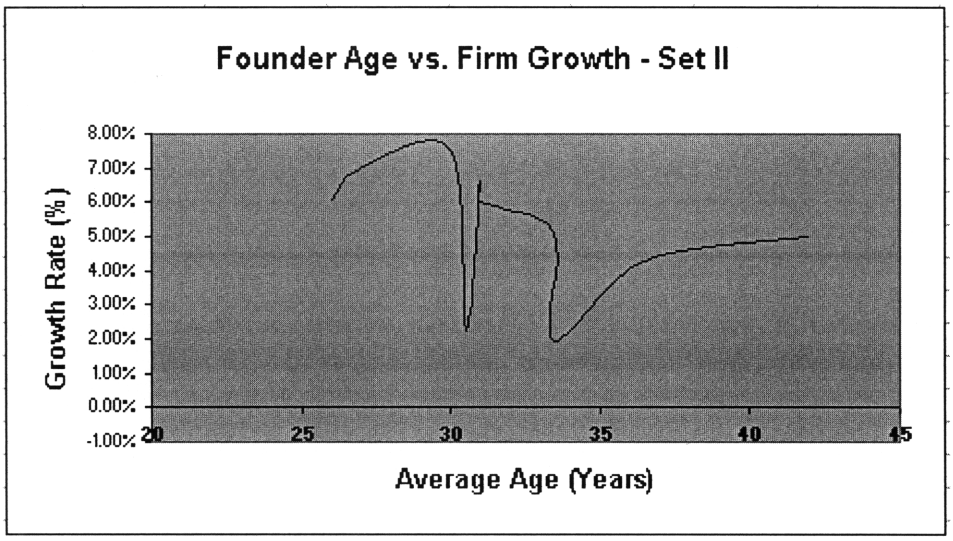

Figure 4: Founder Age vs. Growth - Sample Set II

As can be seen from Figures 3 and 4 above, "no" significant correlation between founder age and firm growth can be observed. One might hypothesize that maturity or higher age would lead to higher probability of firm success. On the contrary, one might also believe that since younger people have the motivation and drive to lead their firm to success compared to the older group; these younger people are more likely to lead their firms to higher success. The study does not support any link between age of founders and firm growth. This has also been confirmed by the studies of Sandberg and Hofer, where the authors find little impact on new company performance of the biographical characteristics of entrepreneurs (Sandberg and Hofer 1987).

Figure 3 shows a higher growth rate of firms with founders with ages 30 and above as well as slightly younger founders with ages around 20's. Founders of Microsoft, Oracle, Intel, and Adobe with ages of 21, 33, 40, and 42.5 years respectively led their firms to higher growth compared to other founders in the same sample. Similarly, Figure 4 shows a higher growth rate of firms with founders of ages between 25 and 31. Founders of Yahoo, Ebay, Amazon, and NVidia with ages 26, 27, 30, and 31 respectively led their firms to higher growth compared to other founders in the same sample. The exact reasoning behind this behavior was not evaluated in the study.

In summary, no significant correlation between founder ages and firm growth has been found in the study. A similar result has also been confirmed by Ed. Roberts (1996) and Sandberg and Hofer (1987) in the study they performed using different sample sets and different evaluation criterion.

3.2.2 Relevant Industry Experience

In order to assess the correlation of founder's prior industry experience and firm growth, the histogram of founder experience and cumulative growth is plotted in Figures 5 and 6 for the 10 high-tech firms studied in each sample. Figures 5 and 6 sum the growth rates of firms whose founder experiences fall within the same work experience phase. For example, founders of both Microsoft and Sun (sample set 1) had approximately 1-2 years of experience before founding their respective firms. The growth rates of both Microsoft and Sun are summed to represent the overall effect of the 1-2 year work experience phase on firm growth. The numbers inside the bars represent the total number of firms with founder(s) having the same work experience.

Tables 7 and 8, lists the average relevant experience of the founder(s) before staring their firms. Where firms were founded by a team, the prior experience of the founders was averaged in the study. The tables also list the cumulative growth rates of the firms corresponding to founders with same work experience. The cumulative growth rate was used for plotting the histograms in Figures 5 and 6.

Company Name	Avg. Relevant Industry Experience	Firm Growth	Cumulative Firm Growth (Work Experience Phase)
Microsoft Corporation	1	4.5%	
Sun Microsystems	1	1.13%	5.63%
Electronic Arts	3	0.04%	
Apple	4.5	-0.77%	3.00%
Oracle Systems	5	3.73%	
Analog Devices	6	2.83%	
Intuit Inc.	6	1.8%	4.63%
Adobe Systems	12	5.22%	

Intel Corporation	13.5	4.91%	12.20%
EMC Corporation	15	2.07%	

Table 7: Average Relevant Industry Experience vs. Cumulative Firm Growth - Sample Set I

Company Name	Avg. Relevant Industry Experience	Firm Growth	Cumulative Firm Growth (Work Experience Phase)
Yahoo Inc.	0	6.06%	6.06%
Network Appliance	6	6.57%	
Broadcom	6.5	5.11%	
EBay Inc.	7	6.96%	32.22%
Amazon	7	7.53%	
NVidia	7.5	6.05%	
Akamai	9	1.91%	
Red Hat	10	2.22%	8.42%
SanDisk	11	4.29%	
Juniper Networks	12	5.02%	5.02%

Table 8: Average Relevant Industry Experience vs. Cumulative Firm Growth - Sample Set II

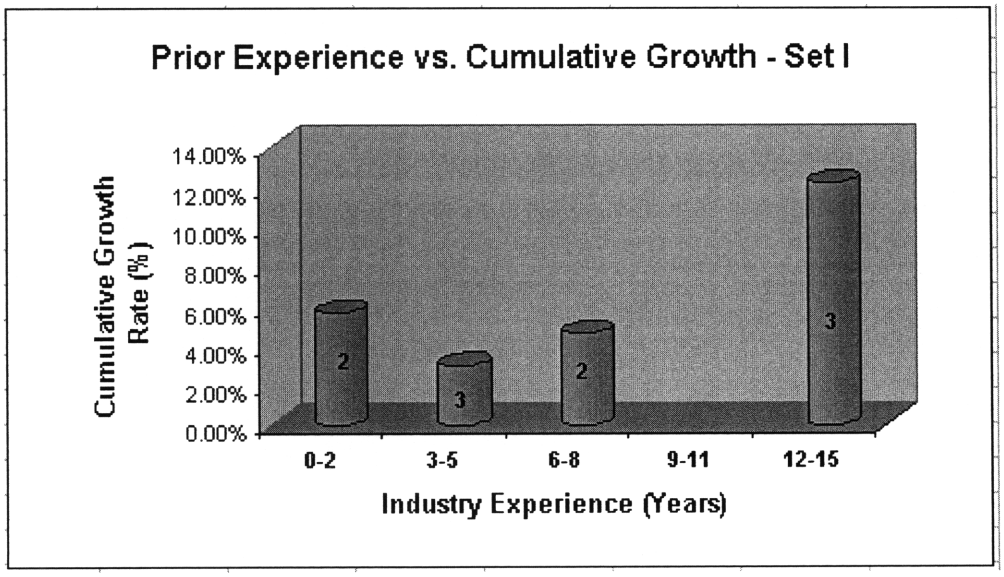

Figure 5: Histogram of Founder Experience vs. Cumulative Growth - Sample Set I

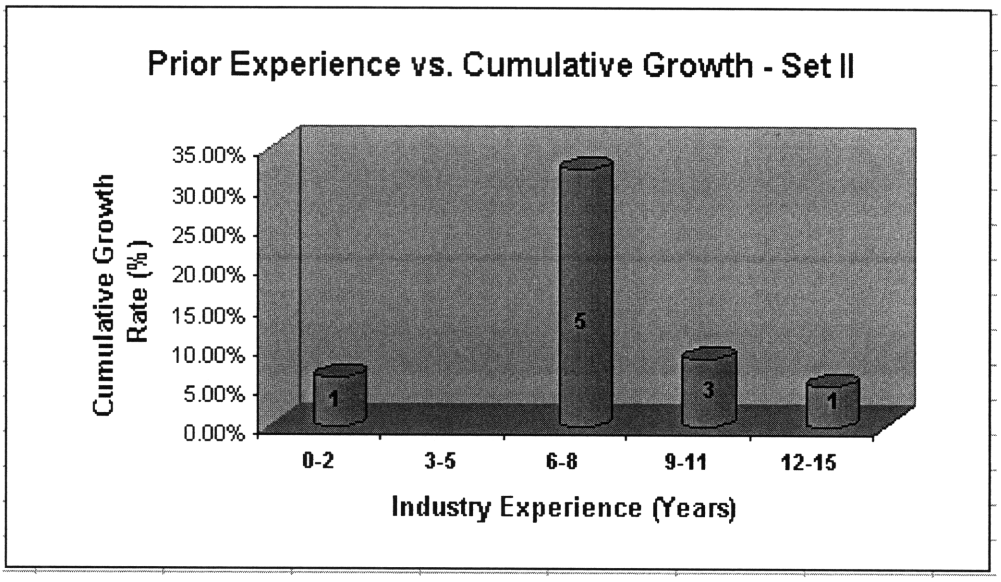

Figure 6: Histogram of Founder Experience vs. Cumulative Growth - Sample Set II

The impact of relevant industry experience on the founder's ability to successfully launch and grow a firm was studied. Here, the common notion that founders with experience in the same industry as their current venture have more mature network of industry contacts and a better understanding of the subtleties of their respective industries (MacMillan and Day, 1987) to lead their firms to success was investigated.

As can be seen from Figures 5 and 6, founder(s) experience in relevant industry prior to starting their new firm are generally consistent with the firm growth. Therefore, a somewhat strong correlation was found to exist between founders having an average of 6+ years of experience in the relevant industry prior to starting their venture. For sample set I a peak was observed in the 12-15 years work experience phase as well as in the 6-8 years phase. The peak in the 0-2 years work experience phase was primarily due to the growth of Microsoft led by Bill Gates. It can be argued that since Bill Gates is a prodigy and is thus not necessarily considered to be representative of the sample population of high-tech firm founders, who may not necessarily be prodigies. The unusual growth peak in the 0-2 years work experience phase was not considered to be a significant result of the study. Similarly, for sample set II a peak was observed in the 6-8 years work experience with the next being at 9-11 years.

The reader might argue that the peaks in the 6-8 year category in sample set II and 12-15 year category in sample set I are due to the cumulative effect of a larger number of firm growth rates in that work experience categories. After a careful observation of data in Table 7, we note that the growth rate of Adobe (5.22%) alone, a firm in the 12-15 year category, is higher among any firm's growth rates in other work experience categories within the same sample. For example, the growth rate of Adobe alone is higher than the cumulative growth rates of firms in the 3-5 (3.00%) and 6-8 (4.63%) year categories. Similarly, after a careful observation of data in Table 8, we note that growth rates of Amazon and Ebay alone, in the 6-8 year work experience category, is highest among any firm's growth rates in other work experience categories within the same sample. For example, the growth rates of Amazon (7.53%) and Ebay (6.96%) alone are higher than the cumulative growth rates of firms in the 0-2 (6.06%) and 12-15 (5.02%) year categories. Hence, the argument that the peaks in 12-15 years (sample set I) and in 6-8 years (sample set II) are due to the cumulative effect of a larger number of firm growth rates is not necessarily true.

In summary, a somewhat strong correlation exists between founders having an average of 6+ years of relevant industry experience prior to starting their venture. The prior work experience in the relevant field contributes positively to growing the new firm as founder(s) have a better understanding of their respective industries and can leverage their industry contacts to drive sales and profitability.

3.2.3 Prior Entrepreneurial Experience

In order to assess the correlation of founder's prior entrepreneurial experience and firm growth, the histogram of founder entrepreneurial experience and cumulative growth is plotted in Figures 7 and 8 for the 10 high-tech firms studied in each sample. Figures 7 and 8 sum the growth rates of firms whose founder's experience fall within the same work experience phase. For example, the growth rate of firms whose founders did not have any prior entrepreneurial experience are summed and compared with growth rates of firms whose founders have had some prior entrepreneurial experience. This procedure is repeated for both samples of the 10 high-tech firms studied. As was the case for prior relevant industry experience, where firms were founded by a team the prior experience of each founder was

averaged and then used in the study. The numbers inside the bars represent the total number of firms with founder(s) having the same work experience.

Tables 9 and 10, list the average prior entrepreneurial experience of founder(s) before staring their firms. Where firms were founded by a team, the prior experience of the founders was averaged in the study. The tables also list the cumulative growth rates of the firms corresponding to the same work experience phase. The cumulative growth rate was used for plotting the histograms in Figures 7 and 8.

