Friedrich-Alexander-Universität Erlangen-Nürnberg
Technische Fakultät, Department Informatik

Maria del Carmen Romero Aranibar
Master Thesis

All Aboard the Bandwagon?

Employee Stock Options at Caldera Systems

Submitted on April 12, 2016

Supervisor: Prof. Dr. Dirk Riehle, M.B.A.
Professur für Open-Source-Software
Department Informatik, Technische Fakultät
Friedrich-Alexander University Erlangen-Nürnberg

Versicherung

Ich versichere, dass ich die Arbeit ohne fremde Hilfe und ohne Benutzung anderer als der angegebenen Quellen angefertigt habe und dass die Arbeit in gleicher oder ähnlicher Form noch keiner anderen Prüfungsbehörde vorgelegen hat und von dieser als Teil einer Prüfungsleistung angenommen wurde. Alle Ausführungen, die wörtlich oder sinngemäß übernommen wurden, sind als solche gekennzeichnet.

_____

Nürnberg, 12.04.2016

License

This work is licensed under the Creative Commons Attribution-NonCommercial 4.0 International License. To view a copy of this license, visit http://creativecommons.org/licenses/by-nc/4.0/ or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.

_____

Nürnberg, 12.04.2016

Abstract

Employee Stock Option Plans offer employees an opportunity to participate in a firms' success. However, employees who face the decision to exercise their options often lack the sophistication of professional investors and are therefore more prone to suffer losses from their investment. This case investigates Caldera System's employee stock option plan. The Linux business' initial public offering was shortly before the bust of the Dot-com bubble and employees who exercised their stock options incurred in considerable losses. The case provides the reader with the tools to evaluate Caldera's performance and form expectations on stock market prices prior to exercising stock options. In the case solution, we combine a quantitative analysis that draws on methods from accounting and finance with a qualitative analysis of Caldera's business plan and the Linux business. The resulting investment scenarios take the special tax treatment of employee stock option plans into account.

Contents

Tables

Figures

1 Introduction

The popularity of employee stock option plans (ESOPs) increased dramatically in the last decades. For an ever growing number of technology-related startups, employee stock option plans provide an opportunity to combine stronger employee involvement with the provision of funding for future growth. This development has inspired a large body of literature on ESOPs. Large parts of this literature focus on the employer perspective, while the decision problem of employees remains largely unexplored. In contrast to employers, employees have less access to resources and information to optimize their choice. This makes employees prone to losses after exercising their stock options and adds to the importance of a comprehensive analysis of the employee's decision problem.

This master's thesis addresses this gap in the literature. The thesis elaborates a Case Study on the decision problem of a young professional who has to decide whether to join the band-wagon of co-workers who exercise their employee stock options. As a method, the case study has the advantage of making complex concepts that guide the employee's decision accessible for the reader by relating the concepts to data and information from a real-life situation (Leenders, M. R. & Mauffette-Leenders L. A., Erskine, 2001).

In the case, we follow Frances Feldberg, employee and stock option holder of the US software company Caldera Systems Inc., which is at the verge of its initial public offering (IPO). Frances faces the challenge of taking different perspectives on exercising her stock options into account. She considers Caldera's open source-based business model, the performance of a stock market index, tax implications, and Caldera's financial statements. This holistic analysis, spanning different data sources and methods, provides the groundwork for Frances' decision on exercising her options. Because her decision's outcome depends on uncertain future stock price developments, she conducts a scenario analysis that differentiates between different degrees of optimism regarding Caldera's stock price after the IPO. Besides Frances, the case discusses a Friends and Family program and one of Frances' relatives decision to exercise stock options.

After an in depth analysis of the available data sources, Frances decides to exercise her stock options. The teaching material accompanying the case allows for an ex-post analysis of this decision. The ex-post analysis is particularly interesting in the case, as the IPO is set against the backdrop of the Dot-com bubble's bust shortly after Frances' decision. With detailed information on the stock price development and taxes, we calculate Frances losses and can form ideas about the predictability of risks and the vulnerability of employees as shareholders.

The remainder of the thesis comprises three sections. First, the thesis presents the case. After a brief description of the open source industry and Caldera, the case introduces Caldera's employee stock option plan. The case then provides data that allows Frances to make a rational decision: information on the development of an aggregated stock market index, Caldera's financial statements, and the aspects of the tax code that are relevant for stock option holders. Second, the thesis discusses the main concepts behind Frances decision on the basis of the available literature. These concepts include open source-based business models, stock option plans, initial public offerings, and the analysis of financial statements. Third, the teaching notes outline a master solution to the case and provide additional material. The teaching notes are designed to guide the solution and discussion of the case. The additional material includes the necessary information to conduct an ex-post analysis of Frances' decision and guidelines for a classroom discussion.

2 Teaching Case

2.1 Getting a Piece of the Pie: Employee Stock Option Plans

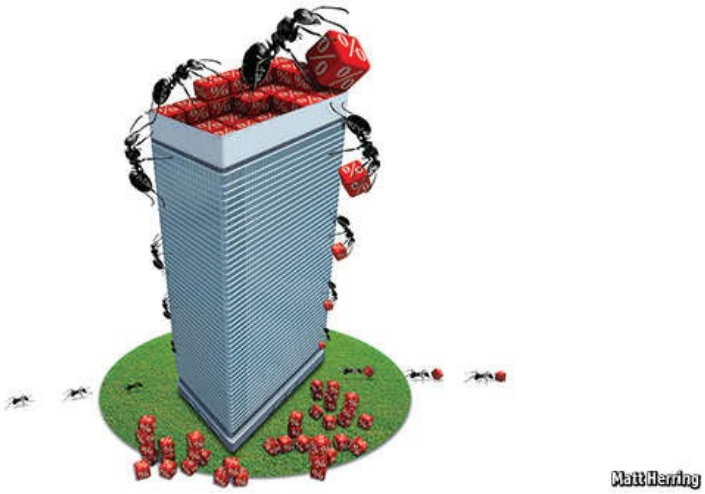

Figure 1: Illustration from Economist print edition, August 20, 2015

The last day of February 1999 had ended and Frances Feldberg, a software developer at Caldera Deutschland GmbH, the German subsidiary of Caldera Systems Inc., turned off her computer and went home with a resolution in mind. She had spent the last couple of hours checking stock prices and making calculations. The executives had promised exciting news for weeks and finally invited all employees to the highly anticipated information meeting, which took place via a conference call earlier that day. In the meeting, Alan Hansen, Caldera's chief financial officer, announced that Caldera was going public.

Surprised as she was, Frances could not but stop thinking about what the initial public offering (IPO) meant for her financial future. Frances was part of the employee stock options plan that Caldera had implemented the year before, granting employees the option to buy shares of the company. She could feel how her life was about to change. Moreover, the IPO was a big opportunity for her mother, a potential beneficiary of the *Friends and Family* package included with the IPO. All the more reason to make an informed, professional, and rational decision about her stock options. But how to make that decision? Frances was particularly concerned about the implications for her tax liability and the uncertainty over future stock prices in the software industry. Should she join the bandwagon of co-workers who planned to buy shares of stock? Mr. Hansen had shared very exciting news indeed.

2.2 The Industry: Linux and the Linux Business

2.2.1 Linux in a Nutshell

The late 1990s were characterized by a hub of open source software[1], with Linux as its main booster. In 1991, Linus Torvalds developed the core (or kernel[2]), which together with Richard

1 Open source software is software whose source code is distributed at no cost and is open for use and modification.

2 The kernel can be seen as the core set of instructions necessary to respond to incoming and outgoing

Stallman's GNU tools, came to be known as the free operating system (OS) Linux. In 1983, Stallman had put together GNU[3] tools, intending to create an operating system himself. Failing to create a matching kernel, Stallman left the project incomplete until Torvalds' intervention. Because Torvalds' Linux kernel assured security and scalability by working in independent modules, it played an important part in the operating system's success. After a rather informal introduction of the operating system, Linux immediately gained popularity and supporters. Because of the OS's portability, reliability, similarity to UNIX, and open source nature, Linux was appealing to developers and, eventually, to companies (West & Dedrick, 2001).

Before Caldera's IPO, Linux was becoming increasingly popular. In 1998, one year before Caldera's IPO, the number of companies using Linux increased by 27 per cent (Millman, 1998).

2.2.2 The Linux Business

In order to understand the business model of companies in the Linux industry, we briefly summarize how operating systems work. An OS is a combination of different components. In sum, an OS consists of the kernel, operating systems tools, applications and environments. Most of the components are developed independently and distributed in source code form, which means they can be assembled together by any user. However, to ensure the perfect combination of components into a single – properly working – operating system, distributions compile the code, configure the system and allow for installing applications. A distribution only needs to be booted and installed and can be purchased from a distribution maker. Companies in the Linux business mainly profit from the commercialization of distributions and support services for Linux.

Contradictory as it may sound, commercial companies offering Linux distributions made profitable businesses based on free open source operating systems. Right after the launch of Linux, distributions sold on CD-ROM and technical support packages from startup companies such as TurboLinux, SuSe and Red Hat were high in demand. The main competitor of Linux as an operating system was Windows. Advocates of Linux pointed out a number of advantages that outweighed the limited number of applications that ran on Linux. First, the multiuser version of Linux with documentation and 60- to 90-day support from Caldera sold at US$199, a considerably lower price than the more popular Windows NT offered at about US$1500. Second, because Linux was open source, it was easier to customize to specific needs of the client and ran on a large number of platforms. Third, Linux was more stable than its competing products which made it attractive as a server operating system and for manufacturing and financial applications (Millman, 1998).

These factors contributed to a large increase in the market share of Linux. In 1998, International Data Corporation (IDC) reported a 150 per cent market share growth for Linux. Linux reached a 17 per cent market share, the highest shore since the inception of Linux as an operating system in 1991 (West & Dedrick, 2001). Two key aspects may have influenced the results. First, the popularity of the open source movement as a philosophy for young computer scientists and technology companies. Second, the explosion and accelerated adoption of the Internet. Linux came as the ideal operating system, successfully combining both tendencies.

software requests.

3 Note that contrary to a common misconception, GNU is not UNIX.

2.3 The Company: History and Business Model

2.3.1 LST Software Becomes Caldera Deutschland

> *"Middle Franconia has the highest density of Linux developers in the world. We are a Linux-Valley."* Johannes Nussbickel, Chief Financial Officer at SuSe Linux in 2000

At the time Caldera Deutschland GmbH was founded, Caldera Inc. was a young company herself. Incorporated in 1994 by Bryan Sparks and Ransom Love in Utah (USA), the Canopy Group-funded startup had less than fifty employees. The company had an ambitious business model, without any previous records of success in the industry. Caldera relied on a combination of open source software and proprietary technology, as well as support and consulting services.

From 1995 onwards, Caldera expanded internationally. Besides Germany, responsible for Linux-related technologies, the company established a development center for the operating system DR-DOS[4]in the United Kingdom, and sales retailers for disk operating system-based (DOS) products in Taiwan. In 1998, Caldera Inc. decided to divide the company into two separated and independent entities. Caldera Systems Inc., in charge of Linux businesses, and Caldera Thin Clients Inc., in charge of embedded businesses. The goal behind the separation was to achieve the company's vision to position itself in both, Linux and e-commerce systems. Caldera's history of acquisitions, separation and reincorporation would expand for more than a decade until 2011, when international operations were officially canceled.

LST Software GmbH's origins lie in the Linux Support Team (LST), a community project which began at the University of Erlangen. The team working on the project was responsible for *Linux Power*, a popular Linux distribution. The distribution had quickly become a success and was adopted by many German universities. The Linux Power (*LST Distribution 2.2*) installation and system administration tool was the first Linux distribution to ship with a single 2.0 kernel. The popularity in Germany was mainly due to the language, keyboard support and international flexibility (language expansion). After the Linux distribution system had gained popularity, Ralf Flax and Stefan Probst founded LST Software GmbH in 1996 in Erlangen, Germany. Because of Linux Power's automatic hardware detection and graphical user interface with on-screen prompts, it did not come as a surprise that the product got the attention of Caldera, Inc.

Caldera Inc., the US Linux vendor looking for European partners and international expansion, was impressed by LST's distribution and installation. Soon, both companies were engaged in a joint project. Caldera had two failed product releases based on a competitor's product, which lacked a working installation. LST satisfied Caldera's internationalization requirements and offered a working installation. Eventually, what started as a contract work became permanent. In May 1997, LST Software GmbH became Caldera Deutschland GmbH, independent German subsidiary of Caldera Inc. With the split of Caldera Inc. into Caldera Systems Inc. and Caldera Thin Clients Inc. in 1998, Caldera Deutschland GmbH became part of Caldera Systems Inc. Table 1 shows a brief summary of the timeline.