Company Name	Avg. Entrepreneurial Experience	Firm Growth	Cumulative Firm Growth (Work Experience Phase)
Microsoft Corporation	0	4.5%	
Sun Microsystems	0	1.13%	
Electronic Arts	0	0.04%	
Apple	0	-0.77%	15.65%
Oracle Systems	0	3.73%	
Intuit Inc.	0	1.8%	
Adobe Systems	0	5.22%	
Intel Corporation	3.5	4.91%	4.91%
Analog Devices	4	2.83%	2.83%
EMC Corporation	7.5	2.07%	2.07%

Table 9: Average Entrepreneurial Experience vs. Cumulative Firm Growth - Sample Set I

Company Name	Avg. Entrepreneurial Experience	Firm Growth	Cumulative Firm Growth (Work Experience Phase)
Yahoo Inc.	0	6.06%	
Network Appliance	0	6.57%	
Broadcom	0	5.11%	
Juniper Networks	0	5.02%	38.25%
Amazon	0	7.53%	
NVidia	0	6.05%	
Akamai	0	1.91%	
SanDisk	2.5	4.29%	4.29%

EBay Inc.	4	6.96%	6.96%
Red Hat	10	2.22%	2.22%

Table 10: Average Entrepreneurial Experience vs. Cumulative Firm Growth - Sample Set II

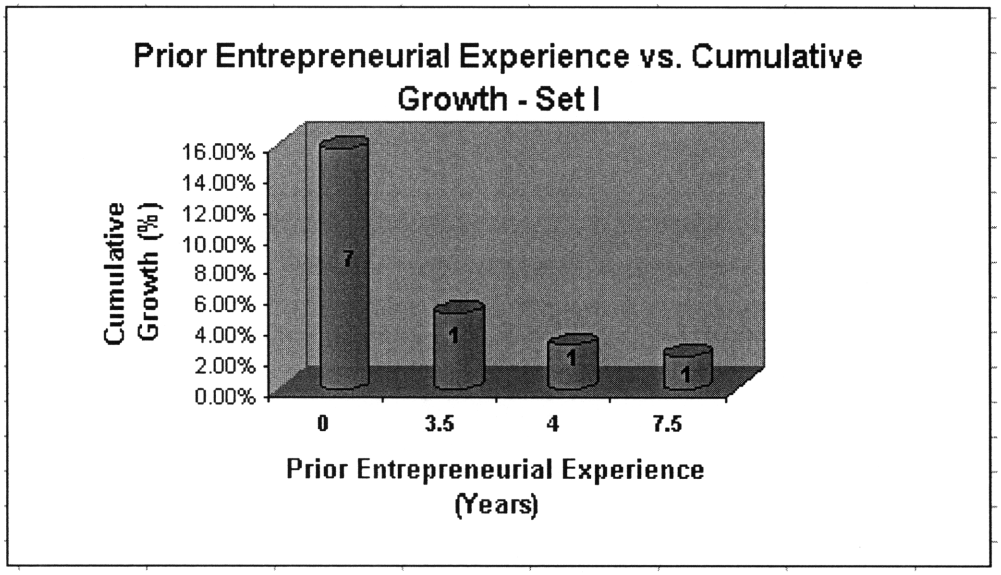

Figure 7: Histogram of Founder Entrepreneurial Experience vs. Cumulative Growth - Sample Set I

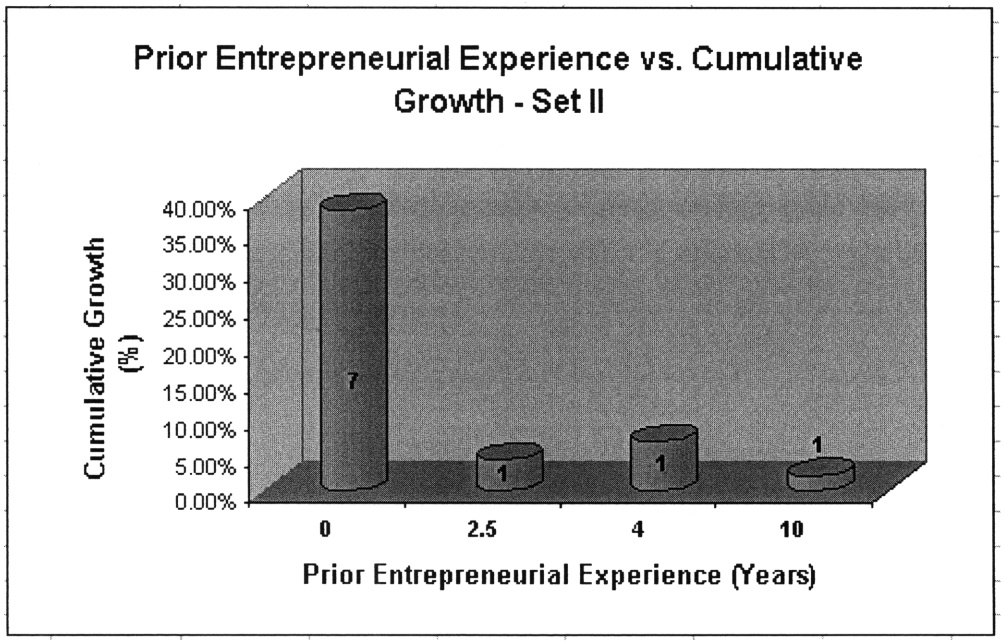

Figure 8: Histogram of Founder Entrepreneurial Experience vs. Cumulative Growth - Sample Set II

As can be seen from the histograms in Figures 7 and 8, no positive correlation and in fact a somewhat negative correlation is observed between founders having prior entrepreneurial experience and growth of their firms. As a matter fact, for the samples that were studied, founders who did not have any prior entrepreneurial experience overall seemed to perform better compared with founders who had some prior entrepreneurial experience. The reader might observe that since the no entrepreneurial experience bar (0 years) contains the sum of 7 different firms in each sample, the overall effect of that category on firm growth is obviously higher compared with the effect of entrepreneurial experience in other categories on firm growth. This is not necessarily true, after a careful observation of data in Tables 9 and 10.

In sample set I, firms like Microsoft, Adobe, and Oracle, whose founders had no prior entrepreneurial experience, exhibited stronger growth compared with Analog Devices and EMC whose founders have had an average of 4 and 7.5 years, respectively of prior entrepreneurial experience. The only exception is Intel, whose growth rate (4.91%) is higher than that of Microsoft's (4.5%) but smaller than that of Adobe's (5.22%). Similarly, in sample set II, firms like Yahoo, Network Appliance, Amazon, and NVidia, whose founders had no prior entrepreneurial experience, exhibited stronger growth compared with SanDisk and Red Hat, whose founders have had an average of 2.5 and 10 years, respectively of prior entrepreneurial experience. Here, the only exception is Ebay, whose growth rate (6.96%) is higher than that of Yahoo (6.06%), Network Appliance (6.57%), and NVidia (6.05%) but smaller than that of Amazon (7.53%).

In summary, no strong correlation was found to exist between a founder having any prior entrepreneurial experience and growth of the firm. This is in contrast to the common investor belief that previous start-up experience is an asset to the venture. As a matter fact, for the samples that were studied, founders who did not have any prior entrepreneurial experience overall seemed to perform better compared with founders who have had some prior entrepreneurial experience. The exact reasoning behind this behavior was beyond the scope of the study. One reason could be that experience in starting a business could have acted as a liability because of biases, the success syndrome, and other rigidities of the founder(s). The other reason could be the following finding:

In sample set I, among the founders who had no prior entrepreneurial experience 67% were young founders (~30 years or less). Similarly, in sample set II, among the founders who had no prior entrepreneurial experience 71% were young founders (~30 years or less). It is possible that these young founders had more motivation and drive to lead their firms to success compared with their older peers in the same sample. It is also possible that these young founders had more industry contacts through friends, families, or other acquaintances that might have helped them in starting their venture or in general mentoring. However, these aspects were not part of the study since the focus was on the correlation between any prior entrepreneurial experience and firm growth.

A founder's prior experience in starting a new venture may provide some indication about the know-how available to take a new venture through funding and growth however the study does not provide any positive relation between a founder's prior entrepreneurial experience and success of the firm.

3.2.4 Education

The final set of founder characteristic studied was the impact of founder education on firm growth. In most studies, education has served as a proxy for entrepreneurial skills and abilities. Sapienza and Grimm (1997), for example, argued that search skills, foresight, imagination, and communication skills are enhanced through college education. In addition, specific forms of knowledge-intensive education, such as engineering, computer science, and biochemistry, provide the recipients of education an advantage if they start a firm that is related to their expertise. Other studies have stressed the importance of formal college-level education, experience, and ability as a manager and as an entrepreneur (Gartner et. al. 1998, Pennings et al 1998).

In order to assess the correlation of founder's education with firm growth, the histogram of founder education vs. cumulative firm growth is drawn for the two sets of 10 high-tech firms. Figures 9 and 10, represent the cumulative growth rates of firms with founder's having the same degree prior to starting their venture. For example, cumulative growth corresponding to

all founders who earned a master's degree prior to starting their firms is represented by the bar labeled 'Masters'. This procedure is repeated for both the samples. Where firms were founded by a team, the education of the founder having the highest degree was used in the study. All of the bachelor degrees, such as B.A. and B.S were characterized under Bachelor's. Similarly, all the master's degrees, such as M.S., M.A., and MBA were characterized under Master's. The numbers inside the bars represent the total number of firms with founder(s) having the same education prior to starting their ventures. Tables 11 and 12 list the founder education and the level and cumulative growth rate of firms used in the study for plotting the histograms.

Company Name	Founder(s) & Education Level	Education Level used in Study	Growth Rate	Cumulative Growth Rate
Oracle Systems	Larry Ellison (High School)	High School	3.73%	
Microsoft Corporation	Bill Gates (High School), Paul Allen (High School)	High School	4.5%	8.23%
Apple	Steve Jobs (High School), Steve Wozniak (BS)	Bachelor's	-0.77%	1.30%
EMC Corporation	Richard Egan (BS), Roger Marino (BS)	Bachelor's	2.07%	
Analog Devices	Ray Stata (MS), Matthew Lorber (N/A)	Master's	2.83%	
Electronic Arts	Trip Hawkins (MBA)	Master's	0.04%	
Intuit Inc.	Scott Cook (MS), Tom Proulx (N/A)	Master's	1.8%	5.8%
Sun Microsystems	Andy Bechtolsheim (Masters), Vinod Khosla (MBA), Scott McNealy (MBA), Bill Joy (MS)	Master's	1.13%	
Adobe Systems	John Warnock (PhD), Charles Geschke (PhD)	PhD	5.22%	10.13%
Intel Corporation	Gordon E. Moore (PhD), Robert Noyce (PhD)	PhD	4.91%	

Table 11: Founder Education vs. Cumulative Firm Growth - Sample Set I

Company Name	Founder(s) & Education Level	Education Level used in Study	Growth Rate	Cumulative Growth Rate
EBay Inc.	Pierre Omidyar (BS)	Bachelor's	6.96%	
Amazon	Jeff Bezos (BS)	Bachelor's	7.53%	
Red Hat	Bob Young (BS), Marc Ewing (BS)	Bachelor's	2.22%	16.71%
NVidia	Jen-Hsun Huang (MS), Chris Malachowsky (MS)	Master's	6.05%	
Network Appliance	David Hitz (BS), James K. Lau (MS)	Master's	6.57%	18.68%
Yahoo Inc.	Jerry Yang (MS), David Filo (MS)	Master's	6.06%	
SanDisk	Eli Harari (PhD), Sanjay Mehrotra (MS)	PhD	4.29%	
Broadcom	Dr. Henry Nicolas (PhD), Dr. Henry Samueli (PhD)	PhD	5.11%	
Juniper Networks	Pradeep Sindhu (PhD), Dennis Ferguson (N/A), Bjorn Liencres (N/A)	PhD	5.02%	16.33%
Akamai	Daniel Lewis (PhD), Prof. Thomas Leighton (PhD)	PhD	1.91%	

Table 12: Founder Education vs. Cumulative Firm Growth - Sample Set II

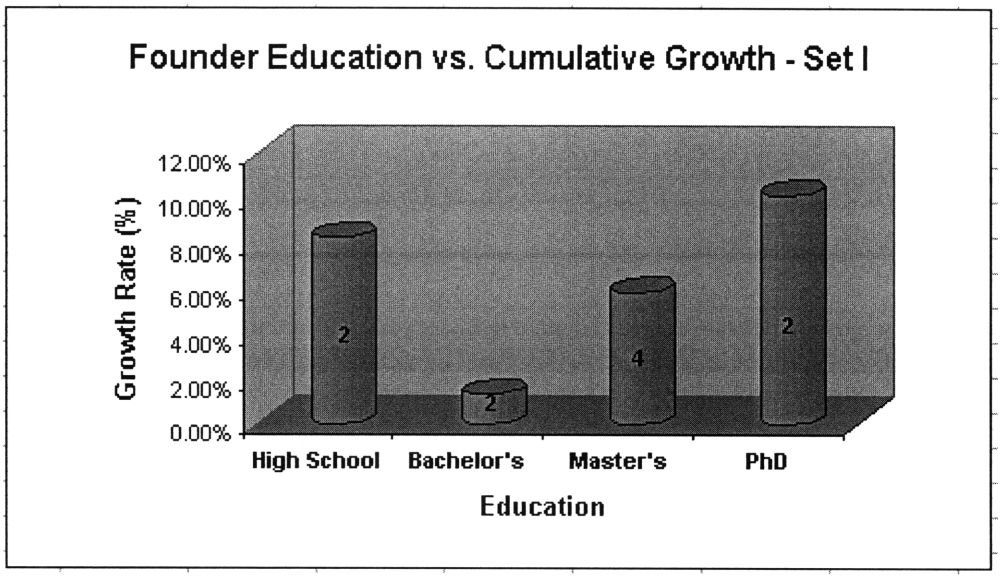

Figure 9: Founder Education vs. Cumulative Growth - Sample Set I

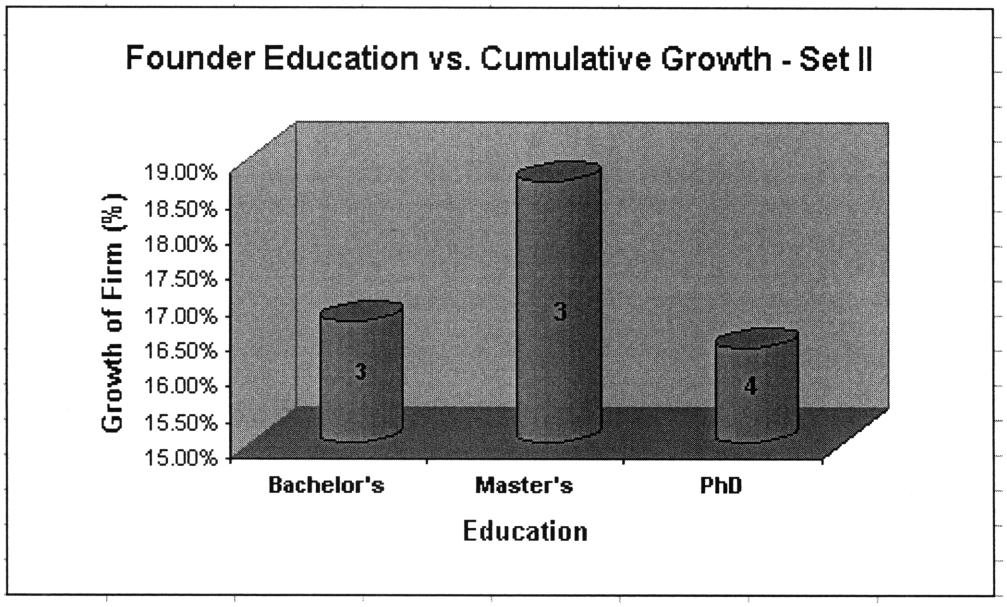

Figure 10: Founder Education vs. Cumulative Growth - Sample Set II

The relationship between founder education and firm growth was studied. Although, it is difficult to determine what effect education alone might have had on the overall firm growth, it is evident from Figures 9 and 10 that "no" significant correlation exists between founder education level and firm growth. However, when the overall effect of firm growth rates with

founders having higher education degrees, such as Master's and PhD is compared with those having a high-school and/or bachelor degrees, the group with the highest degrees outperforms the one with the lower degree.