4 DR-DOS is a desktop solution and embedded application purchased by Caldera from Novell.

TIMELINE		
Incorporation of Caldera Inc.	**1994**	
	1995	
	1996	Foundation of LST Software GmbH
	1997	LST becomes Caldera Deutschland GmbH
Caldera Inc. splits into: Caldera Systems Inc. Caldera Thin Clients Inc.	**1998**	Caldera Deutschland GmbH becomes the German subsidiary of Caldera Systems Inc.

Table 1: Timeline Caldera & LST

Frances' team's first project and achievement in the German subsidiary was *OpenLinux 2.3*, a Linux for business solution that helped Caldera establish itself as one of the industry leaders alongside Red Hat and VA Linux. Because *OpenLinux* included commercial packages that were not included under the GNU Public License[5], the product was only available through Caldera's authorized distribution channels around the world, and not for free download over the internet. As part of the offered services, Caldera's partners provided users with assistance, training and configuration. Frances' team had high hopes and was convinced that future releases of *OpenLinux* would be highly recognized in the industry.

2.3.2 Business Model

Caldera's business model's basic premise was the combination of open source software and proprietary commercial products. Since Caldera's incorporation in 1994, the company had redefined its business plan on several occasions, trying to figure out the key to successfully implement such a challenging model. Starting as a software provider for novice Linux users, Caldera jumped to eBusiness and appliance servers. By the time of the IPO, the company decided to focus on eBusiness solutions. This change in focus represented a change in the product line as well. So far, Caldera's revenue had been based on the sales of *OpenLinux* and related products. Some employees, including Frances, were worried about the future sales of new products, especially with the upcoming IPO, and the capacity of the company to generate revenue based on sales of new products.

A second branch of the business were value-added services. On the one hand, Caldera offered training for Linux. On the other hand, Caldera offered a set of complementary services. Through a set of courses designed to teach about development, deployment, and management, attendees of Caldera's training sessions mastered any Linux distribution. Training was offered locally and internationally via Caldera Open Learning Provider's educational programs. Other services included:

- Technical support for the installation of products
- Consulting and custom development
- Hardware optimization and certification
- Documentations

2.4 Caldera's Stock Option Plan

When LST became Caldera Deutschland GmbH, working contracts of several employees changed in accordance with the new company's policies. For Frances, this meant the possibil-

5 Free software license, which entitles end users with the freedoms to run, study, share, and modify the software.

ity to participate in Caldera's *1998 Employee Stock Option Plan*, which was adopted in December of the same year. As it is common in startups, Caldera offered employee stock options as part of the employee compensation package. Employee eligibility was determined by the Board of Director's Compensation Committee, internally called Plan Administrator. Frances had started working as a software developer for LST in 1996. As one of the employees with tenure in the company, she was entitled to participate in the companies' extraordinary benefits plans. Frances was a recognized Linux developer. Her vast experience with Linux made her indispensable, respected by her colleagues, and an asset to the company. Frances was quite happy with her job and her employer; it was exciting to be part of an emerging industry and she was curious to see what the future would hold for the company and herself. Stock options were a big incentive to keep up with the good work.

Based on Frances' profile, performance, and annual wage of EUR60,000[6] Frances was granted 5,000 stock options at a grant price of US$3.28 with her new working contract. Her vesting schedule spanned four years with twenty five per cent of the grant vested each year. Vesting is the minimum holding period between grant and purchase of an option (OECD, 2005).

2.4.1 Option Terms

Under the 1998 Plan, employees were eligible for options to purchase shares of Caldera's common stock. The plan opened five million shares of common stock for issuance to participating employees and limited the maximum number of shares per employee to one million shares.

Regarding the specifics of the stocks, employees were offered non-qualified stocks with an expiration date of 10 years from grant date i.e. until December 29, 2008. Optionees[7] did not have any shareholder rights before exercising the option and would not benefit from dividends on the shares, because Caldera did not plan to pay dividends to common shareholders. Exercising options is the process under which the employee proceeds with the actual purchase of vested shares (Khincha, 2002). Only after exercising the options, an employee holder of a record of purchased shares has shareholder rights on her shares.

All administrative affairs involving the plan were under the responsibility of the plan administrator, who had total authority to determine:

- Employee eligibility
- Option grant schedules
- Share number covered under the grant
- Exercise price of the options
- Exercise schedule
- Vesting schedule

2.4.2 The Friends and Family Program

Caldera made ten per cent of common stock available to friends and family of employees when filing for IPO, a program formally known as directed share program (Ljungqvist & Wilhelm, 2002).

Under this program, Frances' mother, an enthusiastic amateur investor, had the right to buy shares at the initial public offering price, estimated to be higher than US$7 per share. Partici-

6 We use US dollars as main currency throughout the case. In case currency conversion is required, we apply a standard exchange rate of 1.13 EUR/US$.

7 Employees participating in the 1998 Plan who were granted shares of common stock.

pants could buy the shares without commission and had the liberty to sell at any point in time. Because being part of the program was considered an attractive investment opportunity, many employees had a long list of potential beneficiaries. However, Frances position and profile guaranteed her mother's name on the very exclusive list.

Because the number of available stock was limited, each friend and family member had rights to only a few shares. After a classification process, Frances' mother could buy up to 300 shares of stock. "Still, my name is on the list" she said when Frances announced how many shares would be available. "I feel like I won a golden ticket!"

2.4.3 Exercise and Lock-up Terms

If an employee wished to exercise her vested stock options, she would have to give Caldera written notice. The day on which the notice was received by the company counted as the exercise date.

The exercise price per share of US$3,28 was determined by the plan administrator on the day of the grant and should always meet the fair market value. After exercising the options, employees signed a lock-up agreement under which selling and further commercial activities involving the shares were restricted for after a period of 180 days. Beneficiaries of the Friends and Family program did not fall under the lock-up period.

2.5 Making a Decision

Frances had kept a post-it note on the side of her computer screen for days, her personal resolution to take advantage of this opportunity. The time to decide whether to exercise her stock options was close, but she had not wasted any time. Making a decision as rationally as possible had always been her priority. She would consider the outlook of Caldera's future stock price, i.e. the money she would potentially win or lose by exercising her stock options, and no personal feelings would influence her decision. She did however contemplate some aspects on the side. She was a big industry enthusiastic, an active part of the Linux community, and a believer in Caldera's success.

In order to make a rational decision based on uncertain future stock prices, Frances considered the performance of the Linux industry and Caldera's performance.

2.5.1 The Industry

To form expectations on Caldera's potential at the stock market, Frances studied the software industry's stock market performance in the past 12 months.[8] To get a grasp on the software industry's performance, Frances searched for an index that aggregated stock market prices of several US Software companies. Frances found just such an index and the outlook was very positive. Figure 2 shows the index reflecting the aggregated stock market value of selected US software companies for up to 12 months prior to Caldera's IPO. The figure, provided by an internet investment portal, also included a simple projection of the index's development. If the positive outlook applied to Caldera, the value of her stock might almost double in the course of a year.

Of course, there were also stories of stock market busts lingering in her mind. From the famous example of the Netherlands' tulip prices, to more contemporary examples, such as the Japanese asset price bubble of the 1980s. There was always the possibility that the stock was

8 Figure 2 shows the development of an aggregate index of stock market prices of software companies up to 12 months prior to the IPO. The data was retrieved from Thomson Reuters Datastream. The projection is based on a regression of the index value on time. The projections provide a very rough approximation and only reflect the information provided by changes in stock market prices in the previous year.

overpriced and that market forces would eventually lead to a downward adjustment. If this was the case, the past development was a bad indicator, as it would only reflect overconfidence of investors in the market. Alas, the bust of investment bubbles was almost impossible to predict.

Frances understood that the advantage of an aggregate index was that any forces that affected only single companies would average out. Therefore, the index should provide her with a good assessment of the systematic potential of the industry without relying heavily on single companies' success stories that might not apply to Caldera. However, Frances also understood that Caldera might perform worse than the industry as a whole, so in the next step, she tried to assess Caldera's specific performance and the potential of its business model. She would also have a look at the development of stock market prices of similar companies who filed for IPO before Caldera.

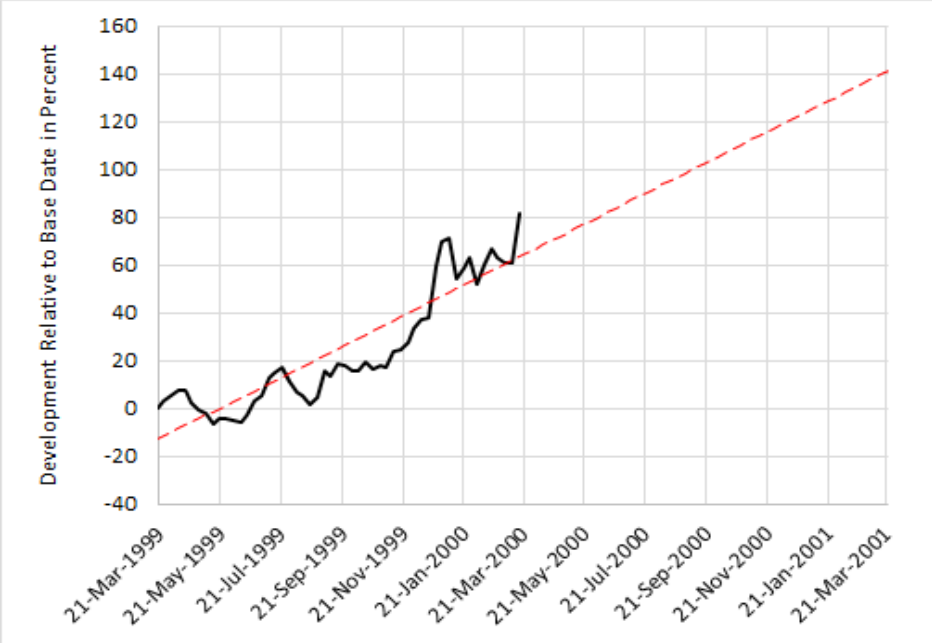

Figure 2: Development of an aggregate index of stock prices

2.5.2 Caldera

To get an idea of Caldera's performance, Frances evaluated the company's financial statements, with special attention to the balance sheet and income statement. The first thing that sprang to her attention was that Caldera was not yet a profitable company. Caldera's financial situation had been as volatile as its business focus. The company had not achieved profitability in any working year. By the time of the IPO, which was schedule to become effective a year after the internal announcement, Caldera anticipated an accumulated total net loss of almost US$35.1 million.

At first glance, the situation was not looking good in Frances' eyes. Expenses would only increase as a result of new product development, new employee hiring and brand promotion. "Fluctuation is only normal in this business" she thought. "Sales increase with a new product release and decrease when a new version is announced, no news there". Of course, open source products were not going to be highly profitable, and eBusiness solutions could make a difference. The newly implemented training and services program could also generate profit.

Even if the company was not profitable in the next years, stock prices could rise and the investment would be profitable if investors saw profits on the horizon. Frances' assessment would have to strike a balance between the present losses and the prospect of growth and potentially large but uncertain future profits.

The net loss in the income statement left a strong impression on Frances. She knew that everybody at Caldera was confident that they were selling a great service and that eventually the company would take off. Still, she would have to think about how (and if) she should take the information provided in the financial statements into consideration when she made her decision.

2.5.3 Tax Implications of Exercising Stock Options

One of the most important aspects to keep in mind before making a decision were taxes. Non-qualified stock options have no preferential tax treatment (Bickley, 2012). Thus, Frances knew she would be taxed twice. First, for the bargain element of exercising options. And, second, for capital gains when she eventually sold the stock.[9]

An important factor was that Frances would need cash to pay for the stock and her taxes when she exercised her options. Because of the lock-up period of 180 days, her tax liability could not be offset by an immediate gain from selling the stocks at a higher price. Thinking about all this, Frances said to herself: “If I have to invest money at front to pay taxes, I need to be very cautious in my calculation of how much money I would actually make, or lose, if I were to sell the stocks eventually”.

When exercising options allows the investor to buy stock at a price below the market price, the money she saves is called a bargain element.[10][11] In the German tax code, this bargain element increases income in the same way an extraordinary cash bonus does. Therefore, Frances would be taxed on the bargain element of exercising the options. Frances gains from the bargain element fell under the top marginal tax rate of forty two per cent.[12] This simplified the calculations as the top marginal tax rate is flat in Germany and the progression of tax rates does not have to be taken into account.[13] Because Frances' mother was not an employee at Caldera, she would only need to calculate the tax on sale and not the tax on exercise.

The second time Frances would have to pay taxes was on selling her stock. Frances would need to declare capital gains on the sale, which, in Germany, is taxed at a flat rate (Abgeltungssteuer) of twenty five per cent.[14] In a nutshell, this capital gain is the gain an investor re-

9 In this case, we use the tax code of 2016 for our calculations. In 2000, Frances was subject to different tax rates and a different method for calculating the tax liability (half-income assessment method). However, as in 2016, she was taxed twice: when she exercised her options and when she sold her stock.

10 An important distinction has to be made between companies whose stock is already traded and companies before their IPO. Because there are no market prices available before the IPO, the company itself determines the fair market value of their stock. This is the price that is relevant for the calculation of the bargain element.

11 Importantly, the gain from the bargain element is only monetarily realized at the moment the investor sells the stock. When she exercises the option, she merely saves money compared to buying stock at market prices.

12 In her calculation, Frances had to consider an annual tax exemption (Freibetrag) applying to the bargain element of EUR360, converted at an exchange rate of 1.13 EUR/US$. She also considered the 5.5 per cent solidarity surcharge (Solidaritätszuschlag) on the tax payment.

13 The Federal Ministry of Finance provides a calculator of tax liabilities for all incomes on their website. If the annual income falls below the threshold of EUR53,665 per year, the tax liability can be easily estimated with this calculator. For incomes above this threshold, we can use the top marginal tax rate of 42 per cent to calculate the tax liability.

14 In her calculation, Frances had to consider the annual tax exemption (Freibetrag) on capital gains of EUR 801, converted at an exchange rate of 1.13 EUR/US$. She also considered the 5.5 per cent solidarity

alizes if she sells her stock at a higher price than the purchase price (In Frances case, the price at which Caldera went public).

Of course, there were no official stock prices to work with and it was quite difficult to estimate the price of the stock after the lock-up period. Therefore, Frances figured she would contemplate the exercise cost first. Second, she would calculate the potential proceeds of selling the stocks right after the lock-up period is over. Similar calculations for her mother would be necessary as well. “The best way to proceed is to analyze every possible scenario”, she thought.

Following Caldera's projections, the stock price at the day of the IPO would fall between US$7 to US$9. However, the company expected the price to go up before going public. Frances made the necessary calculations to estimate her tax liability. Would her savings be enough to pay the taxes? Was a loan to pay the taxes necessary? Was paying that much money in taxes even worth it? Above all, how could she predict the future stock price on the market?

2.6 Initial Public Offer Right Ahead

Starting between 1996 and 1997, the stock market experienced unparalleled overnight rises of stock prices of companies shortly after their IPOs. When tech-companies surprisingly triplicated their stock prices on the first day of trading, other companies hurried to file for IPO. Analysts expected the number of offerings of internet and technology related firms, or “Dot-com offerings”, to continue to grow in 1999. Factors for such sudden growth may have included access to the internet becoming relevant in everyday-life for business and private use, the open source movement becoming an industry, and tax changes, such as the Taxpayer Relief Act of 1997.[15]NASDAQ, the stock exchange housing most of the tech-companies’ stocks, grew along with the trend to approximately 5,000 points in 2000.

For Caldera, the moment of the IPO had finally arrived. All employees were very excited about the upcoming events. A year after the internal announcement, Caldera filed for IPO with the Securities and Exchange Commission (SEC) on January 10, 2000. The company expected the projected price of the stock to go up before going public and to raise an estimated US$57.5 million.

Caldera had reasons to be optimistic about the IPO. By the time Caldera – as an award-winning Linux products and services provider – would go public, investors would still be completely engaged with open source software. Those who decided to invest in the stock were sure there was still room for Linux companies to succeed on the stock market.

The news of the IPO did not come out of the blue in the industry. Rumors of Caldera going public circulated for months, making competitors and employees curious about the results. After competitor Red Hat’s stock had exploded in value the first day of trading (starting at US$14 and closing at US$52, giving the company capital value of approximately US$3 billion), and VA Linux had NASDAQ’s most successful first-day performance on record (going from US$30 to US$239.25 a share), Linux-related IPOs were closely followed on Wall Street.

surcharge (Solidaritätszuschlag) on the tax payment.

15 US tax-reduction legislation under which amounts that could be excluded from estate taxes increased and capital gains tax rate become lower.

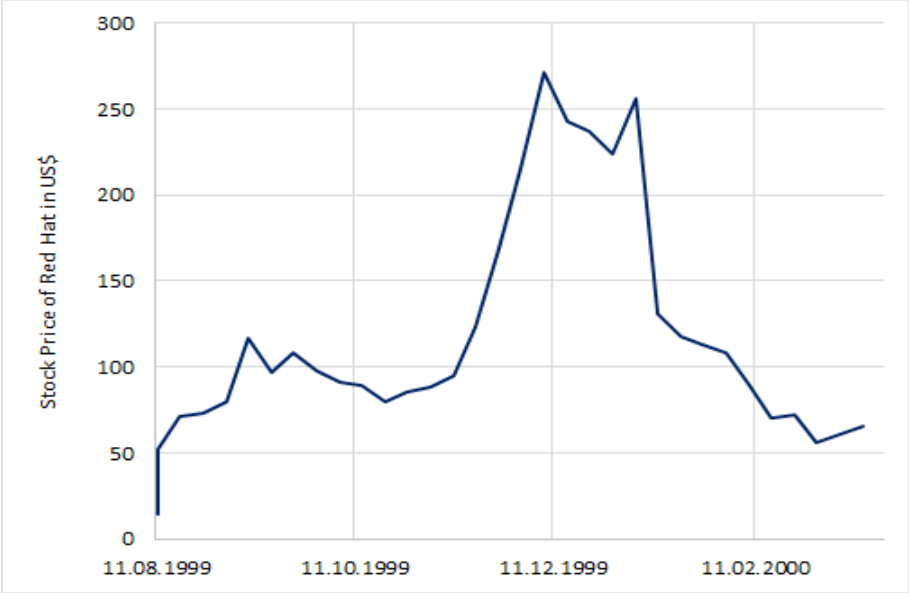

Figure 3: Development of Red Hat's stock market price

Figure 3 shows Red Hat's stock market price after the IPO.[16] The figure illustrates the large hike of the stock price on the day of the public offering. After the IPO, the price is very volatile, rising to over US$250 and falling back to a price around US$50 in the course of half a year.

With the success story of Red Hat's IPO in mind, everybody arrived early on the day of Caldera's initial public offering. It was not going to be a typical day at work.

16 The data was retrieved from Thomson Reuters Datastream.

Exhibit 1: Article on Linux and the Linux Business

COMPUTERWORLD QUICK STUDY

HOT TRENDS & TECHNOLOGIES IN BRIEF

Check out www.computerworld.com/more for more resources, Computerworld articles and links.

LINUX RESOURCES

▸ **Instructions on how to download Linux**
http://www.linux.org/help/beginner/install.html

▸ **Linux Journal**
LINUX JOURNAL
• A magazine for Linux users. It's available on newsstands, by subscription and online at http://www.linuxjournal.com

BOOKS

▸ **Using Linux**
Author: Bill Ball
Publisher: Que Education and Training
Date published: July 1998
Cover price: $29.99
For the beginner to intermediate user of Linux and geared toward the day-to-day use of the operating system

▸ **Linux for Dummies Quick Reference**
Author: Phil Hughes
Publisher: IDG Books Worldwide, a sister company to *Computerworld*
Date published: December 1997
Cover price: $14.99
A reference manual for Linux commands

CONFERENCES

▸ **1998 Atlanta Linux Showcase Conference and Exhibition**
Oct. 23-24 (following Networld/Interop '98 Atlanta)
Atlanta
For more information go to www.ale.org/showcase

▸ **The International Linux Conference and Exhibition**
Jan. 7-10, 1999
San Jose, Calif.
For more information go to www.lincexpo.org

■ *Are there technologies or issues you would like to learn about in QuickStudy? Please send your ideas to QuickStudy editor Stefanie McCann at* **stefanie_mccann@cw.com.**

Linux

DEFINITION: Linux (pronounced "lin-ucks") is an open-source, multitasking, Unix-like operating system. Multitasking allows Linux to run many programs at one time. The phrase "open source" means that Linux's source code is available free. Users can download the latest version from the Internet (www.ssc.com/linux/apps/ftp.html) or purchase the software on CDs, along with printed documentation and support, from vendors such as Red Hat Software, Inc. and Caldera, Inc.

Good (and bad) news: No one owns it

By Howard Millman

IN 1991, Linus Torvalds, a graduate student at Finland's University of Helsinki, wanted an alternative to DOS and Windows.

So he wrote his own version of Unix. In 1994, he released Linux 1.0. Since then, Linux has become one of the fastest-growing operating systems. The number of Linux users has almost doubled annually from 500,000 in 1994 to about 7 million this year.

The primary attraction of Linux is that it's open-source software, which means users can modify it to meet their needs without paying a licensing fee.

But there can still be a price tag involved with Linux. Pricing is based on services and support that are bundled with the operating system. Red Hat Software, Inc. and Caldera, Inc., the two major U.S. Linux players, sell the operating system, documentation, 60- to 90-day support and tools and applications. A multiuser version of Caldera's Linux sells for $199. A similar configuration of Microsoft Corp.'s Windows NT costs about $1,500.

Another reason for Linux's appeal is it runs on many platforms including older PCs with 386/486 CPUs, Apple Computer, Inc.'s Macintosh, Sun Microsystems, Inc.'s SPARC and 3Com Corp.'s PalmPilot.

Linux's other strengths include its stability, which makes it suitable as a server operating system for manufacturing and financial applications. Its high performance makes it especially suitable for multimedia — Linux generated the spectacular special effects for the movie *Titanic*.

Linux also spawns camaraderie among programmers. For example, if a programmer discovers a defect in the code, he fixes it and shares the patch with others. Thus Linux gets improved continuously.

Linux could be an alternative to Windows in many organizations, according to Bill Peterson, an analyst at Framingham, Mass.-based International Data Corp., which is a sister company to *Computerworld*.

According to a survey by Dataquest, a market research firm in San Jose, Calif., the number of companies using Linux increased 27% last year. Linux and Windows NT are the only enterprise-class operating systems whose market share is growing.

AT ISSUE
Will applications be available?

But not everyone is optimistic about Linux. Ted Schadler, an analyst at Forrester Research, Inc. in Cambridge, Mass., says he doesn't expect larger firms to adopt Linux.

Ironically, Linux's biggest benefit, the fact that no one owns it, is also its biggest drawback. Chief information officers want someone to be responsible for Linux, Peterson says.

Bottom line: If Linux is going to stay around, it will need applications to run on it. "Applications drive operating system sales," Peterson says. "The more quality applications available on Linux, the easier it is to sell Linux." □

Millman operates the Data System Service Group LLC, a consultancy in Croton, N.Y. Reach him at (914) 271-6883 or hmillman@ibm.net.

GLOSSARY

Distribution – A complete implementation of the Linux operating system. It includes the tools needed to modify it.

Kernel – The heart of the operating system. It manages memory, files and allocates hardware resources.

Man pages – Short for 'manual pages.' Documentation for Linux.

Open-source software – Software that is freely available and can be read, modified and redistributed. For example, the kernel and other operating system devices are open so developers can write to them and share them with others.

Source code – Program instructions in the original form.

Unix – A multiuser, multitasking operating system for workstations. It was meant to be used only by programmers and was one of the first operating systems written in C.

▸ **The Linux mascot** – Linus Torvalds personally chose this penguin because it looks content – what Torvalds believes Linux users are.