In sample set I (Table 11), the overall growth of firms whose founders have a master's and PhD degree 15.93% (10.13% + 5.8%) is higher than the overall growth of firms whose founders have a high-school and bachelor's degree 9.53% (8.23%+1.3%). Similarly, in sample set II (Table 12), the overall growth of firms whose founders have a master's and PhD degree 35.01% (18.68% + 16.33%) is higher than the overall growth of firms whose founders have a bachelor's degree 16.71%. Thus, at least for high-tech firms, founders with higher degrees seem to perform better than those with a bachelor's or high-school degrees. One possible reason behind this is that higher education provides these founders with the skills necessary to launch a venture, particularly if the venture pertains to high-tech. In other cases, the extra time spent obtaining a degree embeds the founder in a social network that is helpful in launching a business venture.

The argument that in general, PhD as a group does not perform well as entrepreneurs is not necessarily true for high-tech firms. At least for the four high-tech industries, Software, Semiconductors, Internet, and technology hardware, studied. However, note that for both groups of samples studied, the PhD founders had an average of 10+ year industry experience before starting their respective firms. This is in stark contrast to an average of 6.5 years of experience of founders having a Master's degree. Therefore, commercially oriented PhD founders seem to perform as well as those with either a bachelor's or a master's degree.

In summary, no correlation exists between founder education level and firm growth. However, when the overall effect of firm growth rates with founders having higher education degrees, such as Master's and PhD is compared with those having a high-school and/or bachelor degrees, the group with the higher degrees outperforms the one with the lower degree. Within the same group, founders with PhDs had an average of 10+ years of industry experience while founders with a Master's degree had an average of 6.5 years of industry experience prior to starting their respective ventures. This leads to conclude that in order to

be an effective founder; PhDs need to gain more industry experience compared to the founders with Master's degrees before starting their respective ventures.

4 Conclusion

The study evaluated the correlation of pre-IPO venture funds and various founder characteristics with high-tech firm growth. High-tech firms were selected because of their importance in the US economy. These firms have not only spawned new industries and spearheaded the development of innovative products and services but are also an important stimulus to the national economy. In addition, these firms are an important stimulus to the economy as these create new jobs and lead innovations. Twenty different high-tech firms were evaluated in the study. The high-tech firms were limited to the internet, software, semiconductors, and technology hardware industries. 10 of these firms went public (IPO) at least five years before the 2000 recession. The other ten firms went public (IPO) close to the 2000 recession.

During the first phase of the study the correlation between pre-IPO venture funds and firm growth was studied. The results drew some interesting insights. A tendency towards a negative correlation between the size of the pre-IPO venture funds and average firm growth was observed. This behavior was exactly similar for the two sets of the 10 high-tech firms that were studied. The exact reasoning behind this behavior was difficult to determine and was beyond the scope of the study. All of the firms studied, except those belonging to the internet industry, exhibited slower growth rates. No significant founder characteristic, such as age, prior industry experience, prior entrepreneurial experience, or education were found to be common in firms that exhibited slower growth rates in the two samples studied. The result is similar to Florin's (2003) study that confirmed that venture characteristics pre-IPO and venture performance post-IPO was not significantly different when comparing ventures with and without VC backing. The study used different samples and different evaluation criterion to arrive at the conclusion.

The present study could not support the argument that founders who receive or are capable of receiving more pre-IPO funds have an advantage in leading their respective firms to higher firm growth. Neither the study could support the common investor practice of preferring to fund those founders who have had significant prior entrepreneurial. Although founder(s) experience in

relevant industry prior to starting their new firm are generally consistent with the firm growth. One conclusion is that it is possible to take high-growth firm without investor support and that such a growth strategy can result in significant rewards for its founders. Investors may want to exercise caution in directly correlating the size of venture funds directly with the potential of the firm to grow beyond an IPO. In addition, they should try to avoid giving preference to those founders with prior entrepreneurial experiences in funding new ventures. Growth rate of firms depend on several factors, such as demand opportunities, market condition, competitive environment, and barriers to entry but not necessarily on the size of investor funds.

During the second phase of the study, correlation between various founder characteristics and firm growth was studied. No significant correlation between founder age and firm growth was found in the study. The data as a whole do not support any link between the age of the founder and firm growth. A somewhat strong correlation existed between founders having an average of 6+ years of experience in the relevant industry prior to starting their venture. The prior work experience in the relevant field contributes positively to growing the new firm, as founders have a better understanding of their respective industries and can leverage their industry contacts to drive sales and profitability. In particular previous relations with key customers should provide valuable windows on opportunities as well as networking and loyalty advantages (Sapienza and Grimm). Furthermore, no significant correlation was found to exist between a founder having any prior entrepreneurial experience and growth of the firm. As a matter of fact, for the samples that were studied, founders who did not have any prior entrepreneurial experience overall seemed to perform better compared with founders who had some prior entrepreneurial experience. One interesting finding was that within the same category of data, a majority of founders who did well were relatively younger than those who were older and had no prior entrepreneurial experience.

Finally, no correlation existed between founder education level and firm growth. However, when the overall effect of firm growth rates with founders having higher education degrees, such as Master's and PhD, was compared to those having a high-school and/or bachelor degrees, the group with the higher degrees outperformed the one with the lower degree. One of the most surprising findings of the study was that within the group of founders having a Master's and PhD

degrees, the PhD's had an average of 10+ years of industry experience while the founders with a Master's degree had only an average of 6.5 years of industry experience prior to starting their respective firms. This led to conclude that effective founders with a PhD degree may need to gain more industry experience compared to those with Master's degrees before starting their respective ventures.

The second phase of the study evaluated a number of different founder characteristics with firm growth. The most important of them are relevant industry experience and education. It may benefit investors, researchers, and academics or even start-up founders to closely look into these characteristics when investing, starting a venture, building a team, or even advancing research on founder characteristics and firm growth.

To conclude, the results of the study are applicable to only founders of high-tech IPO ventures within the software, internet, semiconductor, and technology hardware industries. Although these characteristics may appear to greatly limit the generalizability of the findings, they certainly reflect conditions that have occurred in the 1990s and 2000s. Most of the findings on the various founder characteristics and impact of pre-IPO funds reported above affirmed the existing literature on the same topic. The results of the present correlation study are also important because they confirm the results obtained by various other researchers using different methodologies and evaluation criterions. Additionally, the results of the present study are also important because the study focuses specifically on high-tech firms and highlights a few additional insights on the size of pre-IPO venture funds and behavior and impact of high-tech founder characteristics on firm growth not presented in previous studies.

5 Future Work

The study attempted to study the correlation of pre-IPO venture funds and various founder characteristics with high-tech firm growth. Future work on the study could include a similar evaluation, i.e. pre-IPO venture funds and founder characteristics, on low-tech firm growth within the same periods evaluated in the present study. The results of the low-tech firm would either strengthen the conclusions made in the present study. This would lead to the treatment of results by the investors similarly for both the high-tech and low-tech firms. Or the results could

be completely different from the present study, resulting in the treatment of results by the investors, researchers, and academics differently for the two types of high and low-tech firms. Additionally, the present study can further be extended by including more firms in the samples studied. This would provide a better averaging effect on the overall results on the correlation of pre-IPO venture fund and various founder characteristics with high-tech firm growth.

Another study in future could include two interesting investigations: (1) Do investor-backed firms get too much funding early on that leads them to behave more like large organizations and less like cash-strapped entrepreneurs, squandering part of their wealth in unworthy or very risky opportunities? (2) Is it that VC-backed ventures are more aggressive in pursuing growth after IPO?

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APPENDIX 1

Intel Corporation

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19721130			0.049764	N/A
19721229	-49.75	C	0.011243	N/A
19730131	-50.25	0.01005	-0.02758	3.76%
19730228	-43.25	-0.1393	-0.04449	-9.48%
19730330	-46.25	0.069364	-0.00794	7.73%
19730430	-33.5	0.086486	-0.05178	13.83%
19730531	-30	-0.10448	-0.02451	-8.00%
19730629	-34	0.133333	-0.00868	14.20%
19730731	-55.25	0.625	0.057102	56.79%
19730831	-61.75	0.117647	-0.02966	14.73%
19730928	-76.25	0.234818	0.054007	18.08%
19731031	-87.25	0.144262	-0.0003	14.46%
19731130	-66.25	-0.24069	-0.12083	-11.99%
19731231	-78.75	0.188679	0.011404	17.73%
19740131	-89.75	0.139683	0.004425	13.53%
19740228	-103.75	0.155989	0.002343	15.37%
19740329	-86.75	-0.16386	-0.02337	-14.05%
19740430	-67.25	0.162824	-0.04596	20.88%
19740531	-77.25	0.148699	-0.04198	19.07%
19740628	-65.75	-0.14887	-0.02294	-12.59%
19740731	-36.25	-0.44867	-0.07088	-37.78%
19740830	-30.75	-0.15172	-0.08776	-6.40%
19740930	-18.75	-0.39024	-0.10972	-28.05%
19741031	-30.25	0.613333	0.165585	44.78%
19741129	-26.75	-0.1157	-0.04105	-7.47%
19741231	-23	-0.14019	-0.02701	-11.32%
19750131	-30.75	0.336957	0.1416	19.54%
19750228	-45	0.463415	0.058411	40.50%
19750331	-53.25	0.183333	0.030191	15.31%
19750430	-66.25	0.244131	0.046497	19.76%
19750530	-69.25	0.045283	0.05514	-0.99%
19750630	-70.5	0.018051	0.051473	-3.34%
19750731	-62	-0.12057	-0.06039	-6.02%
19750829	-69	0.112903	-0.02356	13.65%
19750930	-74.75	0.083333	-0.03801	12.13%
19751031	-72.75	-0.02676	0.055857	-8.26%
19751128	-74.25	0.020619	0.031223	-1.06%
19751231	-73.25	-0.01347	-0.011	-0.25%
19760130	-85.75	0.170648	0.126011	4.46%
19760227	-93.75	0.093294	0.007314	8.60%

19760331	-109.75	0.170667	0.026799	14.39%
19760430	-70.75	-0.03303	-0.01039	-2.26%
19760528	-69.75	-0.01413	-0.00937	-0.48%
19760630	-68.25	-0.02151	0.044487	-6.60%
19760730	-65.75	-0.03663	-0.00616	-3.05%
19760831	-61.25	-0.06844	-0.00143	-6.70%
19760930	-60.75	-0.00816	0.024484	-3.27%
19761029	-54.75	-0.09877	-0.02037	-7.84%

Average Growth Rate	**4.91%**

APPENDIX 2

Intuit Inc.

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19930430	27.5	-0.00901	-0.0254	1.64%
19930528	29	0.054545	0.029591	2.50%
19930630	32.5	0.12069	0.005447	11.52%
19930730	28.75	-0.11539	-0.0008	-11.46%
19930831	31.25	0.086957	0.039478	4.75%
19930930	35.25	0.128	0.000641	12.74%
19931029	33.875	-0.03901	0.018065	-5.71%
19931130	38.75	0.143911	-0.01761	16.15%
19931231	42.625	0.1	0.019513	8.05%
19940131	46.625	0.093842	0.031467	6.24%
19940228	45	-0.03485	-0.02422	-1.06%
19940331	36.375	-0.19167	-0.0458	-14.59%
19940429	36	-0.01031	0.009476	-1.98%
19940531	34.75	-0.03472	0.009359	-4.41%
19940630	33.25	-0.04317	-0.02791	-1.53%
19940729	36	0.082707	0.030632	5.21%
19940831	42.75	0.1875	0.042598	14.49%
19940930	43.75	0.023392	-0.01836	4.18%
19941031	70.5625	0.612857	0.01452	59.83%
19941130	69.75	-0.01152	-0.03722	2.57%
19941230	66.75	-0.04301	0.012608	-5.56%
19950131	66	-0.01124	0.020397	-3.16%
19950228	66.25	0.003788	0.039614	-3.58%
19950331	78	0.177358	0.027041	15.03%
19950428	67.75	-0.13141	0.025048	-15.65%
19950531	63.25	-0.06642	0.034007	-10.04%
19950630	76	0.201581	0.031168	17.04%
19950731	86.25	0.134868	0.040776	9.41%
19950831	43.0625	-0.00145	0.009306	-1.08%
19950929	47	0.091437	0.036358	5.51%
19951031	72	0.531915	-0.01132	54.32%
19951130	84	0.166667	0.042705	12.40%
19951229	78	-0.07143	0.01519	-8.66%
19960131	61.625	-0.20994	0.028146	-23.81%
19960229	66.75	0.083164	0.016309	6.69%
19960329	45	-0.32584	0.010933	-33.68%
19960430	52	0.155556	0.025509	13.01%
19960531	52	0	0.0268	-2.68%
19960628	47.25	-0.09135	-0.0083	-8.31%
19960731	35	-0.25926	-0.05382	-20.54%

19960830	36.5	0.042857	0.032464	1.04%
19960930	31.5	-0.13699	0.053014	-19.00%
19961031	27	-0.14286	0.013632	-15.65%
19961129	35.75	0.324074	0.065501	25.86%
19961231	31.5	-0.11888	-0.01136	-10.75%
19970131	29.25	-0.07143	0.053449	-12.49%
19970228	22.625	-0.2265	-0.00114	-22.54%
19970331	23.25	0.027624	-0.04482	7.24%
19970430	22.125	-0.04839	0.042303	-9.07%
19970530	27.125	0.225989	0.071624	15.44%
19970630	22.9375	-0.15438	0.044145	-19.85%
19970731	25.1875	0.098093	0.076503	2.16%
19970829	26.125	0.037221	-0.03627	7.35%
19970930	32	0.22488	0.058433	16.65%
19971031	32.625	0.019531	-0.03453	5.41%
19971128	30.1875	-0.07471	0.030458	-10.52%
19971231	41.25	0.36646	0.017771	34.87%
19980130	37.375	-0.09394	0.004529	-9.85%
19980227	46.5	0.244147	0.07323	17.09%
19980331	48.375	0.040323	0.051322	-1.10%

Average Growth Rate	**1.80%**

APPENDIX 3

Analog Devices

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19790330	-31.875	0.378378	0.065618	31.28%
19790430	17.5	0.098039	0.008522	8.95%
19790531	15.875	-0.09286	-0.01358	-7.93%
19790629	17	0.070866	0.04685	2.40%
19790731	16.125	-0.05147	0.014991	-6.65%
19790831	18.125	0.124031	0.064728	5.93%
19790928	22.125	0.22069	0.001428	21.93%
19791031	20	-0.09605	-0.07266	-2.34%
19791130	23	0.15	0.063603	8.64%
19791231	22	-0.04348	0.028212	-7.17%
19800131	23.25	0.056818	0.065607	-0.88%
19800229	23	-0.01075	0.001015	-1.18%
19800331	20	-0.13044	-0.12022	-1.02%
19800430	16.5	0.03125	0.052288	-2.10%
19800530	19.5	0.181818	0.06009	12.17%
19800630	22	0.128205	0.037714	9.05%
19800731	27.875	0.267045	0.069438	19.76%
19800829	29.75	0.067265	0.023553	4.37%
19800930	29.125	-0.02101	0.029495	-5.05%
19801031	29.5	0.012876	0.020079	-0.72%
19801128	38.5	0.305085	0.10492	20.02%
19801231	35.25	-0.08442	-0.03441	-5.00%
19810130	34.375	-0.02482	-0.04011	1.53%
19810227	29.5	-0.14182	0.015523	-15.73%
19810331	29.125	-0.01271	0.046184	-5.89%
19810430	25.375	0.089056	-0.01126	10.03%
19810529	23.875	-0.05911	0.013553	-7.27%
19810630	20.625	-0.13613	-0.01023	-12.59%
19810731	19.5	-0.05455	-0.00307	-5.15%
19810831	16	-0.17949	-0.05628	-12.32%
19810930	17.625	0.101563	-0.06377	16.53%
19811030	18.125	0.028369	0.060177	-3.18%
19811130	18.875	0.041379	0.04585	-0.45%
19811231	17.5	-0.07285	-0.0281	-4.48%
19820129	20.125	0.15	-0.02621	17.62%
19820226	21.125	0.049689	-0.05113	10.08%
19820331	22	0.04142	-0.01009	5.15%
19820430	19.875	0.129261	0.043267	8.60%
19820528	17.625	-0.11321	-0.02821	-8.50%
19820630	18.375	0.042553	-0.02391	6.65%

19820730	18.625	0.013605	-0.02053	3.41%
19820831	21.875	0.174497	0.119013	5.55%
19820930	20.5	-0.06286	0.016761	-7.96%
19821029	23.25	0.134146	0.118636	1.55%
19821130	28.375	0.22043	0.051935	16.85%
19821231	27.625	-0.02643	0.014516	-4.10%
19830131	33	0.19457	0.04185	15.27%
19830228	34.375	0.041667	0.030218	1.15%
19830331	33.25	-0.03273	0.034673	-6.74%
19830429	26.875	0.212406	0.074188	13.82%
19830531	31.625	0.176744	0.013224	16.35%
19830630	35.875	0.134387	0.037837	9.66%
19830729	34.125	-0.04878	-0.03157	-1.72%
19830831	36.25	0.062271	0.003464	5.88%
19830930	40	0.103448	0.016059	8.74%
19831031	35.5	-0.1125	-0.02805	-8.45%
19831130	41.625	0.172535	0.029556	14.30%
19831230	38.75	-0.06907	-0.01046	-5.86%
19840131	30.25	-0.21936	-0.01302	-20.63%
19840229	31.375	0.03719	-0.03907	7.63%

Average Growth Rate	**2.83%**

APPENDIX 4

Microsoft Corporation

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19860430	32.25	0.172727	-0.0079	18.06%
19860530	34.75	0.077519	0.050844	2.67%
19860630	30.75	-0.11511	0.014246	-12.94%
19860731	28.5	-0.07317	-0.0597	-1.35%
19860829	28.5	0	0.066181	-6.62%
19860930	28.25	-0.00877	-0.07902	7.03%
19861031	38.75	0.371681	0.049303	32.24%
19861128	49.75	0.283871	0.015079	26.88%
19861231	48.25	-0.03015	-0.02639	-0.38%
19870130	73.125	0.515544	0.128483	38.71%
19870227	76.75	0.049573	0.047901	0.17%
19870331	96.75	0.260586	0.023642	23.69%
19870430	104	0.074935	-0.01701	9.19%
19870529	115.25	0.108173	0.005125	10.31%
19870630	102	-0.11497	0.043689	-15.87%
19870731	94	-0.07843	0.044225	-12.27%
19870831	118.75	0.263298	0.037124	22.62%
19870930	66.25	0.115789	-0.02079	13.66%
19871030	49.75	-0.24906	-0.22534	-2.37%
19871130	44.75	-0.1005	-0.07229	-2.82%
19871231	54.25	0.21229	0.070321	14.20%
19880129	55.75	0.02765	0.044881	-1.72%
19880229	59.375	0.065022	0.051693	1.33%
19880331	56.5	-0.04842	-0.0166	-3.18%
19880429	54.5	-0.0354	0.010986	-4.64%
19880531	58	0.06422	0.000448	6.38%
19880630	67	0.155172	0.051454	10.37%
19880729	59.5	-0.11194	-0.00727	-10.47%
19880831	50	-0.15966	-0.02801	-13.17%
19880930	52.25	0.045	0.037206	0.78%
19881031	49	-0.0622	0.017637	-7.98%
19881130	47.25	-0.03571	-0.01641	-1.93%
19881230	53.25	0.126984	0.021075	10.59%
19890131	59.625	0.119718	0.066103	5.36%
19890228	59.5	-0.0021	-0.01645	1.44%
19890331	49.875	-0.16177	0.021465	-18.32%
19890428	55.875	0.120301	0.048204	7.21%
19890531	60.5	0.082774	0.039338	4.34%
19890630	53	-0.12397	-0.00487	-11.91%
19890731	54.75	0.033019	0.077131	-4.41%

19890831	58.75	0.073059	0.022127	5.09%
19890929	68.5	0.165957	-0.00147	16.74%
19891031	81.75	0.193431	-0.02928	22.27%
19891130	87	0.06422	0.017815	4.64%
19891229	87	0	0.018295	-1.83%
19900131	92.5	0.063218	-0.07012	13.33%
19900228	98.75	0.067568	0.014901	5.27%
19900330	110.75	0.121519	0.02414	9.74%
19900430	58	0.047404	-0.02829	7.57%
19900531	73	0.258621	0.088936	16.97%
19900629	76	0.041096	-0.0042	4.53%
19900731	66.5	-0.125	-0.00941	-11.56%
19900831	61.5	-0.07519	-0.0919	1.67%
19900928	63	0.02439	-0.05384	7.82%
19901031	63.75	0.011905	-0.0125	2.44%
19901130	72.25	0.133333	0.065744	6.76%
19901231	75.25	0.041522	0.029513	1.20%
19910131	98.125	0.303987	0.049078	25.49%
19910228	103.75	0.057325	0.075847	-1.85%
19910328	106.125	0.022892	0.028923	-0.60%

Average Growth Rate	**4.51%**

APPENDIX 5

Oracle Corporation

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19861128	21.5	0.194444	0.015079	17.94%
19861231	20.75	-0.03488	-0.02639	-0.85%
19870130	27	0.301205	0.128483	17.27%
19870227	38.5	0.425926	0.047901	37.80%
19870331	22	0.142857	0.023642	11.92%
19870430	23.5	0.068182	-0.01701	8.52%
19870529	27.25	0.159574	0.005125	15.45%
19870630	22.25	-0.18349	0.043689	-22.72%
19870731	22.75	0.022472	0.044225	-2.18%
19870831	26.75	0.175824	0.037124	13.87%
19870930	32.5	0.214953	-0.02079	23.57%
19871030	25	-0.23077	-0.22534	-0.54%
19871130	21.75	-0.13	-0.07229	-5.77%
19871231	14.5	0.333333	0.070321	26.30%
19880129	14	-0.03448	0.044881	-7.94%
19880229	15.125	0.080357	0.051693	2.87%
19880331	16.25	0.07438	-0.0166	9.10%
19880429	16.75	0.030769	0.010986	1.98%
19880531	16.75	0	0.000448	-0.05%
19880630	19.75	0.179104	0.051454	12.77%
19880729	19	-0.03798	-0.00727	-3.07%
19880831	18.5	-0.02632	-0.02801	0.17%
19880930	20.125	0.087838	0.037206	5.06%
19881031	15.75	-0.21739	0.017637	-23.50%
19881130	17.25	0.095238	-0.01641	11.17%
19881230	19.5	0.130435	0.021075	10.94%
19890131	23.625	0.211538	0.066103	14.54%
19890228	22.5	-0.04762	-0.01645	-3.12%
19890331	24.125	0.072222	0.021465	5.08%
19890428	29	0.202073	0.048204	15.39%
19890531	30.5	0.051724	0.039338	1.24%
19890630	29.75	-0.02459	-0.00487	-1.97%
19890731	15.375	0.033613	0.077131	-4.35%
19890831	18.75	0.219512	0.022127	19.74%
19890929	23.625	0.26	-0.00147	26.15%
19891031	23.25	-0.01587	-0.02928	1.34%
19891130	24	0.032258	0.017815	1.44%
19891229	23.375	-0.02604	0.018295	-4.43%
19900131	21.5	-0.08021	-0.07012	-1.01%
19900228	22.375	0.040698	0.014901	2.58%

19900330	18.875	-0.15643	0.02414	-18.06%
19900430	15.875	-0.15894	-0.02829	-13.07%
19900531	19.75	0.244094	0.088936	15.52%
19900629	23.125	0.170886	-0.0042	17.51%
19900731	16.875	-0.27027	-0.00941	-26.09%
19900831	11.625	-0.31111	-0.0919	-21.92%
19900928	6.5	-0.44086	-0.05384	-38.70%
19901031	5.375	-0.17308	-0.0125	-16.06%
19901130	7.875	0.465116	0.065744	39.94%
19901231	7.875	0	0.029513	-2.95%
19910131	9	0.142857	0.049078	9.38%
19910228	9	0	0.075847	-7.59%
19910328	9	0	0.028923	-2.89%
19910430	9.25	0.027778	0.003322	2.45%
19910531	7.5	-0.18919	0.040732	-22.99%
19910628	8.5	0.133333	-0.04403	17.74%
19910731	9.125	0.073529	0.046795	2.67%
19910830	11.25	0.232877	0.026819	20.61%
19910930	13.375	0.188889	-0.01098	19.99%
19911031	15.75	0.17757	0.017789	15.98%

Average Growth Rate	**3.74%**

APPENDIX 6

Adobe Systems Inc.