Urheberrechtlich geschütztes Material

Figure 4: Article about Linux and Caldera (Millman, 1998)

Exhibit 2: Caldera's Balance Sheet

	October 31		January 31	January 31
	1998	1999	2000	2000 Pro Forma Stock-holders' Equity
CURRENT ASSETS:				
Cash and cash equivalents	75,586	121,989	25,412,907	
Accounts receivable, net of allowance for doubtful accounts of $15,000, $90,000 and $134,000, respectively	151,546	670,043	823,339	
Stock subscriptions receivable	15,481,000	1,500,000	--	
Other receivables	--	375,000	--	
Inventories	49,746	169,409	114,415	
Other current assets	176,605	33,524	102,243	
Total current assets	15,934,483	2,869,965	26,452,904	
PROPERTY AND EQUIPMENT:				
Computer equipment	401,015	609,665	731,555	
Furniture and fixtures	332,915	675,181	708,249	
Leasehold improvements	50,514	86,973	86,973	
	784,444	1,371,819	1,526,777	
Less accumulated depreciation and amortization	(366,269)	(652,399)	(735,470)	
Net property and equipment	418,175	719,420	791,307	
INVESTMENTS IN NON-MARKETABLE SECURITIES:				
Affiliate	--	--	10,000,000	
Non affiliates	--	--	4,450,848	
	--	--	14,450,848	
OTHER ASSETS, net	--	124,430	851,233	
Total assets	16,352,658	3,713,815	42,546,292	
LIABILITIES AND STOCKHOLDERS' EQUITY				
CURRENT LIABILITIES:				
Accounts payable	314,138	1,309,255	1,344,553	
Accrued liabilities	112,948	450,157	608,559	
Accrued marketing development	--	172,900	217,900	
Accrued sales returns and other allowances	54,000	169,000	239,961	
Deferred revenue	--	38,080	143,535	
Current portion of long-term debt	--	3,698	--	
Payable to Caldera, Inc	15,163,890	--	--	
Related party payables	--	48,933	44,707	
Total current liabilities	15,644,976	2,192,023	2,599,215	
LONG-TERM DEBT, net of current portion	--	5,762	--	

– Table continues on next page –

COMMITMENT AND CONTINGENCIES				
STOCKHOLDERS' EQUITY:				
Preferred stock, $0.001 per value; 25,000,000 shares authorized – Series A convertible preferred stock, 6,596,146 shares designated, 6,596,146 shares outstanding at January 31, 2000 and note pro forma	--	--	6,596	--
Series B convertible preferred stock, 5,000,000 shares designated, 5,000,000 shares outstanding at January 31, 2000 and none pro forma	--	--	5,000	--
Common stock, $0.001 per value; 75,000,000 shares authorized, 16,000,000, 26,607,329 and 21,621,198 shares outstanding, respectively, and 33,217,344 pro forma	16,000	26,607	21,621	33,217
Additional paid-in capital	1,752,693	16,160,312	75,185,795	75,185,795
Stock subscriptions receivable	--	(1,500,000)	(1,500,000)	(1,500,000)
Deferred compensation	--	(2,734,934)	(6,683,831)	(6,683,831)
Accumulated comprehensive income (loss)	3,991	(4,365)	(20,131)	(20,131)
Accumulated deficit	(1,065,002)	(10,431,590)	(27,067,973)	(27,067,973)
Total stockholders' equity	707,682	1,516,030	39,947,077	39,947,077
Total liabilities and stockholders' equity	16,352,658	3,713,815	42,546,292	

Table 2: Caldera's Balance Sheet

Exhibit 3: Caldera's Income Statement

		Year Ended October 31			Quarter Ended January 31	
		1997	1998	1999	1999	2000
1	**REVENUE:**					
2	Software and related products	1,116,794	1,057,088	2,772,878	508,305	394,840
3	Services	--	--	277,429	29,908	158,359
4	Total revenue	1,116,794	1,057,088	3,050,307	538,213	553,199
5	**COST OF REVENUE:**					
6	Software and related products	1,142,187	1,016,682	2,388,601	220,523	294,802
7	Services	--	--	537,877	52,499	255,284
8	Write-off of prepaid royalties	--	1,381,695	--	--	--
9	Total cost of revenue	1,142,187	2,398,377	2,926,478	273,022	550,086
10	**GROSS MARGIN (DEFICIT)**	(25,393)	(1,341,289)	123,829	265,191	3,113
11	**OPERATING EXPENSES:**					
12	Sales and marketing (exclusive of non-cash compensation of $0, $0, $177,050, $0 and $487,132, respectively)	4,619,341	2,223,814	4,767,508	412,680	2,030,556
13	Research and development (exclusive of non-cash compensation of $0, $0, $103,070, $0 and $363,959, respectively)	2,136,118	1,489,041	2,302,302	391,125	964,740
14	General and administrative (exclusive of non-cash compensation of $0, $0, $129,176, $0 and $691,776, respectively)	796,806	1,798,872	1,748,087	272,890	1,078,510
15	Amortization of deferred compensation	--	--	409,296	--	1,542,867
16	Total operating expenses	7,552,265	5,511,727	9,227,193	1,076,695	5,616,673
17	**LOSS FROM OPERATIONS**	(7,577,658)	(6,853,016)	(9,103,364)	(811,504)	(5,613,560)
18	**OTHER INCOME (EXPENSE):**					
19	Interest expense	(593,182)	(1,081,179)	(225,657)	(167,830)	(547)
20	Other income (expense)	22,923	4,838	(2,792)	(7,715)	113,374
21	Other income (expense), net	(570,259)	(1,076,341)	(228,449)	(175,545)	112,827
22	**LOSS BEFORE INCOME TAXES**	(8,147,917)	(7,929,357)	(9,331,813)	(987,049)	(5,500,733)
23	**PROVISION FOR INCOME TAXES**	--	(33,780)	(34,775)	(5,390)	(12,650)
24	**NET LOSS**	(8,147,917)	(7,963,137)	(9,366,588)	(992,439)	(5,513,383)
25	**DIVIDENDS RELATED TO CONVERTIBLE PREFERRED STOCK**	--	--	--	--	(11,123,000)
26	**NET LOSS ATTRIBUTABLE TO COMMON STOCKHOLDERS**	(8,147,917)	(7,963,137)	(9,366,588)	(992,439)	(16,636,383)
27	**BASIC AND DILUTED NET LOSS PER COMMON SHARE**	(.51)	(.50)	(.51)	(.06)	(.67)
28	**WEIGHTED AVERAGE COMMON SHARES OUTSTANDING**	16,000,000	16,000,000	18,457,543	16,000,000	24,779,808
29	**BASIC AND DILUTED SUPPLEMENTAL PRO FORMA NET LOSS PER COMMON SHARE (unaudited)**			(.79)		(.81)
30	**BASIC AND DILUTED SUPPLEMENTAL PRO FORMA NET WEIGHTED AVERAGE COMMON SHARES OUTSTANDING (unaudited)**			11,861,397		20,477,974
31	**OTHER COMPREHENSIVE LOSS:**					
32	Net loss	(8,147,917)	(7,963,137)	(9,366,588)	(992,439)	(5,513,383)
33	Foreign currency translation adjustments	--	3,991	(8,356)	2,385	(15,766)
34	**COMPREHENSIVE LOSS**	(8,147,917)	(7,959,146)	(9,374,944)	(990,054)	(5,529,149)

Table 3: Caldera's Income Statement

3 Concepts

3.1 Open Source Business Models

A company's business model is a key factor for future performance and market share. Therefore, investors analyze business models to predict future stock values. For companies whose business depends on open source software – software that can be modified and distributed for free – coming up with a sustainable business model can be a challenge.

Authors of open source software hold copyrights for their source code and grant specific permissions for others to use and redistribute that code through an Open Source Initiative-approved license.[17] For a company, defining the business model starts with the license choice. Because the type of license is crucial when combining different pieces of software, the choice has implications for the commercial goal of the company (Lerner & Tirole, 2005). On the basis of license policies, we distinguish three categories of business models[18]:

GNU General Public License (GPL): The GPL license allows distribution and modification of code, but ensures that the source code of future developments of the software remains open, the same way the original software was. In sum, copy, distribution and modification of code is allowed as long as the changes remain open and under the same license. Companies with a GPL-licensed business model usually profit from support services such as maintenance and consulting to complement open source products.

BSD (Berkeley Software Distribution) licenses: BSD licenses are a family of licenses much more liberal regarding software distribution. BSD-style licenses allow future developments of the software to become proprietary as long as the BSD copyright is included. Companies with a BSD license business use open source code in derivative proprietary products, which can be openly commercialized.

Dual-licensing: Dual licensing is a combination of both, open source and proprietary licenses to obtain one software product. Usually, companies combine open source with proprietary licenses. Under this business model, companies can avoid the commercial restrictions of the open source license by obtaining the proprietary license, which allows for any commercial activity.

For years, companies have struggled with successfully combining open and proprietary software. Because open source companies have limitations when defining product differentiation and product pricing, they often barely make revenues. One way to generate revenue based on open source software is to add features or services which can be sold. In a nutshell, the company generates revenue by adding value to open source resources. Because such a business model usually relies on the exclusivity of the additions, companies with a commercial business strategy are more likely to choose licenses that allow them to restrict distribution and modification, such as BSD licenses. However, critics believe that by restricting distribution and modification, these companies also restrict innovation (Economides & Katsamakas, 2006; Krishnamurthy, 2003; Lerner & Tirole, 2005; Staiman & Tompson, 1998; Valimaki, 2003; West & Dedrick, 2001; West, 2003).

The continuous changes in Caldera's business model are a reflection of the company's struggle to implement a successful combination of open source and proprietary strategies. Red Hat, the acclaimed provider of a Linux operating system and Caldera's competitor, is the only company in the industry which successfully implemented such a hybrid business model.

17 An open source license is a set of policies, developers agree on when deciding to contribute to a project.
18 For more information on open source licenses refer to https://opensource.org/licenses

3.1 Stock Option Plans

Employees' compensation packages consist of three main parts. The first part and primary element is regular compensation, i.e. wages and salaries. The second part consists of additional benefits, such as health insurance or paid vacations. The third part is equity compensation. Equity compensation entitles employees to non-cash benefits to profit from a small (almost symbolic) share of ownership of the company. The most popular kinds of equity compensation are stock option plans and restricted stocks. A stock option represents the future right to buy or sell stock at a predetermined price (Khincha, 2002).

In the 1990s, most of the companies listed on well-known stock market indexes already offered some kind of extraordinary benefit package. Since then, the popularity of offering equity compensation has only increased (DeLong & Magin, 2006; Hall & Murphy, 2003; Kahle & Shastri, 2005; Liebig, 2001; West & Dedrick, 2001).

3.1.1 Employee Stock Options Plans: USA and Germany

Employee stock options' popularity in the United States has exponentially grown since the 1990s, especially for managerial positions. In 2000, Watson Wyatt Worldwide reported that eighty six per cent of employers offered ESOPs and nineteen per cent of all employees were eligible to participate in an ESO-program (European Commission, 2003). Since then, most companies have opened their programs to include employees in lower positions.

Although ESOPs are popular in Germany as well, the share of companies offering this form of compensation to employees is much smaller. The first companies to implement a stock-based compensation plan in Germany were Daimler-Benz and Deutsche Bank in 1996. Regardless of being two of the most powerful companies in the country, their decision was criticized at the time. One of the criticisms was that because employee stock options were not formally legalized in Germany until 1998, the companies had exploited a loophole to implement the programs. The number of companies implementing ESOPs has increased ever since. Today, two thirds of companies that are listed on the German stock index (DAX) offer ESOPs. However, DAX-listed companies represent only a low share of the overall number of companies in Germany (European Commission, 2003; Liebig, 2001; Sanders & Tuschke, 2007).

3.1.2 Employee Stock Option Plans: Motivation for Employers

One of the main arguments for implementing stock options plans is the alleged effect of ESOPs on employees. Companies believe that ESOPs improve the flow of information, help to develop entrepreneurial spirit and increase employee's interest and productivity by developing strong sense of involvement. By turning employees into shareholders, the plans allow employees to benefit from the success of the company more directly and create incentives to provide work effort to increase the company's success. Of course, one can argue that single employees actually have little influence in the company's financial performance and stock prices and, therefore, employee motivation should not be significantly increased by participating in the program.

The second advantage of an ESOP with respect to human resources revolts around personnel attraction and retention. Because grant agreements usually involve option vests of several years and become invalid if the employee resigns, retention rates increase. In startup companies, where individual employees are key to the structure of the company, retaining personnel can be crucial for success. ESOPs provide a tool to retain qualified employees without incurring the high cost of (cash) wages that reduces the company's liquidity (Engelhardt & Madrian, 2004; Niemman & Simons, 2002; Oyer & Schaefer, 2004).

Company culture may be influenced by ESOPs as well. Especially in startups, where it is easier to see how each single employee affects and makes up for the team and company as a hole, ESOPs can help create the sense of a community. Within a community, employees may perceive a strong sense of organizational fairness, leaving behind the special treatment figure for executives or specific employees (European Commission, 2003; Huddart & Lang, 1995).