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19860930	-17.75	0.302752	-0.07902	38.18%
19861031	-23.5625	0.327465	0.049303	27.82%
19861128	-24.75	0.050398	0.015079	3.53%
19861231	-25.875	0.045455	-0.02639	7.19%
19870130	-34.25	0.323671	0.128483	19.52%
19870227	45.5	0.328467	0.047901	28.06%
19870331	34.5	0.516484	0.023642	49.28%
19870430	48.5	0.405797	-0.01701	42.28%
19870529	48	-0.01031	0.005125	-1.54%
19870630	34.75	-0.27604	0.043689	-31.97%
19870731	33	-0.05036	0.044225	-9.46%
19870831	32.25	-0.02273	0.037124	-5.99%
19870930	38.5	0.193798	-0.02079	21.46%
19871030	22.5	-0.41558	-0.22534	-19.03%
19871130	24.25	0.077778	-0.07229	15.01%
19871231	29.5	0.216495	0.070321	14.62%
19880129	26.5	-0.1017	0.044881	-14.66%
19880229	29	0.09434	0.051693	4.27%
19880331	31	0.068966	-0.0166	8.56%
19880429	35	0.129032	0.010986	11.81%
19880531	35.25	0.007143	0.000448	0.67%
19880630	40.25	0.141844	0.051454	9.04%
19880729	41.5	0.031056	-0.00727	3.83%
19880831	39	-0.06024	-0.02801	-3.22%
19880930	43.5	0.117436	0.037206	8.02%
19881031	42.875	-0.01437	0.017637	-3.20%
19881130	22.25	0.037901	-0.01641	5.43%
19881230	24.5	0.101124	0.021075	8.01%
19890131	23.125	-0.05449	0.066103	-12.06%
19890228	20.25	-0.12432	-0.01645	-10.79%
19890331	21.5	0.064198	0.021465	4.27%
19890428	26.75	0.244186	0.048204	19.60%
19890531	28.25	0.056075	0.039338	1.67%
19890630	26.5	-0.06018	-0.00487	-5.53%
19890731	22.75	-0.14151	0.077131	-21.86%
19890831	25.25	0.10989	0.022127	8.78%
19890929	17.75	-0.29505	-0.00147	-29.36%
19891031	16.75	-0.05634	-0.02928	-2.71%
19891130	19.25	0.149254	0.017815	13.14%

19891229	20.25	0.051948	0.018295	3.37%
19900131	23.5	0.162963	-0.07012	23.31%
19900228	30.25	0.287234	0.014901	27.23%
19900330	38	0.258182	0.02414	23.40%
19900430	38.25	0.006579	-0.02829	3.49%
19900531	35.625	-0.06863	0.088936	-15.76%
19900629	36.75	0.031579	-0.0042	3.58%
19900731	35.125	-0.04259	-0.00941	-3.32%
19900831	25	-0.28826	-0.0919	-19.64%
19900928	19	-0.2376	-0.05384	-18.38%
19901031	24	0.263158	-0.0125	27.57%
19901130	25.25	0.052083	0.065744	-1.37%
19901231	29.125	0.153465	0.029513	12.40%
19910131	38	0.306781	0.049078	25.77%
19910228	48.125	0.266447	0.075847	19.06%
19910328	54	0.12374	0.028923	9.48%
19910430	51.75	-0.04167	0.003322	-4.50%
19910531	50.5	-0.02416	0.040732	-6.49%
19910628	43.25	-0.14198	-0.04403	-9.80%
19910731	53.5	0.236994	0.046795	19.02%
19910830	50.875	-0.04907	0.026819	-7.59%

Average Growth Rate	**5.23%**

APPENDIX 7

Apple Inc.

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19890131	37.75	-0.06211	0.066103	-12.82%
19890228	36.25	-0.03709	-0.01645	-2.06%
19890331	35.625	-0.01724	0.021465	-3.87%
19890428	39	0.094737	0.048204	4.65%
19890531	47.75	0.226923	0.039338	18.76%
19890630	41.25	-0.13613	-0.00487	-13.13%
19890731	39.75	-0.03636	0.077131	-11.35%
19890831	44.5	0.122013	0.022127	9.99%
19890929	44.5	0	-0.00147	0.15%
19891031	46.5	0.044944	-0.02928	7.42%
19891130	44.25	-0.04602	0.017815	-6.38%
19891229	35.25	-0.20339	0.018295	-22.17%
19900131	34	-0.03546	-0.07012	3.47%
19900228	34	0.003235	0.014901	-1.17%
19900330	40.25	0.183824	0.02414	15.97%
19900430	39.375	-0.02174	-0.02829	0.66%
19900531	41.25	0.050413	0.088936	-3.85%
19900629	44.75	0.084848	-0.0042	8.90%
19900731	42	-0.06145	-0.00941	-5.21%
19900831	37	-0.11643	-0.0919	-2.45%
19900928	29	-0.21622	-0.05384	-16.24%
19901031	30.75	0.060345	-0.0125	7.29%
19901130	36.75	0.199024	0.065744	13.33%
19901231	43	0.170068	0.029513	14.06%
19910131	55.5	0.290698	0.049078	24.16%
19910228	57.25	0.033694	0.075847	-4.22%
19910328	68	0.187773	0.028923	15.89%
19910430	55	-0.19118	0.003322	-19.45%
19910531	47	-0.14327	0.040732	-18.40%
19910628	41.5	-0.11702	-0.04403	-7.30%
19910731	46.25	0.114458	0.046795	6.77%
19910830	53	0.148541	0.026819	12.17%
19910930	49.5	-0.06604	-0.01098	-5.51%
19911031	51.5	0.040404	0.017789	2.26%
19911129	50.75	-0.01223	-0.03728	2.50%
19911231	56.375	0.110837	0.106778	0.41%
19920131	64.75	0.148559	-0.00118	14.97%
19920228	67.5	0.044324	0.013354	3.10%
19920331	58.25	-0.13704	-0.0237	-11.33%
19920430	60.125	0.032189	0.013441	1.88%

19920529	59.75	-0.00624	0.006417	-1.27%
19920630	48	-0.19464	-0.01927	-17.54%
19920731	46.75	-0.02604	0.039878	-6.59%
19920831	46	-0.01348	-0.0208	0.73%
19920930	45.125	-0.01902	0.012434	-3.15%
19921030	52.5	0.163435	0.011	15.24%
19921130	57.5	0.097524	0.040199	5.73%
19921231	59.75	0.03913	0.017752	2.14%
19930129	59.5	-0.00418	0.012643	-1.68%
19930226	53	-0.10723	0.005402	-11.26%
19930331	51.5	-0.0283	0.025075	-5.34%
19930430	51.25	-0.00485	-0.0254	2.06%
19930528	56.625	0.10722	0.029591	7.76%
19930630	39.5	-0.30243	0.005447	-30.79%
19930730	27.75	-0.29747	-0.0008	-29.67%
19930831	26.5	-0.04072	0.039478	-8.02%
19930930	23.375	-0.11793	0.000641	-11.86%
19931029	30.75	0.315508	0.018065	29.74%
19931130	31.5	0.028293	-0.01761	4.59%
19931231	29.25	-0.07143	0.019513	-9.09%

Average Growth Rate	**-0.77%**

APPENDIX 8

EMC Corporation

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19880429	7	-0.53719	0.010986	-54.82%
19880531	6.375	-0.08929	0.000448	-8.97%
19880630	6.125	-0.03922	0.051454	-9.07%
19880729	5.25	-0.14286	-0.00727	-13.56%
19880831	4.5	-0.14286	-0.02801	-11.49%
19880930	4.625	0.027778	0.037206	-0.94%
19881031	4.375	-0.05405	0.017637	-7.17%
19881130	4.375	0	-0.01641	1.64%
19881230	5.375	0.228571	0.021075	20.75%
19890131	5	-0.06977	0.066103	-13.59%
19890228	4.25	-0.15	-0.01645	-13.36%
19890331	3.5	-0.17647	0.021465	-19.79%
19890428	3.5	0	0.048204	-4.82%
19890531	4.125	0.178571	0.039338	13.92%
19890630	5.125	0.242424	-0.00487	24.73%
19890731	5.375	0.04878	0.077131	-2.84%
19890831	5	-0.06977	0.022127	-9.19%
19890929	4.25	-0.15	-0.00147	-14.85%
19891031	3.5	-0.17647	-0.02928	-14.72%
19891130	3.875	0.107143	0.017815	8.93%
19891229	3.25	-0.16129	0.018295	-17.96%
19900131	4.25	0.307692	-0.07012	37.78%
19900228	5.25	0.235294	0.014901	22.04%
19900330	5.875	0.119048	0.02414	9.49%
19900430	5.375	-0.08511	-0.02829	-5.68%
19900531	6.125	0.139535	0.088936	5.06%
19900629	5.625	-0.08163	-0.0042	-7.74%
19900731	5.625	0	-0.00941	0.94%
19900831	5	-0.11111	-0.0919	-1.92%
19900928	6.25	0.25	-0.05384	30.38%
19901031	6.75	0.08	-0.0125	9.25%
19901130	7.75	0.148148	0.065744	8.24%
19901231	8	0.032258	0.029513	0.28%
19910131	9.875	0.234375	0.049078	18.53%
19910228	8.125	-0.17722	0.075847	-25.31%
19910328	9.875	0.215385	0.028923	18.65%
19910430	11.75	0.189873	0.003322	18.66%
19910531	11.375	-0.03192	0.040732	-7.27%
19910628	10.125	-0.10989	-0.04403	-6.59%
19910731	6.75	-0.33333	0.046795	-38.01%

19910830	7.5	0.111111	0.026819	8.43%
19910930	6	-0.2	-0.01098	-18.90%
19911031	9.375	0.5625	0.017789	54.47%
19911129	9	-0.04	-0.03728	-0.27%
19911231	12.5	0.388889	0.106778	28.21%
19920131	15.625	0.25	-0.00118	25.12%
19920228	13.75	-0.12	0.013354	-13.34%
19920331	13	-0.05455	-0.0237	-3.09%
19920430	12.75	-0.01923	0.013441	-3.27%
19920529	15.25	0.196078	0.006417	18.97%
19920630	17.75	0.163934	-0.01927	18.32%
19920731	18.5	0.042254	0.039878	0.24%
19920831	16.75	-0.0946	-0.0208	-7.38%
19920930	21	0.253731	0.012434	24.13%
19921030	23.5	0.119048	0.011	10.81%
19921130	20.625	0.316489	0.040199	27.63%
19921231	23.75	0.151515	0.017752	13.38%
19930129	25.875	0.089474	0.012643	7.68%
19930226	23.5	-0.09179	0.005402	-9.72%
19930331	24.875	0.058511	0.025075	3.34%

Average Growth Rate	**2.07%**

APPENDIX 9

Sun Microsystems Inc.

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19870430	36	0.165992	-0.01701	18.30%
19870529	43.5	0.208333	0.005125	20.32%
19870630	40.75	-0.06322	0.043689	-10.69%
19870731	34.625	-0.15031	0.044225	-19.45%
19870831	38.75	0.119134	0.037124	8.20%
19870930	36.25	-0.06452	-0.02079	-4.37%
19871030	33.75	-0.06897	-0.22534	15.64%
19871130	28	-0.17037	-0.07229	-9.81%
19871231	33.5	0.196429	0.070321	12.61%
19880129	33.5	0	0.044881	-4.49%
19880229	32.75	-0.02239	0.051693	-7.41%
19880331	35.75	0.091603	-0.0166	10.82%
19880429	35.25	-0.01399	0.010986	-2.50%
19880531	33.75	-0.04255	0.000448	-4.30%
19880630	37.5	0.111111	0.051454	5.97%
19880729	36.625	-0.02333	-0.00727	-1.61%
19880831	38.625	0.054608	-0.02801	8.26%
19880930	35.25	-0.08738	0.037206	-12.46%
19881031	28.5	-0.19149	0.017637	-20.91%
19881130	27.375	-0.03947	-0.01641	-2.31%
19881230	16.625	0.214612	0.021075	19.35%
19890131	19	0.142857	0.066103	7.68%
19890228	17.75	-0.06579	-0.01645	-4.93%
19890331	16.125	-0.09155	0.021465	-11.30%
19890428	17.125	0.062016	0.048204	1.38%
19890531	22	0.284672	0.039338	24.53%
19890630	17	-0.22727	-0.00487	-22.24%
19890731	14.5	-0.14706	0.077131	-22.42%
19890831	15.625	0.077586	0.022127	5.55%
19890929	15.25	-0.024	-0.00147	-2.25%
19891031	16.625	0.090164	-0.02928	11.95%
19891130	16.25	-0.02256	0.017815	-4.04%
19891229	17.25	0.061538	0.018295	4.32%
19900131	19.375	0.123188	-0.07012	19.33%
19900228	22.375	0.154839	0.014901	13.99%
19900330	22.625	0.011173	0.02414	-1.30%
19900430	24.625	0.088398	-0.02829	11.67%
19900531	30.375	0.233503	0.088936	14.46%
19900629	34	0.119342	-0.0042	12.35%
19900731	31.5	-0.07353	-0.00941	-6.41%

19900831	28.75	-0.0873	-0.0919	0.46%
19900928	21.875	-0.23913	-0.05384	-18.53%
19901031	16	-0.26857	-0.0125	-25.61%
19901130	20.875	0.304688	0.065744	23.89%
19901231	21.375	0.023952	0.029513	-0.56%
19910131	28.375	0.327485	0.049078	27.84%
19910228	32.125	0.132159	0.075847	5.63%
19910328	31.75	-0.01167	0.028923	-4.06%
19910430	36.75	0.15748	0.003322	15.42%
19910531	36.875	0.003401	0.040732	-3.73%
19910628	27.875	-0.24407	-0.04403	-20.00%
19910731	30.625	0.098655	0.046795	5.19%
19910830	32.25	0.053061	0.026819	2.62%
19910930	30.25	-0.06202	-0.01098	-5.10%
19911031	24.75	-0.18182	0.017789	-19.96%
19911129	24	-0.0303	-0.03728	0.70%
19911231	28.375	0.182292	0.106778	7.55%
19920131	30.5	0.07489	-0.00118	7.61%
19920228	34.5	0.131148	0.013354	11.78%
19920331	28.625	-0.17029	-0.0237	-14.66%

Average Growth Rate	**1.13%**

APPENDIX 10

Electronic Arts Inc.

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19930430	29	-0.00855	-0.0254	1.69%
19930528	34.5	0.189655	0.029591	16.01%
19930630	30.25	-0.12319	0.005447	-12.86%
19930730	29	-0.04132	-0.0008	-4.05%
19930831	34.625	0.193966	0.039478	15.45%
19930930	34.25	-0.01083	0.000641	-1.15%
19931029	39	0.138686	0.018065	12.06%
19931130	34.875	-0.10577	-0.01761	-8.82%
19931231	30	-0.13979	0.019513	-15.93%
19940131	28.625	-0.04583	0.031467	-7.73%
19940228	26	-0.0917	-0.02422	-6.75%
19940331	26.25	0.009615	-0.0458	5.54%
19940429	21.75	-0.17143	0.009476	-18.09%
19940531	20.3125	-0.06609	0.009359	-7.55%
19940630	14	-0.31077	-0.02791	-28.29%
19940729	14.25	0.017857	0.030632	-1.28%
19940831	17.75	0.245614	0.042598	20.30%
19940930	18.5	0.042254	-0.01836	6.06%
19941031	22.5	0.216216	0.01452	20.17%
19941130	19.875	-0.11667	-0.03722	-7.95%
19941230	19.25	-0.03145	0.012608	-4.41%
19950131	17.875	-0.07143	0.020397	-9.18%
19950228	21.5	0.202797	0.039614	16.32%
19950331	22.625	0.052326	0.027041	2.53%
19950428	23	0.016575	0.025048	-0.85%
19950531	25.75	0.119565	0.034007	8.56%
19950630	27.125	0.053398	0.031168	2.22%
19950731	36.125	0.331797	0.040776	29.10%
19950831	38	0.051903	0.009306	4.26%
19950929	36.75	-0.0329	0.036358	-6.93%
19951031	36.625	-0.0034	-0.01132	0.79%
19951130	34.125	-0.06826	0.042705	-11.10%
19951229	26.125	-0.23443	0.01519	-24.96%
19960131	24	-0.08134	0.028146	-10.95%
19960229	25	0.041667	0.016309	2.54%
19960329	26.5	0.06	0.010933	4.91%
19960430	26.75	0.009434	0.025509	-1.61%
19960531	31.625	0.182243	0.0268	15.54%
19960628	26.75	-0.15415	-0.0083	-14.59%
19960731	30	0.121495	-0.05382	17.53%

19960830	30.875	0.029167	0.032464	-0.33%
19960930	37.375	0.210526	0.053014	15.75%
19961031	37.5	0.003344	0.013632	-1.03%
19961129	32.125	-0.14333	0.065501	-20.88%
19961231	29.9375	-0.06809	-0.01136	-5.67%
19970131	31.875	0.064718	0.053449	1.13%
19970228	31.25	-0.01961	-0.00114	-1.85%
19970331	26.625	-0.148	-0.04482	-10.32%
19970430	24.125	-0.0939	0.042303	-13.62%
19970530	32	0.326425	0.071624	25.48%
19970630	33.625	0.050781	0.044145	0.66%
19970731	33.5	-0.00372	0.076503	-8.02%
19970829	30.8125	-0.08022	-0.03627	-4.40%
19970930	38.625	0.25355	0.058433	19.51%
19971031	33.875	-0.12298	-0.03453	-8.85%
19971128	33.5	-0.01107	0.030458	-4.15%
19971231	37.8125	0.128731	0.017771	11.10%
19980130	35.9375	-0.04959	0.004529	-5.41%
19980227	44.125	0.227826	0.07323	15.46%
19980331	46.9375	0.063739	0.051322	1.24%

Average Growth Rate	**0.04%**

APPENDIX 11

Broadcom Corporation

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19980529	51.125	0.065104	-0.02576	9.09%
19980630	73.625	0.440098	0.031954	40.81%
19980731	62.75	-0.14771	-0.02326	-12.44%
19980831	51.25	-0.18327	-0.15767	-2.56%
19980930	71	0.385366	0.063836	32.15%
19981030	82.9375	0.168134	0.074357	9.38%
19981130	89.3125	0.076865	0.061986	1.49%
19981231	120.75	0.351994	0.063053	28.89%
19990129	133.125	0.102484	0.038346	6.41%
19990226	60.1875	-0.09578	-0.03811	-5.77%
19990331	61.625	0.023884	0.037862	-1.40%
19990430	77.125	0.251521	0.048986	20.25%
19990528	95.75	0.241491	-0.02074	26.22%
19990630	144.5625	0.509791	0.050964	45.88%
19990730	120.5	-0.16645	-0.03061	-13.58%
19990831	128.75	0.068465	-0.01	7.85%
19990930	109	-0.1534	-0.02284	-13.06%
19991029	127.8125	0.172592	0.062027	11.06%
19991130	179.0625	0.400978	0.036856	36.41%
19991231	272.375	0.521117	0.083903	43.72%
20000131	289.3125	0.062184	-0.03976	10.19%
20000229	197.375	0.364442	0.031745	33.27%
20000331	242.875	0.230526	0.053534	17.70%
20000428	172.375	-0.29027	-0.05947	-23.08%
20000531	130.0625	-0.24547	-0.03905	-20.64%
20000630	218.9375	0.683325	0.051649	63.17%
20000731	224.25	0.024265	-0.01711	4.14%
20000831	250	0.114827	0.076372	3.85%
20000929	243.75	-0.025	-0.05114	2.61%
20001031	222.375	-0.08769	-0.02456	-6.31%
20001130	97.5	-0.56155	-0.10255	-45.90%
20001229	84	-0.13846	0.020346	-15.88%
20010131	109.9375	0.30878	0.039533	26.93%
20010228	49.25	-0.55202	-0.09927	-45.28%
20010330	28.9	-0.4132	-0.07029	-34.29%
20010430	41.56	0.438062	0.083904	35.42%
20010531	33.26	-0.19971	0.010561	-21.03%
20010629	42.76	0.285628	-0.01748	30.31%
20010731	43.63	0.020346	-0.01835	3.87%
20010831	32.15	-0.26312	-0.05908	-20.40%

20010928	20.3	-0.36859	-0.09154	-27.71%
20011031	34.41	0.695074	0.027968	66.71%
20011130	43.99	0.278407	0.078734	19.97%
20011231	40.87	-0.07093	0.017841	-8.88%
20020131	42.47	0.039149	-0.01606	5.52%
20020228	30.65	-0.27831	-0.02171	-25.66%
20020328	35.9	0.171289	0.044693	12.66%
20020430	34.5	-0.039	-0.04965	1.07%
20020531	22.55	-0.34638	-0.01046	-33.59%
20020628	17.54	-0.22217	-0.07025	-15.19%
20020731	18.76	0.069555	-0.08114	15.07%
20020830	16.49	-0.121	0.007984	-12.90%
20020930	10.68	-0.35234	-0.09998	-25.24%
20021031	11.98	0.121723	0.074958	4.68%
20021129	19.55	0.631886	0.061276	57.06%
20021231	15.06	-0.22967	-0.05331	-17.64%
20030131	13.54	-0.10093	-0.02343	-7.75%
20030228	14.48	0.069424	-0.01541	8.48%
20030331	12.35	-0.1471	0.010333	-15.74%
20030430	17.89	0.448583	0.082796	36.58%

Average Growth Rate	**5.12%**

APPENDIX 12

NVidia

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19990226	21.9375	0.154605	-0.03811	19.27%
19990331	21.125	-0.03704	0.037862	-7.49%
19990430	18.25	-0.1361	0.048986	-18.51%
19990528	17.0625	-0.06507	-0.02074	-4.43%
19990630	19.125	0.120879	0.050964	6.99%
19990730	20.125	0.052288	-0.03061	8.29%
19990831	28.125	0.397516	-0.01	40.75%
19990930	19.25	-0.31556	-0.02284	-29.27%
19991029	22.125	0.149351	0.062027	8.73%
19991130	34.625	0.564972	0.036856	52.81%
19991231	46.9375	0.355596	0.083903	27.17%
20000131	37.0625	-0.21039	-0.03976	-17.06%
20000229	64	0.726813	0.031745	69.51%
20000331	84.48438	0.320068	0.053534	26.65%
20000428	89.125	0.054929	-0.05947	11.44%
20000531	114.125	0.280505	-0.03905	31.96%
20000630	63.5625	0.11391	0.051649	6.23%
20000731	60	-0.05605	-0.01711	-3.89%
20000831	79.375	0.322917	0.076372	24.66%
20000929	81.875	0.031496	-0.05114	8.26%
20001031	62.14063	-0.24103	-0.02456	-21.65%
20001130	40.5	-0.34825	-0.10255	-24.57%
20001229	32.76563	-0.19097	0.020346	-21.13%
20010131	51.625	0.575584	0.039533	53.61%
20010228	44.6875	-0.13438	-0.09927	-3.51%
20010330	64.92188	0.452797	-0.07029	52.31%
20010430	83.3	0.283081	0.083904	19.92%
20010531	85.61	0.027731	0.010561	1.72%
20010629	92.75	0.083401	-0.01748	10.09%
20010731	80.9	-0.12776	-0.01835	-10.94%
20010831	84.71	0.047095	-0.05908	10.62%
20010928	27.47	-0.35143	-0.09154	-25.99%
20011031	42.86	0.560248	0.027968	53.23%
20011130	54.64	0.274848	0.078734	19.61%
20011231	66.9	0.224378	0.017841	20.65%
20020131	65.74	-0.01734	-0.01606	-0.13%
20020228	51.01	-0.22406	-0.02171	-20.24%
20020328	44.36	-0.13037	0.044693	-17.51%
20020430	34.81	-0.21528	-0.04965	-16.56%
20020531	33.46	-0.03878	-0.01046	-2.83%

20020628	17.18	-0.48655	-0.07025	-41.63%
20020731	11.07	-0.35565	-0.08114	-27.45%
20020830	10.1056	-0.08712	0.007984	-9.51%
20020930	8.56	-0.15295	-0.09998	-5.30%
20021031	11.9	0.390187	0.074958	31.52%
20021129	17.13	0.439496	0.061276	37.82%
20021231	11.51	-0.32808	-0.05331	-27.48%
20030131	10.32	-0.10339	-0.02343	-8.00%
20030228	12.62	0.222868	-0.01541	23.83%
20030331	12.88	0.020602	0.010333	1.03%
20030430	14.27	0.107919	0.082796	2.51%
20030530	26.17	0.833917	0.063507	77.04%
20030630	22.91	-0.12457	0.016332	-14.09%
20030731	19.09	-0.16674	0.023128	-18.99%
20030829	18.17	-0.04819	0.024908	-7.31%
20030930	15.97	-0.12108	-0.0091	-11.20%
20031031	17.68	0.107076	0.060331	4.68%
20031128	21.23	0.200792	0.016607	18.42%
20031231	23.2	0.092793	0.045532	4.73%
20040130	22.25	-0.04095	0.023065	-6.40%

Average Growth Rate	**6.05%**

APPENDIX 13

Yahoo Inc.

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19960531	28	-0.05882	0.0268	-8.56%
19960628	21	-0.25	-0.0083	-24.17%
19960731	18	-0.14286	-0.05382	-8.90%
19960830	19.625	0.090278	0.032464	5.78%
19960930	21.25	0.082803	0.053014	2.98%
19961031	19.75	-0.07059	0.013632	-8.42%
19961129	19.125	-0.03165	0.065501	-9.72%
19961231	17	-0.11111	-0.01136	-9.98%
19970131	33.875	0.992647	0.053449	93.92%
19970228	30.25	-0.10701	-0.00114	-10.59%
19970331	28.125	-0.07025	-0.04482	-2.54%
19970430	34.125	0.213333	0.042303	17.10%
19970530	32.25	-0.05495	0.071624	-12.66%
19970630	35.25	0.093023	0.044145	4.89%
19970731	56.5	0.602837	0.076503	52.63%
19970829	59.5	0.053097	-0.03627	8.94%
19970930	50.125	0.263655	0.058433	20.52%
19971031	43.84375	-0.12531	-0.03453	-9.08%
19971128	51.125	0.166073	0.030458	13.56%
19971231	69.25	0.354523	0.017771	33.68%
19980130	63.375	-0.08484	0.004529	-8.94%
19980227	73.1875	0.154832	0.07323	8.16%
19980331	92.4375	0.263023	0.051322	21.17%
19980430	118.9375	0.28668	0.010862	27.58%
19980529	109.5	-0.07935	-0.02576	-5.36%
19980630	157.5	0.438356	0.031954	40.64%
19980731	181.9375	0.155159	-0.02326	17.84%
19980831	69	-0.2415	-0.15767	-8.38%
19980930	129.5	0.876812	0.063836	81.30%
19981030	130.8438	0.010376	0.074357	-6.40%
19981130	192	0.467399	0.061986	40.54%
19981231	236.9375	0.234049	0.063053	17.10%
19990129	354.25	0.49512	0.038346	45.68%
19990226	153.5	-0.13338	-0.03811	-9.53%
19990331	168.375	0.096906	0.037862	5.90%
19990430	174.6875	0.037491	0.048986	-1.15%
19990528	148	-0.15277	-0.02074	-13.20%
19990630	172.25	0.163851	0.050964	11.29%
19990730	136.4375	-0.20791	-0.03061	-17.73%
19990831	147.5	0.081081	-0.01	9.11%