Besides this employee-centric perspective, stock option plans are an attractive means to raise capital. For young technology companies with a strong orientation towards growth in need of funds, ESOPS may be the answer. Adding to these arguments for ESOPs are favorable tax treatment and simple accounting practices. The possibility to deduct the cost of ESOPs from the total tax burden may help to explain why companies turn to equity compensation.

In sum, a report by the European Commission categorizes reasons why companies offer employee stock options in three groups: motivation and productivity, personnel recruitment and retention and, capital and liquidity-related reasons (European Commission, 2003).

3.1.3 Employee Stock Option Plans: Motivation for Employees

Employee stock option plans offer employees an opportunity to participate in future increments of a company's value and success. By buying shares at a discounted price, employees have the possibility to benefit from the company's overall performance. Furthermore, because employees are entitled to a tiny portion of the company's earnings and assets, they become owners of the company.

3.1.4 The Nuts and Bolts of Employee Stock Option Plans

Employee stock options entitle employees to buy stock of the hiring company.[19] Stock options granted to employees are non-qualified stock options. The following explanation of concepts related to ESOPs is based on a number of sources that also provide additional details (Bickley, 2012; Crimmel & Schildkraut, 1999; Hall & Murphy, 2003; Ofek & Richardson, 2000; Pinedo & Tannenbaum, 2015; PwC, 2011; Thomas, 2001).

Usually, companies grant *call* options i.e. options to buy a predefined number of shares of stock at a fixed price and expiration date. *American* style options allow employees to exercise at any time after the predefined vesting period, while *European* style options allow for exercise only after the end of the predefined period. The life cycle and implementation of an ESOP usually involves the following stages:

Grant: Is the process under which a company offers the option to buy shares of stock. i.e. employees receive the option to buy stock. Although employees are not obligated to buy the stock, the grant is of contractual nature and is established under a legal document. The grant agreement specifies the characteristics of the plan, such as the number of options, the grant price and the vesting schedule. Typically, the grant price is lower or equal to the market price on the date of grant, which make options more attractive than buying stocks directly on the market.

Vesting: One of the conditions under which options are granted involves a lock-in period.[20] Vesting is the period during which employees have no right to exercise options, i.e. buy shares. Companies usually define a schedule for vesting periods, with a predefined amount of options opening for exercise at the end of each phase. Upon vesting, employees can exercise options following the conditions established at grant.

19 It is important to understand that ESOPs offer employees only the *option* to buy stock and do not provide the actual shares of stock directly.

20 Note that lock-in is not to be confused with lock-up (see below).

Exercising: Option exercise is the process by which an employee executes her rights over the options. When the stock is free for exercise, the option is called “vested”. In a nutshell, exercising options is the actual purchase of shares.

The lock-up: In order to avoid influencing stock prices with the new amount of available shares, employees fall under a lock-up period after exercising options. During the lock-up period the sale of the stocks is not allowed. The lock-up period expands up to 180 days and no employee is excluded from this rule.

Sale: For an employee to actually realize cash benefits, she needs to sell her stocks. The employee sells her acquired shares on the stock market. After the lock-up period, the time between exercising and selling options depends exclusively on the employee.

To clarify the definitions and to understand how stock options work, consider the following example: Employee E is working for company C and is granted options to buy 20,000 shares of the company's stock for US$5 per share. Options expire in 10 years. According to E's vesting schedule, options vest partially. Fifty per cent of the grant vests after two years and fifty per cent after four years. Thus, E has the following options regarding exercise: a) E exercises fifty per cent of the options after two years, b) E exercises one hundred per cent of the options after four years and c) E exercises one hundred per cent of the options after five or more years (but no longer than 10 years). E decides to exercise fifty per cent of the options after two years. The stock price after two years has increased to US$6. Because the price is predetermined in her option, she pays US$5 per share, despite the higher market price.

To continue with the example, we introduce a new concept: the **bargain element**. The bargain element is the difference between the market price of the stock at exercise and the grant price (also called *strike*), times the number of shares purchased. In our example, the bargain element is US$10,000 (market price of the stock after two years US$6 minus stock price at grant US$5, times 50 per cent of grant). The bargain element (also called *spread*) is the amount of money the employee saves compared to buying the stock at the market price, and the basis to calculate E's tax liability for exercising her options.

3.1.5 Taxation of Employee Stock Options

To introduce employee stock options' taxation, it is key to understand the difference between the two types of options, companies usually grant: qualified and non-qualified stock options. Non-qualified stock options or NSOs (also called non-statutory) are the most common type of stock options issued to employees. When employees exercise non-qualified stock options, the spread is taxed as income. After exercise, and sale of the stock, the employee declares capital gains on the profits and is taxed on the proceeds from the transaction. Qualified stock options (also incentive or statutory stock options) have a special, favorable tax treatment. Qualified stock options are, however, not easily granted. Qualified stock options are taxed on the profit of the sale as capital gains, and not at exercise on the spread. The following paragraphs discusses taxation of NSOs and draw on a number of different sources (Babenko & Tserlukevich, 2009; DechertOnPoint, 2009; Falk GmbH & Co. KG, 2011; Huddart, 1998; Liebig, 2001; Patzner, 2015; PwC, 2014).

Caldera Systems was a US company, subject to US legislation. However, taxation of employee stock options of the German subsidiary Caldera Deutschland GmbH fell under German jurisdiction. Tax regulations on employee stock options differ between the two countries. Yet, several aspects between the tax policies are similar. Because the steps an employee needs to follow to calculate her tax liability are the same in both countries, we begin with a discussion

of US legislation. Next, we discuss the key elements to consider when calculation tax liability under German legislation.[21]

Although the majority of countries' tax systems implement taxation on exercise, ESOPs may be taxed at different points in time, depending on specific country regulations. Under **US** tax law, non-qualified stock options are benefits from employment. Thus, the bargain element is taxed as income at ordinary tax rates (brackets) in the exercise year. In our example, E would have to pay taxes on the bargain element of US$10,000 she made when exercising her options. The tax bracket to calculate her tax liability depends on her martial status, salary, and other elements. US tax rates on ordinary income in 2016 are in the range of 10 and 39.60 per cent. Assuming E falls in the 39,60 per cent bracket, her tax liability for exercising the options would be US$3,960.[22]

When E decides to sell her stocks, she is taxed a second time. This time at the capital gains rates (0 to 20 per cent on her tax basis). The stock price of our exemplary company C has increased to US$10 when E decides to sell the stock. First, we need to calculate the tax basis, which is the difference between the market price on the sale date and the market price on the exercise date, multiplied by the number of shares sold. In short, the tax basis is the capital gain for the investor from selling her stock. In our example this is (US$10 * 10,000 – US$6 * 10,000 = US$40,000). This gain from selling the stock at the new market price is taxed at the corresponding capital gains tax bracket. Assuming that E falls under the twenty per cent capital gains tax rate, E's tax liability on capital gains is US$8,000. We can now calculate the total tax liability of E, i.e. the sum over the taxes paid on exercise, and the taxes paid on the capital gains: US$11,960.

The tax code in **Germany** is similar to the US code regarding employee stock options. The bargain element of ESOPs is treated as ordinary income and employees have to pay taxes on capital gains. There are three particularities, to keep in mind when calculating the tax liability in Germany. First, tax rates differ from the US. For the bargain element the income tax rates apply. Because of progressive marginal income tax rates, the tax rate for the bargain element depends on other sources of income. The top marginal tax-rate (which we use throughout the case) is 42 per cent. For capital gains, Germany implemented a flat tax rate of 25 per cent in 2009. The flat rate applies only if the employee holds less than 1 per cent of the share capital of the company. Second, in Germany, investors pay a 5.5 per cent solidarity surcharge (Solidaritätszuschlag) on the taxes owed for the bargain element and the capital gain. This increases the effective tax rates. Third, there is a tax-free amount of EUR360 for ordinary income and EUR801 for capital gains.[23] These tax-free amounts lower the tax base. To calculate the tax liability, subtract the tax-free amounts from the tax base before multiplication with the tax rates.

3.3 Initial Public Offering

When companies find themselves in need of capital, they have two primary sources of funds: debt and equity. The company may increase its debt by taking a loan. Or, the company may increase equity by selling the company's shares of stock at the stock market. When a private company becomes publicly held, i.e. its securities become open for trading on a stock market to the public for the first time, we are talking about an initial public offering (IPO).

21 Although Caldera's IPO happened in 2000, we provide an updated overview of US and German tax codes in 2016. The 2016 tax code should also be used in the solution of the case.

22 Ordinary income is income that is not the result of the sale or exchange of a capital assets. For more information on ordinary income and the US tax brackets for 2016 refer to ww.irs.gov

23 Tax-free amounts for single filers.

Going public increases the company's **available capital** and the company's **visibility**. After the IPO, companies have capital which they can allocate to re-investments, business expansion, research and development, or even to pay outstanding debts. Furthermore, thanks to the new market for its securities, stock can be used as partial payment in future merger or acquisition deals. However, companies not only increase their liquidity by going public, but also benefit from advantages such as visibility. Because highly qualified employees are interested in strong stock option plans and shareholders are interested in information regarding their investment, IPO-companies' visibility increases. Moreover, many companies value being listed on major stock markets as a sign of prestige and status[24].

However, going public can be challenging for the company. IPOs are expensive, they require disclosure of information and are often subjects of underpricing. Once a company has decided to file for IPO, a long, time-consuming, and expensive process begins. IPO-related **expenses** are high because the company needs to prepare reports, disclosures and organize its internal affairs. In addition, a large share of the total capital raised in the IPO has to be spent on underwriting fees for taking the company to the market. Additional expenses may include hiring specialists such as attorneys and accountants, expenses for public relations, stock exchange fees, audits and so on. A second disadvantage of going public is **disclosure**. In order to obtain the Securities and Exchange Commission certification, companies have to make financial statements, descriptions of business operations, management salaries and other internal information public. By allowing the public to invest in its stock, the company parially loses its privacy rights. Being subject to **underpricing** is one of the most discussed disadvantages of an IPO in comparison to other forms of raising capital. Underpricing happens when the pricing of shares in an IPO is below the shares market value i.e. the offer price is lower than the closing price on the first day of the IPO. When companies go public at a price below the first-day closing price, they may raise only a fraction of the capital they could have raised, had they open the IPO at the market price.

Next, we present the process a company filling for IPO usually follows. The first step of the IPO process is hiring an underwriter (bank) to take care of the IPO. Together, the company and the bank define how much capital the company expects (and needs) to raise with the IPO. The underwriter buys all the initial shares to sell them to the public at the predefined price. Usually, companies hire more than one underwriter.

The second step is the preparation and submission of documents to the Securities and Exchange Commission (SEC). In the United States, the SEC is the federal agency in charge of stock trading regulation and investors protections.[25] The company's securities need to be registered with the SEC with a registration file (or S-1 File) detailing the company's financial statements, business models and employee compensation. The document also reveals the plans of the company for the money raised in the IPO and potential risks for investors. The aim of the file is to provide information to the public interested in making an investment in the company.

With green light from the SEC, the underwriters prepare the prospectus. The prospectus is a document which summarizes key IPO information including the estimated stock price range. The process of sharing the prospectus with potential (big institutional) investors is called a road show. The road show is designed to awake interest in the IPO. Furthermore, if investors are willing to participate, offering shares at the price set before actually going public is allowed and known as IPO allocation. The road show helps to determine the final price of the

24 The three principal stock markets in the US are NASDAQ, New York Stock Exchange and American Stock Exchange. In Germany, the two biggest include the Frankfurt Stock Exchange and the Stuttgart Stock Exchange.

25 The corresponding institution in Germany is the Federal Financial Supervisory Authority or BaFIn (Bundesanstalt für Finanzdienstleistungsaufsicht). For further information see www.bafin.de.

IPO. Following, the SEC declares the registration statement effective and includes the final price, so that the company's stock can be bought and sold.

The IPO process ends with deciding how much stock is offered to investors. The day of the IPO, stock begins to trade on the stock market at the offering price previously defined. The opening price is ultimately determined by investors' behavior (demand for the stock) (Binay, Gatchev, & Pirinsky, 2007; Brau & Fawcett, 2006; Huyghebaert & Van Hulle, 2006; Pinedo & Tannenbaum, 2015; PwC, 2011).