19990930	179.5	0.216949	-0.02284	23.98%
19991029	179.0625	-0.00244	0.062027	-6.45%
19991130	212.75	0.188133	0.036856	15.13%
19991231	432.6875	1.033784	0.083903	94.99%
20000131	322.0625	-0.25567	-0.03976	-21.59%
20000229	159.6875	-0.00835	0.031745	-4.01%
20000331	171.375	0.07319	0.053534	1.97%
20000428	130.25	-0.23997	-0.05947	-18.05%
20000531	113.0625	-0.13196	-0.03905	-9.29%
20000630	123.875	0.095633	0.051649	4.40%
20000731	128.6875	0.03885	-0.01711	5.60%
20000831	121.5	-0.05585	0.076372	-13.22%
20000929	91	-0.25103	-0.05114	-19.99%
20001031	58.625	-0.35577	-0.02456	-33.12%
20001130	39.625	-0.32409	-0.10255	-22.16%
20001229	30.0625	-0.24133	0.020346	-26.17%
20010131	37.3125	0.241164	0.039533	20.16%
20010228	23.8125	-0.36181	-0.09927	-26.25%
20010330	15.75	-0.33858	-0.07029	-26.83%
20010430	20.18	0.28127	0.083904	19.74%

Average Growth Rate	**6.06%**

APPENDIX 14

Akamai Technologies

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19991130	237	0.632372	0.036856	59.55%
19991231	327.625	0.382384	0.083903	29.85%
20000131	249.125	-0.2396	-0.03976	-19.98%
20000229	261.25	0.04867	0.031745	1.69%
20000331	160.8125	-0.38445	0.053534	-43.80%
20000428	98.875	-0.38515	-0.05947	-32.57%
20000531	66.75	-0.32491	-0.03905	-28.59%
20000630	118.7344	0.778792	0.051649	72.71%
20000731	78.85938	-0.33583	-0.01711	-31.87%
20000831	75.5625	-0.04181	0.076372	-11.82%
20000929	52.51563	-0.305	-0.05114	-25.39%
20001031	51	-0.02886	-0.02456	-0.43%
20001130	28.75	-0.43627	-0.10255	-33.37%
20001229	21.0625	-0.26739	0.020346	-28.77%
20010131	29.0625	0.379822	0.039533	34.03%
20010228	16.9375	-0.4172	-0.09927	-31.79%
20010330	8.5625	-0.49447	-0.07029	-42.42%
20010430	9.45	0.10365	0.083904	1.98%
20010531	10.33	0.093122	0.010561	8.26%
20010629	9.175	-0.11181	-0.01748	-9.43%
20010731	7.75	-0.15531	-0.01835	-13.70%
20010831	4.21	-0.45677	-0.05908	-39.77%
20010928	2.91	-0.30879	-0.09154	-21.73%
20011031	3.16	0.085911	0.027968	5.79%
20011130	5.76	0.822785	0.078734	74.41%
20011231	5.94	0.03125	0.017841	1.34%
20020131	4.61	-0.22391	-0.01606	-20.79%
20020228	3.11	-0.32538	-0.02171	-30.37%
20020328	4.001	0.286495	0.044693	24.18%
20020430	2.29	-0.42764	-0.04965	-37.80%
20020531	2	-0.12664	-0.01046	-11.62%
20020628	1.3	-0.35	-0.07025	-27.98%
20020731	1.06	-0.18462	-0.08114	-10.35%
20020830	0.95	-0.10377	0.007984	-11.18%
20020930	0.83	-0.12632	-0.09998	-2.63%
20021031	0.97	0.168675	0.074958	9.37%
20021129	2.06	1.123711	0.061276	106.24%
20021231	1.73	-0.16019	-0.05331	-10.69%
20030131	1.33	-0.23121	-0.02343	-20.78%
20030228	1.53	0.150376	-0.01541	16.58%

20030331	1.41	-0.07843	0.010333	-8.88%
20030430	2.42	0.716312	0.082796	63.35%
20030530	3.662	0.513223	0.063507	44.97%
20030630	4.78	0.305298	0.016332	28.90%
20030731	4.58	-0.04184	0.023128	-6.50%
20030829	4.16	-0.0917	0.024908	-11.66%
20030930	4.29	0.03125	-0.0091	4.04%
20031031	7.9	0.841492	0.060331	78.12%
20031128	13.4	0.696202	0.016607	67.96%
20031231	10.76	-0.19702	0.045532	-24.26%
20040130	12.95	0.203532	0.023065	18.05%
20040227	15.08	0.164479	0.015469	14.90%
20040331	13.14	-0.12865	-0.01069	-11.80%
20040430	11.84	-0.09894	-0.02423	-7.47%
20040528	14.86	0.255068	0.014127	24.09%
20040630	17.95	0.207941	0.021563	18.64%
20040730	14.93	-0.16825	-0.03768	-13.06%
20040831	13.45	-0.09913	0.002714	-10.18%
20040930	14.05	0.04461	0.020555	2.41%
20041029	13.85	-0.01424	0.01781	-3.21%

Average Growth Rate	**1.91%**

APPENDIX 15

Red Hat Inc.

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19990930	96	0.166287	-0.02284	18.91%
19991029	88.625	-0.07682	0.062027	-13.89%
19991130	210	1.369535	0.036856	133.27%
19991231	211.25	0.005952	0.083903	-7.80%
20000131	95.125	-0.09941	-0.03976	-5.97%
20000229	60.6875	-0.36202	0.031745	-39.38%
20000331	42.375	-0.30175	0.053534	-35.53%
20000428	25.0625	-0.40856	-0.05947	-34.91%
20000531	16.0625	-0.3591	-0.03905	-32.01%
20000630	27.0625	0.684825	0.051649	63.32%
20000731	18.75	-0.30716	-0.01711	-29.01%
20000831	25.125	0.34	0.076372	26.36%
20000929	17.0625	-0.3209	-0.05114	-26.98%
20001031	12.5	-0.2674	-0.02456	-24.28%
20001130	6.25	-0.5	-0.10255	-39.75%
20001229	6.25	0	0.020346	-2.04%
20010131	9.34375	0.495	0.039533	45.55%
20010228	6.4375	-0.31104	-0.09927	-21.18%
20010330	6.09	-0.05398	-0.07029	1.63%
20010430	5.15	-0.15435	0.083904	-23.83%
20010531	5.45	0.058252	0.010561	4.77%
20010629	4	-0.26606	-0.01748	-24.86%
20010731	3.96	-0.01	-0.01835	0.84%
20010831	3.54	-0.10606	-0.05908	-4.70%
20010928	3.5	-0.0113	-0.09154	8.02%
20011031	4.72	0.348571	0.027968	32.06%
20011130	7.98	0.690678	0.078734	61.19%
20011231	7.1	-0.11028	0.017841	-12.81%
20020131	8.12	0.143662	-0.01606	15.97%
20020228	5.89	-0.27463	-0.02171	-25.29%
20020328	5.709	-0.03073	0.044693	-7.54%
20020430	4.59	-0.19601	-0.04965	-14.64%
20020531	4.81	0.04793	-0.01046	5.84%
20020628	5.87	0.220374	-0.07025	29.06%
20020731	4.61	-0.21465	-0.08114	-13.35%
20020830	4.75	0.030369	0.007984	2.24%
20020930	4.75	0	-0.09998	10.00%
20021031	4.49	-0.05474	0.074958	-12.97%
20021129	6.87	0.530067	0.061276	46.88%
20021231	5.91	-0.13974	-0.05331	-8.64%

20030131	5.14	-0.13029	-0.02343	-10.69%
20030228	5.89	0.145914	-0.01541	16.13%
20030331	5.43	-0.0781	0.010333	-8.84%
20030430	6	0.104972	0.082796	2.22%
20030530	7.45	0.241667	0.063507	17.82%
20030630	7.54	0.012081	0.016332	-0.43%
20030731	6.32	-0.1618	0.023128	-18.49%
20030829	7.25	0.147152	0.024908	12.22%
20030930	10	0.37931	-0.0091	38.84%
20031031	15.01	0.501	0.060331	44.07%
20031128	13.32	-0.11259	0.016607	-12.92%
20031231	18.77	0.409159	0.045532	36.36%
20040130	19.3	0.028236	0.023065	0.52%
20040227	18.09	-0.06269	0.015469	-7.82%
20040331	23.05	0.274185	-0.01069	28.49%
20040430	22.72	-0.01432	-0.02423	0.99%
20040528	27.33	0.202905	0.014127	18.88%
20040630	22.97	-0.15953	0.021563	-18.11%
20040730	17.12	-0.25468	-0.03768	-21.70%
20040831	12.26	-0.28388	0.002714	-28.66%

Average Growth Rate	**2.22%**

APPENDIX 16

Juniper Networks

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19990730	162.4375	0.090185	-0.03061	12.08%
19990831	205	0.262024	-0.01	27.20%
19990930	182.0625	-0.11189	-0.02284	-8.91%
19991029	275.625	0.513903	0.062027	45.19%
19991130	277.125	0.005442	0.036856	-3.14%
19991231	340	0.226883	0.083903	14.30%
20000131	135.3125	0.193934	-0.03976	23.37%
20000229	274.3125	1.027252	0.031745	99.55%
20000331	263.5625	-0.03919	0.053534	-9.27%
20000428	212.6875	-0.19303	-0.05947	-13.36%
20000531	175.1875	-0.17632	-0.03905	-13.73%
20000630	145.5625	0.661791	0.051649	61.01%
20000731	142.4375	-0.02147	-0.01711	-0.44%
20000831	213.75	0.500658	0.076372	42.43%
20000929	218.9375	0.024269	-0.05114	7.54%
20001031	195	-0.10934	-0.02456	-8.48%
20001130	124.625	-0.3609	-0.10255	-25.84%
20001229	126.0625	0.011535	0.020346	-0.88%
20010131	105.9375	-0.15964	0.039533	-19.92%
20010228	64.5625	-0.39056	-0.09927	-29.13%
20010330	37.96	-0.41204	-0.07029	-34.18%
20010430	59.03	0.555058	0.083904	47.12%
20010531	42.53	-0.27952	0.010561	-29.01%
20010629	31.1	-0.26875	-0.01748	-25.13%
20010731	25.69	-0.17396	-0.01835	-15.56%
20010831	14	-0.45504	-0.05908	-39.60%
20010928	9.7	-0.30714	-0.09154	-21.56%
20011031	22.19	1.287629	0.027968	125.97%
20011130	24.58	0.107706	0.078734	2.90%
20011231	18.95	-0.22905	0.017841	-24.69%
20020131	15.32	-0.19156	-0.01606	-17.55%
20020228	9.32	-0.39165	-0.02171	-36.99%
20020328	12.62	0.354077	0.044693	30.94%
20020430	10.11	-0.19889	-0.04965	-14.92%
20020531	9.27	-0.08309	-0.01046	-7.26%
20020628	5.65	-0.39051	-0.07025	-32.03%
20020731	8	0.415929	-0.08114	49.71%
20020830	7.27	-0.09125	0.007984	-9.92%
20020930	4.8	-0.33975	-0.09998	-23.98%
20021031	5.825	0.213542	0.074958	13.86%

20021129	9.74	0.672103	0.061276	61.08%
20021231	6.8	-0.30185	-0.05331	-24.85%
20030131	8.77	0.289706	-0.02343	31.31%
20030228	8.99	0.025085	-0.01541	4.05%
20030331	8.17	-0.09121	0.010333	-10.16%
20030430	10.24	0.253366	0.082796	17.06%
20030530	13.809	0.348535	0.063507	28.50%
20030630	12.47	-0.09697	0.016332	-11.33%
20030731	14.43	0.157177	0.023128	13.41%
20030829	17.21	0.192654	0.024908	16.78%
20030930	15	-0.12841	-0.0091	-11.93%
20031031	18	0.2	0.060331	13.97%
20031128	18.87	0.048333	0.016607	3.17%
20031231	18.68	-0.01007	0.045532	-5.56%
20040130	28.83	0.543362	0.023065	52.03%
20040227	25.87	-0.10267	0.015469	-11.81%
20040331	26.02	0.005798	-0.01069	1.65%
20040430	21.88	-0.15911	-0.02423	-13.49%
20040528	20.95	-0.04251	0.014127	-5.66%
20040630	24.57	0.172792	0.021563	15.12%