3.2 Analysis of Financial Statement

Caldera's financial statement offers an opportunity to evaluate the company before the IPO. This section gives an overview of the information that is typically provided in the statement and describes indicators that aggregate the financial information and allow for an assessment of Caldera's past performance. More importantly, the indicators provide the groundwork for predicting the future performance, a pivotal factor for an investment decision.

When a company files for an IPO, it has to provide financial statements. For marketing purposes, the information from these statements is often included in the offering document. This gives investors and employees the opportunity to make an informed decision about stock purchases, i.e. the participation in an employee stock option plan. The financial statement includes four main sections. First, the balance sheet in the year of the IPO and one year prior to the IPO, showing what the company owes and owns. Second, the income statement, showing profits and losses. Third, the statement of changes in shareholder's equity, indicating changes in ownership. Fourth, the statement of cash flows, reporting on cash movements. In this case, we will focus on the balance sheet and the income statements as the two major sources of information for investors.

To make sense of the large amount of information the financial statement provides, investors often calculate ratios and other indicators with the available information. In a nutshell, these indicators show relationships between different items in the financial statement and allow the investor to assess a company's profitability, exposure to specific risks and overall performance. The following sections focus on simple indicators that are relevant for Caldera as a technology company. Indicators such as inventory turnover, that are important for manufacturing companies but are not relevant for Caldera, are not discussed. The indicators in this section were selected and are discussed based on (Davies & Boczko, 2005; Glautier & Underdown, 2001; Hail, 2002; Merrill Lynch, 2000).

3.2.1 Indicators on the Basis of the Balance Sheet

By offering a means to analyze what the company owes and owns, indicators that are based on the balance sheet allow us to quantify financial risks, future capital requirements, and the profitability of common stock in comparison to preferred stock. We also get a rough idea of the compensation of stock holders in case of a liquidation of the company (a possible worst case scenario).

The **current ratio** are current assets over current liabilities. Current liabilities are due within one year of the balance sheet date and current assets are the funds from which these debts are paid. The ratio reflects if the company is able to meet its obligations and how much capital is left to finance growth and to take advantage of opportunities.

The **debt to equity ratio** are total liabilities over total shareholder's equity. The indicator shows how much leverage the company uses to run its business. A lot of debt means larger ex-

penses to meet interest payments in the future and, in the case of short term debt, also vulnerability to changing interest rates for refinancing the debt.

The **book value per share of common stock** are total assets less liabilities over the number of common stock. The ratio is an indicator of how much money would accrue to each holder of common stock if the company was liquidated at book values. Of course, the bondholders and preferred shareholders would have to be satisfied first.

The **common stock ratio** is common shareholders' equity over total equity, i.e. the sum over debentures, preferred stock, and common shareholders' equity. The ratio shows the structure of Caldera's capital. Because bonds' interest must be paid first and preferred stockholders receive dividends before common stockholders, a low common stock ratio makes holding common stock less attractive.

3.2.2 Indicators on the Basis of the Income Statement

The income statement is the primary source of information on a company's performance. When analyzing the income statement, an important distinction has to be made between young and mature companies. While mature companies should usually make profits in an average year, young companies can run a deficit and still provide an attractive investment opportunity. Caldera, a young company, can run deficits and be profitable in the future. An analysis of the deficit can help us understand if and why we expect future profits.

The **net earnings per common share** is net income (loss) over the number of common shares, i.e. the earnings (losses) that accrue to each share.

The **operating margin** is operating income (loss) over net revenue. The indicator shows the profit (loss), the company makes for each dollar in revenues.

The **gross profit margin** is the gross margin over sales. The measure shows company earnings before operating expenses for administration, marketing, and research. Operating expenses represent recurring costs and are important for future profits. However, by not taking operating expenses into account, gross profit margins can be a good indication of future profits if we expect a future decline in operating expenses (e.g. in a maturing company).

The **leverage**, i.e. the amount of outstanding preferred stock and bonds relative to common stock becomes particularly important if the company is running losses.[26] If we expect no profit in the future, leverage and thus interest payments should be comparably low because they drain capital and can result in eventual insolvency, if the company is not able to raise new capital to satisfy interest payments. Because of this risk and the exposure to the risk of changes in interest rates, conservative investors prefer stock with low leverage.

The financial statement also allows for an analysis of the **cost structure** of the company. In particular, we can distinguish between different types of operating costs. Whereas expenses for research and development can represent long term investments high administrative costs can be an indicator of inefficiently run operations.

26 Preferred Stock is similar to bonds in that they pay a fixed dividend.

4 Teaching Guide

4.1 Case Summary

The case tells the story of Frances Feldberg, a software developer at Caldera Deutschland GmbH, the German subsidiary of US company Caldera Systems Inc. When the case introduces the reader to the Linux products and services provider Caldera in the spring of 2000, the company is preparing to file for its initial public offering (IPO). Frances, in her role as an employee and stock options holder, is trying to figure out the best way to benefit from the situation. Furthermore, Frances invites her mother to participate in the Friends and Family program, where an exclusive list of employee's relatives can buy stock at the IPO price.

After a brief introduction, the case is broadly structured into six sections. First, a brief introduction of the Linux Industry provides information about Linux and the companies in what we call the Linux industry. Because Linux is an open source software, the business models of companies in this industry are different from the classical business model of propietary software companies such as Microsoft. The section provides insight into this unique industry and first information on the rapid growth of the market. By the end of the section, the reader has an impression of the foundation of the optimism and enthusiasm of people working in the industry at the time of Caldera's IPO.

Building on the information on broader ramifications and market environment in the first section, the second section provides more detailed information about Caldera and its business model. Although, at the time of the IPO Caldera is still a young company, it had already undergone fundamental changes in its business model. The section introduces Frances' European branch of the company and discusses the caveats of Caldera's business model. The information about Caldera consistently running losses shed some doubt on the positive previous assessment. Thereby, the section provides Frances and the reader with a counterpoint to the optimism and rapid expansion of the industry.

We then turn to stock options. In section three, the case guides the reader through the most important aspects of employee stock option plans. After providing a brief overview of the nuts and bolts of employee stock option plans, the case explains the specifics of the Friends and Family program at Caldera. Then, the reader learns about exercising options and the specifics of lock-up periods.

The prior section set the stage for Frances' and the reader's main task: Making a decision about whether to participate in the employee stock option plan. Mirroring the structure of the previous sections, the fourth section sets up determinants of the decision in two parts. On the one hand, information on the software industry's recent success on the stock market provides the backdrop for Caldera's IPO. The information highlights the positive outlook of the market and an apparently low market risk. On the other hand, the case discusses Caldera. Here, the case briefly mentions Caldera's financial statements. The reader has access to the balance sheet and the income statement with in depth information for up to three years prior to the IPO. On the basis of these statements, the reader can dissect the business model of Caldera and gain quantitative insights supporting the previous qualitative information on the business model. The section ends with a discussion of the tax implications of stock option plans. Importantly, at the time of exercising stock, employees are already taxed. The case highlights this aspect and explains the tax treatment of beneficiaries of the Friends and Family program.

The fifth section discusses the details of Caldera's IPO and provides information on Red Hat's IPO and stock market price. As a competitor of Caldera, Red Hat provides an opportunity for Frances to form expectations about Caldera's future stock price.

The supporting materials provided with the case include necessary concepts and theory to guide readers through the calculations. The case offers a range of information and data. The data from financial statements and the figures on stock market prices are meant to provide a basis for predictions of future stock market prices and the market prices of Caldera's shares on the day of the IPO. Furthermore, the case mentions baseline data that should always enter the calculation:

- Granted options: 5,000
- Grant price: US$3.28
- Vested stocks (25 per cent): 1,250
- Lock-up period: 180 days
- Frances' annual salary: EUR60,000
- Tax bracket on labor income: 42 per cent plus 5.5 per cent solidarity surcharge
- Tax exemptions: EUR301 on income tax and EUR801 on capital gains
- Tax rate on capital gains: 25 per cent flat rate plus 5.5 per cent solidarity surcharge
- Estimated IPO price: between US$7 and US$9

4.2 Teaching Objectives

The case combines information on open source software, business models, the stock market, employee stock option plans, tax codes, stock market data, and financial statements. By providing this broad range of information from different areas, the student learns to consider different sources of information and put skills and tools from different areas of business management to use.

The teaching objectives are fourfold. First, the student understands the chances and obstacles for open source business models. The student becomes familiar with Linux as an operating system and how a business can make a profit, despite the software being open source.

Second, the student acquires a sound understanding of employee stock option plans. In particular, she learns how to calculate her tax liability when participating in an ESOP. The objective extends to tax implications of participating in stock option plans.

Third, the student learns how to differentiate between different sources of information and associated risks, when making an investment decision. She learns how to interpret financial statements and to retrieve relevant data to argue for or against investment. In particular, after solving the case, she knows about two kinds of risks for an investment, systematic and unsystematic risks. The systematic market risk relates to the performance of an average company of the software industry on the stock market. Evaluating the performance of an index of software companies shares helps to predict the future developments of shares listed on the market. The unsystematic risk relates to the future performance of the company she is investing in. Here, she gets an understanding of how to read financial statements and extract information that is relevant for shareholders. In a successful solution of the case, the student supplements this quantitative information with qualitative information on the Linux industry and business model.

Finally, fourth, the bust following Caldera's IPO offers an opportunity to teach the student about risks that are hard to anticipate. Because busts of investment bubbles are not easy to spot, the decline of the stock market price of Caldera offers the student a possibility to reflect upon investment decisions. Foremost, it provides a cautionary tale showing that a sound financial strategy of an employee should take an unforeseen drop in stock market prices into account.

In sum, the objective of the case is to cover the open source business models, technical knowledge on employee stock market options, a grasp on how to make a choice on such an investment decision as an employee, and a cautionary ex-post assessment of such choices. The student comes up with different scenarios and takes alternative (negative and positive) developments into account when she makes her choice.

4.3 Teaching Plan and Case Analysis

4.3.1 Class Discussion

The case offers room for a variety of topics for discussion. Before discussing the actual case, the class can exchange views on why companies offer employee stock option plans in the first place. How do the incentives for an employee change if she becomes a shareholder? Are there other reasons why employees are attractive shareholders for the company? What is the downside? Why were Linux companies attractive to investors in 1999 and 2000?

The class then discusses the ramifications of the case. Can businesses such as Caldera's be profitable although they relate to open source software? What are alternative services and business models? Is Caldera a typical company in this industry or has Caldera's business model specific flaws that other companies' models do not share? How has the industry changed since 2000?

For the discussion of the case, i.e. Frances' decision, the class is divided into Group A and Group B. One of the groups comes up with arguments in favor of participating in the employee stock option plan. The other group counters these arguments. Importantly, the arguments that relate to information that Frances did not have when she made her decision, e.g. the bust of the Dot-com bubble, are not valid.

The focus of the discussion should revolve around Frances choice. Did Frances exercised the stock or not? Which sources of information should Frances have considered? What would the student have done? An important question is how the student came up with the scenarios and how the student made her decision on the basis of these scenarios. Are there any alternatives to an analysis of scenarios?

Continuing, the discussion should be led to the outcome of the case. The bust of the investment bubble is a low frequency event. Therefore, it is difficult to anticipate the bust as an employee. Are there signs for investment bubbles? The npr "planet money" podcast episode "Bubbleicious"[27] offers a discussion of signs for a bust of a potential current Silicon Valley bubble in 2016. Some signs such as prices of luxury goods that are attractive to managers in the industry in question that can hint at an investment bubble. The signs make for interesting anecdotal evidence and the class might be able to come up with other indicators. Finally, the class can discuss the likelihood of a new investment bubble in companies such as Amazon and Facebook. What is their business model? Are these companies' stock over-valued? What are the main differences and similarities between the then and the current tech-hype?

27 http://play.podtrac.com/npr-510289/npr.mc.tritondigital.com/NPR_510289/media/anon.npr-mp3/npr/pmoney/2015/10/20151009_pmoney_pmoneypod.mp3?orgId=1&d=841&p=510289&story=447253579&t=podcast&e=447253579&siteplayer=true&dl=1

Finally, the class should discuss the risk related to the tax liability on exercise day. Because of the tax treatment of the bargain element, some employees at Caldera had to take up a loan to finance taxes. When the promise of a capital gain did not hold up in the future, this resulted in a financial problem for some employees. The class should discuss this aspect and think about how to take this problem into account when making an investment decision.