Average Growth Rate	**5.02%**

APPENDIX 17

SanDisk Corporation

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19951229	15	-0.32584	0.01519	-34.10%
19960131	19.25	0.283333	0.028146	25.52%
19960229	14	-0.27273	0.016309	-28.90%
19960329	13	-0.07143	0.010933	-8.24%
19960430	14.875	0.144231	0.025509	11.87%
19960531	15	0.008403	0.0268	-1.84%
19960628	12.125	-0.19167	-0.0083	-18.34%
19960731	11.625	-0.04124	-0.05382	1.26%
19960830	11.625	0	0.032464	-3.25%
19960930	15.875	0.365591	0.053014	31.26%
19961031	13.25	-0.16535	0.013632	-17.90%
19961129	13.75	0.037736	0.065501	-2.78%
19961231	9.75	-0.29091	-0.01136	-27.96%
19970131	12	0.230769	0.053449	17.73%
19970228	13.25	0.104167	-0.00114	10.53%
19970331	9.875	-0.25472	-0.04482	-20.99%
19970430	12.75	0.291139	0.042303	24.88%
19970530	14.375	0.127451	0.071624	5.58%
19970630	14.625	0.017391	0.044145	-2.68%
19970731	22	0.504274	0.076503	42.78%
19970829	27.125	0.232955	-0.03627	26.92%
19970930	36	0.327189	0.058433	26.88%
19971031	23.875	-0.33681	-0.03453	-30.23%
19971128	24.5	0.026178	0.030458	-0.43%
19971231	20.3125	-0.17092	0.017771	-18.87%
19980130	20	-0.01539	0.004529	-1.99%
19980227	25.4375	0.271875	0.07323	19.87%
19980331	24.875	-0.02211	0.051322	-7.34%
19980430	20.875	-0.1608	0.010862	-17.17%
19980529	16.125	-0.22755	-0.02576	-20.18%
19980630	13.8125	-0.14341	0.031954	-17.54%
19980731	10.625	-0.23077	-0.02326	-20.75%
19980831	8.75	-0.17647	-0.15767	-1.88%
19980930	7.75	-0.11429	0.063836	-17.81%
19981030	9.625	0.241935	0.074357	16.76%
19981130	11.875	0.233766	0.061986	17.18%
19981231	14.125	0.189474	0.063053	12.64%
19990129	28.875	1.044248	0.038346	100.59%
19990226	28	-0.0303	-0.03811	0.78%
19990331	26.5	-0.05357	0.037862	-9.14%

19990430	20.25	-0.23585	0.048986	-28.48%
19990528	31	0.530864	-0.02074	55.16%
19990630	45	0.451613	0.050964	40.07%
19990730	76.75	0.705556	-0.03061	73.62%
19990831	84.375	0.099349	-0.01	10.93%
19990930	65.1875	-0.22741	-0.02284	-20.46%
19991029	60.625	-0.06999	0.062027	-13.20%
19991130	66.0625	0.089691	0.036856	5.28%
19991231	96.25	0.456954	0.083903	37.31%
20000131	133.875	0.390909	-0.03976	43.07%
20000229	89	0.329599	0.031745	29.79%
20000331	122.5	0.376404	0.053534	32.29%
20000428	91.625	-0.25204	-0.05947	-19.26%
20000531	58.125	-0.36562	-0.03905	-32.66%
20000630	61.1875	0.052688	0.051649	0.10%
20000731	63.75	0.041879	-0.01711	5.90%
20000831	83.5	0.309804	0.076372	23.34%
20000929	66.75	-0.2006	-0.05114	-14.95%
20001031	53.73438	-0.19499	-0.02456	-17.04%
20001130	39.8125	-0.25909	-0.10255	-15.65%

Average Growth Rate	**4.30%**

APPENDIX 18

Network Appliances Inc.

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19951229	40.125	0.326446	0.01519	31.13%
19960131	30.75	-0.23365	0.028146	-26.18%
19960229	31.75	0.03252	0.016309	1.62%
19960329	31.75	0	0.010933	-1.09%
19960430	32	0.007874	0.025509	-1.76%
19960531	34.25	0.070313	0.0268	4.35%
19960628	29.75	-0.13139	-0.0083	-12.31%
19960731	24	-0.19328	-0.05382	-13.95%
19960830	28	0.166667	0.032464	13.42%
19960930	30	0.071429	0.053014	1.84%
19961031	35	0.166667	0.013632	15.30%
19961129	36	0.028571	0.065501	-3.69%
19961231	50.875	0.413194	-0.01136	42.46%
19970131	51.25	0.007371	0.053449	-4.61%
19970228	40	-0.21951	-0.00114	-21.84%
19970331	32.5	-0.1875	-0.04482	-14.27%
19970430	29.125	-0.10385	0.042303	-14.62%
19970530	40.5625	0.392704	0.071624	32.11%
19970630	38	-0.06317	0.044145	-10.73%
19970731	43.625	0.148026	0.076503	7.15%
19970829	47.25	0.083095	-0.03627	11.94%
19970930	54.25	0.148148	0.058433	8.97%
19971031	50.25	-0.07373	-0.03453	-3.92%
19971128	50.375	0.002488	0.030458	-2.80%
19971231	35.5	0.409429	0.017771	39.17%
19980130	30.125	-0.15141	0.004529	-15.59%
19980227	29.5	-0.02075	0.07323	-9.40%
19980331	35.5	0.20339	0.051322	15.21%
19980430	36.0625	0.015845	0.010862	0.50%
19980529	34.78125	-0.03553	-0.02576	-0.98%
19980630	38.9375	0.119497	0.031954	8.75%
19980731	41.75	0.072231	-0.02326	9.55%
19980831	41.6875	-0.0015	-0.15767	15.62%
19980930	50.625	0.214393	0.063836	15.06%
19981030	54.75	0.081481	0.074357	0.71%
19981130	75.125	0.372146	0.061986	31.02%
19981231	44.84375	0.193844	0.063053	13.08%
19990129	53	0.181882	0.038346	14.35%
19990226	42	-0.20755	-0.03811	-16.94%
19990331	50.625	0.205357	0.037862	16.75%

19990430	50.3125	-0.00617	0.048986	-5.52%
19990528	47.15625	-0.06273	-0.02074	-4.20%
19990630	55.875	0.184891	0.050964	13.39%
19990730	54.5	-0.02461	-0.03061	0.60%
19990831	65.6875	0.205275	-0.01	21.53%
19990930	71.625	0.09039	-0.02284	11.32%
19991029	74	0.033159	0.062027	-2.89%
19991130	117.6875	0.590372	0.036856	55.35%
19991231	83.0625	0.411577	0.083903	32.77%
20000131	100.375	0.208427	-0.03976	24.82%
20000229	188.75	0.880448	0.031745	84.87%
20000331	82.75	-0.12318	0.053534	-17.67%
20000428	73.9375	-0.1065	-0.05947	-4.70%
20000531	64.5625	-0.1268	-0.03905	-8.78%
20000630	80.5	0.246854	0.051649	19.52%
20000731	86.1875	0.070652	-0.01711	8.78%
20000831	117	0.357505	0.076372	28.11%
20000929	127.375	0.088675	-0.05114	13.98%
20001031	119	-0.06575	-0.02456	-4.12%
20001130	49.375	-0.58508	-0.10255	-48.25%

Average Growth Rate	**6.57%**

APPENDIX 19

Ebay Inc.

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19981030	83.125	0.84466	0.074357	77.03%
19981130	197.625	1.377444	0.061986	131.55%
19981231	241.25	0.220746	0.063053	15.77%
19990129	277.625	0.150777	0.038346	11.24%
19990226	334	0.203062	-0.03811	24.12%
19990331	137.3125	0.233346	0.037862	19.55%
19990430	208.125	0.515703	0.048986	46.67%
19990528	177.1875	-0.14865	-0.02074	-12.79%
19990630	151.375	-0.14568	0.050964	-19.66%
19990730	97.6875	-0.35467	-0.03061	-32.41%
19990831	125.5625	0.285349	-0.01	29.53%
19990930	141.0625	0.123444	-0.02284	14.63%
19991029	135.125	-0.04209	0.062027	-10.41%
19991130	165.0625	0.221554	0.036856	18.47%
19991231	125.1875	-0.24158	0.083903	-32.55%
20000131	150.0625	0.198702	-0.03976	23.85%
20000229	143.375	-0.04457	0.031745	-7.63%
20000331	176	0.22755	0.053534	17.40%
20000428	159.1875	-0.09553	-0.05947	-3.61%
20000531	62.5625	-0.21398	-0.03905	-17.49%
20000630	54.3125	-0.13187	0.051649	-18.35%
20000731	50	-0.0794	-0.01711	-6.23%
20000831	62	0.24	0.076372	16.36%
20000929	68.6875	0.107863	-0.05114	15.90%
20001031	51.5	-0.25023	-0.02456	-22.57%
20001130	34.3125	-0.33374	-0.10255	-23.12%
20001229	33	-0.03825	0.020346	-5.86%
20010131	49.375	0.496212	0.039533	45.67%
20010228	38.32813	-0.22373	-0.09927	-12.45%
20010330	36.1875	-0.05585	-0.07029	1.44%
20010430	50.48	0.394957	0.083904	31.11%
20010531	60.52	0.198891	0.010561	18.83%
20010629	68.49	0.131692	-0.01748	14.92%
20010731	62.57	-0.08644	-0.01835	-6.81%
20010831	56.23	-0.10133	-0.05908	-4.23%
20010928	45.75	-0.18638	-0.09154	-9.48%
20011031	52.48	0.147104	0.027968	11.91%
20011130	68.07	0.297066	0.078734	21.83%
20011231	66.9	-0.01719	0.017841	-3.50%
20020131	59.02	-0.11779	-0.01606	-10.17%

20020228	52.05	-0.1181	-0.02171	-9.64%
20020328	56.64	0.088184	0.044693	4.35%
20020430	53.1	-0.0625	-0.04965	-1.29%
20020531	55.21	0.039736	-0.01046	5.02%
20020628	61.62	0.116102	-0.07025	18.64%
20020731	57.09	-0.07352	-0.08114	0.76%
20020830	56.52	-0.00998	0.007984	-1.80%
20020930	52.81	-0.06564	-0.09998	3.43%
20021031	63.24	0.1975	0.074958	12.25%
20021129	68.92	0.089817	0.061276	2.85%
20021231	67.82	-0.01596	-0.05331	3.74%
20030131	75.16	0.108228	-0.02343	13.17%
20030228	78.42	0.043374	-0.01541	5.88%
20030331	85.31	0.08786	0.010333	7.75%
20030430	92.91	0.089087	0.082796	0.63%
20030530	101.65	0.09407	0.063507	3.06%
20030630	104	0.023119	0.016332	0.68%
20030731	107.3	0.031731	0.023128	0.86%
20030829	55.41	0.032805	0.024908	0.79%
20030930	53.64	-0.03194	-0.0091	-2.28%

Average Growth Rate	**6.96%**

APPENDIX 20

Amazon Inc.

Date	Stock Price	Stock Return	Market Return	Monthly Growth
19970630	18.5	0.027778	0.044145	-1.64%
19970731	28.75	0.554054	0.076503	47.76%
19970829	28.0625	-0.02391	-0.03627	1.24%
19970930	52.0625	0.855234	0.058433	79.68%
19971031	61	0.171669	-0.03453	20.62%
19971128	49.5	-0.18853	0.030458	-21.90%
19971231	60.25	0.217172	0.017771	19.94%
19980130	59	-0.02075	0.004529	-2.53%
19980227	77	0.305085	0.07323	23.19%
19980331	85.53125	0.110795	0.051322	5.95%
19980430	91.75	0.072707	0.010862	6.19%
19980529	88.125	-0.03951	-0.02576	-1.38%
19980630	99.75	1.26383	0.031954	123.19%
19980731	110.875	0.111529	-0.02326	13.48%
19980831	83.75	-0.24465	-0.15767	-8.70%
19980930	111.625	0.332836	0.063836	26.90%
19981030	126.4375	0.132699	0.074357	5.83%
19981130	192	0.518537	0.061986	45.66%
19981231	321.25	0.673177	0.063053	61.01%
19990129	116.9375	0.092023	0.038346	5.37%
19990226	128.125	0.095671	-0.03811	13.38%
19990331	172.1875	0.343902	0.037862	30.60%
19990430	172.0625	-0.00073	0.048986	-4.97%
19990528	118.75	-0.30984	-0.02074	-28.91%
19990630	125.125	0.053684	0.050964	0.27%
19990730	100.0625	-0.2003	-0.03061	-16.97%
19990831	124.375	0.242973	-0.01	25.30%
19990930	79.9375	0.285427	-0.02284	30.83%
19991029	70.625	-0.1165	0.062027	-17.85%
19991130	85.0625	0.204425	0.036856	16.76%
19991231	76.125	-0.10507	0.083903	-18.90%
20000131	64.5625	-0.15189	-0.03976	-11.21%
20000229	68.875	0.066796	0.031745	3.51%
20000331	67	-0.02722	0.053534	-8.08%
20000428	55.1875	-0.17631	-0.05947	-11.68%
20000531	48.3125	-0.12458	-0.03905	-8.55%
20000630	36.3125	-0.24838	0.051649	-30.00%
20000731	30.125	-0.1704	-0.01711	-15.33%
20000831	41.5	0.377593	0.076372	30.12%
20000929	38.4375	-0.0738	-0.05114	-2.27%

20001031	36.625	-0.04715	-0.02456	-2.26%
20001130	24.6875	-0.32594	-0.10255	-22.34%
20001229	15.5625	-0.36962	0.020346	-39.00%
20010131	17.3125	0.11245	0.039533	7.29%
20010228	10.1875	-0.41155	-0.09927	-31.23%
20010330	10.23	0.004172	-0.07029	7.45%
20010430	15.78	0.542522	0.083904	45.86%
20010531	16.69	0.057668	0.010561	4.71%
20010629	14.15	-0.15219	-0.01748	-13.47%
20010731	12.49	-0.11731	-0.01835	-9.90%
20010831	8.94	-0.28423	-0.05908	-22.52%
20010928	5.97	-0.33222	-0.09154	-24.07%
20011031	6.98	0.169179	0.027968	14.12%
20011130	11.32	0.621776	0.078734	54.30%
20011231	10.82	-0.04417	0.017841	-6.20%
20020131	14.19	0.31146	-0.01606	32.75%
20020228	14.1	-0.00634	-0.02171	1.54%
20020328	14.3	0.014184	0.044693	-3.05%
20020430	16.69	0.167133	-0.04965	21.68%
20020531	18.23	0.092271	-0.01046	10.27%

Average Growth Rate	**7.53%**