4.3.2 Assignment

The students use the information given in the case to answer the questions: Should Frances exercise her vested options? Should Frances' mother participate in the Friends and Family program? The solution of the case should consider inputs from a quantitative and qualitative analysis of the industry and Caldera as a company. The student has to support her decision with a concrete calculation of profits, taking into account taxes.

4.3.3 Scenario Analysis as a Basis for the Choice

The scenario analysis is based on the development of the market index for software companies and the information provided about Caldera's business model and key financial statements (balance sheet and income statement).

During the 12 months prior to Caldera's IPO, stock market prices of other software companies had a very positive development. Although it should be clear that this unmitigated growth could not go on indefinitely, one could expect a further increase of prices. Taking the information about Caldera into account should dampen expectations by some extent because the business model was unlikely to produce large streams of revenue in the immediate future. Hint about this in the case are in sections:

- The Industry
- The Company: History and Business Model
- Making a Decision
- Initial Public Offering – Right Ahead

Realistic scenario: The analysis first leads us to the realistic scenario. The scenario makes predictions on stock market prices that appear most likely given the information in the case. On the basis of the large increase in the market price of Red Hat's stock on the day of its IPO and the positive outlook for the industry, we predict that the market price on the day of the IPO will slightly exceed Caldera's prior expectations. To come up with a projection for the price after the lock-up period, one posibility is to assume that Caldera's stock market price will closely follow the projection of the market index's development. This would mean that the price would roughly double within the following 12 months and would be around 50 per cent higher, 180 days after the IPO. Taking into account that despite a large and growing market for internet applications, Caldera had some issues with the sustainability of its business model, we slightly lower the expected price increase to 25 per cent. Supporting the lowering of expectations is the information from the financial statements. Although the IPO will provide much needed liquidity the continuous net loss overshadows the favorable structure of equity with a 100 per cent share of common equity by the end of 2000. This results in a predicted market price on the exercise day of US$8 and a predicted market price on the sale day of US$10. After taking taxes into account, we arrive at two central findings. First, Frances will have to pay a large sum up front for taxes related to the bargain element on exercise day. Second, Frances will make a capital gain when she sells the stock after the lock-up period under the realistic scenario. Frances mother does not have to pay taxes on exercise day and realizes a considerable capital gain, due to the increasing share prices.

Optimistic scenario: For the optimistic scenario, we assume a higher price on exercise day. The optimistic scenario reflects the general optimism and enthusiasm at Caldera. Here, we assume that Caldera's stock market price development exceeds the increase in the market index. The large and growing potential of Linux as an operating system supports the optimistic assessment. The optimism also reflects investor confidence in the Dot-com market before the bust. Under this scenario, we arrive at a price of US$20 on exercise day and a market price of US$30 after 180 days. Again, this results in a large tax liability on exercise day and a much larger capital gain after 180 days than under the realistic scenario. Although a price of US$30 might seem overly optimistic at first glance, the prediction also reflects the possibility of Frances' taking advantage of a temporal price hike such as Red Hat experienced, when share prices rose from around US$50 to over US$200 in the course of few months. For Frances' mother, the scenario has similar implications. Other than Frances, she only profits from the large increase in market prices.

Pessimistic scenario: Because there is little information on the bust of the stock market bubble and, at the time, many employees at Caldera did not foresee this development, we do not account for a potential bust in the pessimistic scenario. Still, the scenario takes into account doubts about Caldera's business model and the financial soundness of the company. The scenario also acknowledges the possibility that after very strong growth of stock prices in the past year, there could be a downward adjustment in the future. The scenario predicts a market price of US$5 on exercise day and no increase in the stock market price in the following 180 days. The small capital gains and bargain element result in a small tax liability. Frances still makes a capital gain because of the price difference on exercise day. Her mother does not make a profit but neither looses money.

4.3.4 Evaluating the Choices (Ex-post)

The data on the actual development of Caldera's stock market price allows for an accurate ex-post analysis of Frances' decision in the classroom. Because of the lock-up, Frances earliest opportunity to sell her stock is on September 18, 2000. We assume that the outlook is bleak at this point of time and that Frances actually decides to sell her stock.

Figure 5 shows the development of Caldera's stock price and reflects the bust of the Dot-Com bubble. After an initial increase outperforming the predictions to US$29.44 on exercise day, stock prices rapidly fall to US$5.41 at the end of the lock-up period.

We now can make a back of the envelope calculation of Frances and her mothers' loss. Table 2 shows the calculation. Both Frances and her mother incur considerable losses. Frances looses US$3,095. Her mother looses US$2,577. Frances larger losses are partly due to the tax she paid for the bargain element on exercise day.

Exhibit TN-1: Caldera's Ex-post Performance

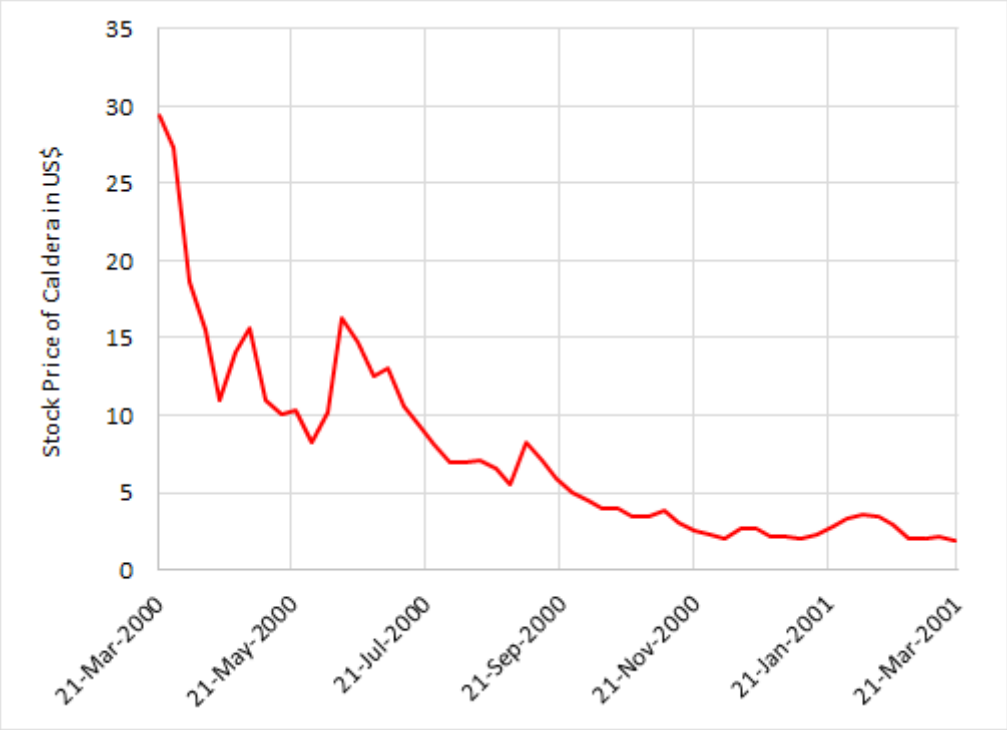

Figure 5: Development of Caldera's stock market price

Exhibit TN-2: Ex-post Analysis of Choices

	Frances	Frances' mother
OPTIONS & MARKET PRICES:		
Number of stock options	5,000	300
Number of vested stocks*	1,250	
Exercise price	3	
Market price on exercise date	14	14
Market price on sale date[1]	5	5
EXERCISING THE OPTIONS:		
Cost of shares	4,100	4,200
Taxes:		
Bargain element	13,400	
Tax exemption (Freibetrag)**	407	
Taxable bargain	12,993	
Effective tax rate (42% Spitzensteuersatz)***	.44	
Tax liability upon exercising options	5,757	
TOTAL COST OF EXERCISING OPTIONS	9,857	
SALE OF SHARES:		
Capital gain from sale	(10,738)	(2,577)
Taxes:		
Tax exemption (Freibetrag)[2]	905	905
Taxable capital gain from sale	--	--
Tax rate (capital gains tax)[3]	.26	.26
Tax liability upon sale	--	--
GROSS PROCEEDS	**6,763**	**1,623**
COST OF SHARES	**4,100**	**4,200**
TOTAL TAX LIABILITY	**5,757**	**--**
NET PROCEEDS	**(3,095)**	**(2,577)**

Table 4: Calculations for ex-post analysis of Frances and Frances mothers' investment[28]

28 Notes in the table:
* 25 per cent of granted stocks vested in the first year, according to Frances' vesting schedule.
** Annual tax exemption (Freibetrag) of EUR360 at an exchange rate of 1.13 EUR/US$.
*** Frances' salary falls under the 42 per cent top tax rate (Spitzensteuersat) plus 5.5 per cent on solidarity surcharge (Solidaritätszuschlag) on the tax payment.
[1] Frances' estimation of Caldera's stock market value after 180 days (Frances) and at the sales date (mother)
[2] Annual tax exemption (Freibetrag) on capital gains of EUR801 at an exchange rate of 1.13 EUR/US$.
[3] Capital gains flat rate of 25 per cent (Abgeltungssteuer) plus 5.5 per cent on solidarity surcharge (Solidaritätszuschlag) on the tax payment.

4.4 Master Solution

The solution proceeds in three steps. In the first step, we provide a brief analysis of the industry and its stock market price index. In the second step, we turn to Caldera and provide a qualitative and quantitative assessment of the company's performance. The third step is a synthesis of the industry and company analysis. On the basis of our findings, we develop three scenarios for an investment, taking into account the tax implications.

4.4.1 The Industry

Two aspects of Caldera's market segment in the software industry are relevant to Frances' decision. First, its open source nature. Because Caldera's products depend mainly on open source software and code, a discontinuation in development could mean the end or interruption of Caldera's product development at any point in time. Second, the market growth for Linux as the preferred operating system may not realize.

Overall, the past performance of stock market prices of companies in the software industry provides a positive outlook for Caldera's IPO. The eventual bust of the investment bubble was hard to anticipate for Frances. However, because the market segment is different from that of established companies, there is still a lot of uncertainty regarding future performance that Frances should consider.

4.4.2 Caldera

Turning to Caldera as a company, we first provide a qualitative assessment of Caldera's products and business model. We then turn to a quantitative analysis on the basis of Caldera's financial statements.

Although Caldera's products have proven to be successful and generate revenue, the company's new focus on eBusiness represents a shift in the product line with uncertain implications for future revenue. So far, the company performance has been tied mainly to the sales of different versions of *OpenLinux*. It is unclear whether sales of new products could be as successful for revenues to increase or remain stable. Overall, Caldera is not a mature company and has experimented with several business models. The current business model has no record of success in the industry and represents a high risk for the future of the company.

We structure the analysis of Caldera's financial statements around four aspects that determine the company's value and performance. First, we analyze profitability, i.e. the relationship between revenue and costs. Second, we investigate Caldera's cost structure. Third, we analyze liquidity, i.e. Caldera's financial solvency, and fourth, we evaluate financial risks.

Profitability: The first thing to note is a continuous negative operating margin since 1997 and a net loss of 22 cents on the dollar for common stockholders in 2000 (line 29 of the income statement).[29] This highlights that an investment in Caldera is essentially an investment in expected future performance. If the company does not turn a profit eventually, an investor is bound to lose money due to falling stock prices. Even if we do not take operating expenses into account, i.e. by looking at the gross profit margin, the profitability is low. This implies that if Caldera lowers operating expenses for marketing and research in the future, it would still have to lower costs of revenues or increase revenues to make a significant profit.

Liquidity: The current ratio and debt to equity ratio show that Caldera had considerable liabilities and was in need of capital before the IPO. A successful IPO would provide new funds

29 The loss is higher if we take the dividend into account. The dividend to preferred stock holders was paid for a conversion to common stock in 2000 and is thus a singular event. The dividend mostly compensated preferred stock holders for conversion of 5,000,000 shares at $6.00 with an estimated fair price of $8.00.

to the company. More than only adding to existing funds, the numbers suggest that the IPO is essential to finance Caldera's future growth. Leverage of Caldera, measured by interest expenses over operating expenses and cost of revenue is low in the year of the IPO.[30] On the one hand, the low current leverage is attractive for an investor. On the other hand, there might be a need for higher leverage in the future to cover operating expenses due to the continuous net loss.

Cost structure: The relationship of operating expenses to cost of revenue is roughly 10:1. Half of Caldera's operating expenses are due to sales and marketing costs. This is not surprising, as Caldera provides services related to an open source software that is to a large extent developed by the open source community. A potential risk factor for the future is a sharp increase in the share of administrative costs in 2000. Because these costs are not representing investments in future products or their profitability, the high administrative cost could erode future profits.

Financial risks: In terms of capital structure, an investment is attractive. The common stock ratio is high. Because the debt is entirely of short term nature in 2000, there is no bond interest. Of course this lack of funding through bonds could reflect Caldera having difficulties financing over capital markets at attractive interest rates. This would be an indication that banks consider Caldera a risky investment.

In sum, the analysis reveals a low profitability which lowers the attractiveness of an investment. At a price of US$8.00 per share, the book value per share seems low with only US$1.20. This reflects the fact that an investment in Caldera is primarily an investment in the future market potential of the company. The financial statement suggests that the IPO comes at a crucial point for the company, providing an important source of liquidity. Despite the low financial risk, the financial statement also shows that an investment is risky. Primary risks for an investment are a low gross profit margin and high administrative expenses that put the company's ability to create profits in the future into doubt.

4.4.3 Tying it Together: Scenario Analysis and Tax Implications

With this insight into Caldera's financial performance, we now proceed with the analysis of three possible scenarios, to evaluate the outcome of exercising the options: realistic, optimistic and pessimist. The realistic scenario is the most likely outcome, the other scenarios provide bounds for more positive and negative developments. For each scenario, we have to predict two prices, the market price of a share on exercise date and the market price on the sale date.

In light of the very positive past performance of the market and the success of competitors' IPOs, we predict a stock price on exercise date that exceeds Caldera's prior estimations of US$ 7 in the realistic (US$8) and optimistic scenario (US$20). Under the pessimistic scenario with a price of US$5, the price is still US$2 higher than the option price of US$3.28. This implies a significant tax liability for Frances due to the bargain element under all scenarios.

In the second step, we predict the stock market price after the lock-up period. The difference between this price and the market price on exercise date determines Frances capital gain from selling the stock. We predict a realistic sales price of US$10, an optimistic sales price of US$30 and a pessimistic sales price of US$5. The moderate increase in the realistic scenario is based on considerable risks that are apparent in the analysis of Caldera's financial statement and the uncertainty of future profits under the current business model. The better performance under the optimistic scenario reflects the general optimism in the market and the market po-

30 The drop in interest expenses between the first quarter of 1999 and 2000 is due to a conversion of Secured Convertible Promissory Note payable to The Canopy Group into common stock during fiscal 1999.

tential for Linux services. For the pessimistic scenario, a decrease under the market price on exercise day remains still unlikely, given the funds and possibilities for growth the capital raised through the public offering provides.

Taking taxes into account, Frances makes a profit under all scenarios. For Frances mother, the investment is more attractive, as she does not have to pay taxes for the bargain element. She is furthermore not subject to the lock-up period and has therefore more flexibility regarding the point of time when she sells her stock.

4.4.4 Conclusion

Because of the profits under all scenarios, we recommend that Frances and her mother take advantage of the opportunity the employee stock option plan and the Friends and Family program provide.

Exhibit TN-3: Analysis of the Financial Statement

BALANCE SHEET BASED INDICATORS				
	1998	**1999**	**2000**	**2000**[31]
Current Ratio……	1.02	1.31	10.2	
Debt to Equity Ratio……	22.1	1.45	0.07	
Debt to Equity Ratio w/o liability to Caldera Inc……...	0.68	1.45	0.07	
Book value per share of common stock...	US$0.04	US$0.06	US$1.85	US$1.20
Common stock ratio…….			0.65	1.00

INCOME STATEMENT BASED INDICATORS					
	1997	**1998**	**1999**	**1st Q 1999**	**1st Q 2000**
Loss per common share w/o dividend…..	-0.51	-0.50	-0.51	-0.06	-0.67
Operating margin…….	-6.8	-6.5	-3.0	-1.5	-10.1
Leverage[32]……	-0.07	-0.14	-0.02	-0.12	< -0.01
Gross profit margin……..	-0.02	-1.27	0.04	0.49	0.01

Table 5: Indicators on the basis of Caldera's Financial Statement

31 Pro-forma stockholders' equity.

32 We use interest expense over operating and expenses and cost of revenue as our measure of leverage.

Exhibit TN-4: Analysis of Taxes and Scenarios

	Frances			Frances' mother		
	Realistic	**Opt.**	**Pess.**	**Realistic**	**Opt.**	**Pess.**
OPTIONS & MARKET PRICES:						
Number of stock options……..	5,000	5,000	5,000	300	300	300
Number of vested stocks*..……..	1,250	1,250	1,250			
Exercise price……...	3	3	3			
Market price on exercise date……..	8	20	5	8	20	5
Market price on sale date[1]……	10	30	5	10	30	5
EXERCISING THE OPTIONS:						
Cost of shares……...	4,100	4,100	4,100	2,400	6,000	1,500
Taxes:						
Bargain element…….	5,900	20,900	2,150			
Tax exemption (Freibetrag)**……..	407	407	407			
Taxable bargain……..	5,493	20,493	1,743			
Effective tax rate (42% Spitzensteuersatz)***……	.44	.44	.44			
Tax liability upon exercising options….	2,434	9,081	772			
TOTAL COST OF EXERCISING	6,534	13,181	4,872			
SALE OF SHARES:						
Capital gain from sale…….	2,500	12,500	--	600	3,000	--
Taxes:						
Tax exemption (Freibetrag)[2]……..	905	905	905	905	905	905
Taxable capital gain from sale..……..	1,595	11,595	--	--	2,095	--
Tax rate (capital gains tax)[3]……	.26	.26	.26	.26	.26	.26
Tax liability upon sale……	421	3,058	--	--	553	--
GROSS PROCEEDS	**12,500**	**37,500**	**6,250**	**3,000**	**9,000**	**1,500**
COST OF SHARES	**4,100**	**4,100**	**4,100**	**2,400**	**6,000**	**1,500**
TOTAL TAX LIABILITY	**2,855**	**12,139**	**772**	**--**	**553**	**--**
NET PROCEEDS	**5,545**	**21,261**	**1,378**	**600**	**2,447**	**--**

Table 6: Tax liability in different scenarios[33]

33 Notes in the table:

* 25 per cent of granted stocks vested in the first year, according to Frances' vesting schedule.

** Annual tax exemption (Freibetrag) of EUR360 at an exchange rate of 1.13 EUR/US$.

*** Frances salary falls under the 42 per cent top tax rate (Spitzensteuersat) plus 5.5 per cent on solidarity surcharge (Solidaritätszuschlag) on the tax payment.

[1] Frances' estimation of Caldera's stock market value after 180 days (Frances) and at the sales date (mother)

[2] Annual tax exemption (Freibetrag) on capital gains of EUR801 at an exchange rate of 1.13 EUR/US$.

[3] Capital gains flat rate of 25 per cent (Abgeltungssteuer) plus 5.5 per cent on solidarity surcharge (Solidaritätszuschlag) on the tax payment.

Appendix A

BALANCE SHEET BASED INDICATORS

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

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

$$\text{Book Value per Share of Common Stock} = \frac{\text{Total Assets} - \text{Liabilities}}{\text{Total Common Shareholders' Equity}}$$

$$\text{Common Stock Ratio} = \frac{\text{Total Shareholders' Equity}}{\text{Total Equity}}$$

INCOME STATEMENT BASED INDICATORS

$$\text{Net Earnings per Common Share} = \frac{\text{Net Earnings}}{\text{Total Number of Common Shares}}$$

$$\text{Operating Margin} = \frac{\text{Operating Income}}{\text{Net Revenue}}$$

$$\text{Gross Profit Margin} = \frac{\text{Gross Margin}}{\text{Sales}}$$

Table 7: Formulas for the analysis of financial statements

References

Babenko, I., & Tserlukevich, Y. (2009). Analyzing the Tax Benefits from Employee Stock Options. *The Journal of Finance*, *64*(4), 1797–1825.

Bickley, J. M. (2012). Employee Stock Options : Tax Treatment and Tax Issues. *Congressional Research Service*.

Binay, M. M., Gatchev, V. A., & Pirinsky, C. A. (2007). The Role of Underwriter-Investor Relationships in the IPO Process. *The Journal of Financial and Quantitative Analysis*, *42*(3), 785–809.

Brau, J. C., & Fawcett, S. E. (2006). Evidence on what CFOs Think About the IPO Process: Practice, Theory, and Managerial Implications. *Journal of Applied Corporate Finance*, *18*(3), 107–117.

Crimmel, B. L., & Schildkraut, J. L. (1999). National Compensation Survey Collects Test Data on Stock Option Plans. *Compensation and Working Conditions*, 17–20.

Davies, T., & Boczko, T. (2005). *Business Accounting and Finance* (Second Ed.). McGraw-Hill.

DechertOnPoint. (2009). *New German Capital Income and Capital Gains Laws Mean Increased Taxes for Investors*. Munich.

DeLong, B. J., & Magin, K. (2006). A Short Note on the Size of the Dot-com Bubble. *National Bureau of Economic Research.*, (No. w12011).

Economides, N., & Katsamakas, E. (2006). Two-Sided Competition of Proprietary vs. Open Source Technology Platforms and the Implications for the Software Industry. *Management Science*, *52*(7), 1057–1071.

Engelhardt, G. V., & Madrian, B. C. (2004). Employee Stock Purchase Plans. *National Bureau of Economic Research*, *No. w1042*.

European Commission. (2003). *Employee Stock Options The Legal and Administrative Environment for Employee Stock Options in the EU*. Brussels.

Falk GmbH & Co. KG. (2011). *Business and Taxation Guide to Germany.*

Glautier, M. W. E., & Underdown, B. (2001). *Accounting Theory and Practice*. Pearson Education.

Hail, L. (2002). Kennzahlenanalyse Beurteilung von Abschlussinformationen mit Hilfe finanzieller Kennzahlen und Kennzahlensysteme*. *Der Schweizer Treuhänder.*

Hall, B. J., & Murphy, K. J. (2003). The Trouble with Stock Options. *National Bureau of Economic Research*.

Huddart, S. (1998). Tax Planning and the Exercise of Employee Stock Options.

Contemporary Accounting Research, *15 (2)*(203).

Huddart, S., & Lang, M. (1995). Employee Stock Option Exercises: An Empirical Analysis. *Journal of Accounting and Economic*, *20*.

Huyghebaert, N., & Van Hulle, C. (2006). Structuring the IPO : Empirical Evidence on the Portions of Primary and Secondary Shares. *Journal of Corporate Finance*, *12*, 296–320.

Kahle, K. M., & Shastri, K. (2005). Firm Performance, Capital Structure, and the Tax Benefits of Employee Stock Options. *The Journal of Financial and Quantitative Analysis*, *40*(1), 135–160.

Khincha, H. P. (2002). Taxation of Employee Stock Option Plans: International Principles. *Revenue Law Journal*, *12*(1).

Krishnamurthy, S. (2003). An Analysis of Open Source Business Models.

Leenders, M. R., & Mauffette-Leenders L. A., Erskine, J. A. (2001). *Writing Cases*. (R. I. S. of Business, Ed.). Ivey Publishing.

Lerner, J., & Tirole, J. (2005). The Scope of Open Source Licensing. *Journal of Law, Economics, and Organization*, *21*(1), 20–56.

Liebig, T. (2001). Is There a "Tax Penalty" on Stock Options in Germany ? *Forschungsinstitut Für Arbeit Und Arbeitsrecht an Der Universität St. Gallen.*

Ljungqvist, A. P., & Wilhelm, W. J. J. (2002). IPO Pricing in the Dot-com Bubble. *The Journal of Finance*, *58*(2), 723–752.

Merrill Lynch. (2000). *How to Read a Financial Report*. New Brunswick.

Millman, H. (1998, September). Good (and bad) news: No one owns it. Retrieved from www.computerworld.com

Niemman, R., & Simons, D. (2002). Costs, Benefits, and Tax-Induced Distortion of Stock Option Plans. *CESifo*, *Working Pa*.

OECD. (2005). *The Taxation of Employee Stock Options*. Paris.

Ofek, E., & Richardson, M. (2000). The IPO Lock-Up Period : Implications for Market Efficiency And Downward Sloping Demand Curves.

Oyer, P., & Schaefer, S. (2004). Why do Some Firms Give Stock Options to all Employees? An Empirical Examination of Alternative Theories. *National Bureau of Economic Research*.

Patzner, A. (2015). Aktien für Mitarbeiter. *Frankfurter Allgemeine*.

Pinedo, A. T., & Tannenbaum, J. R. (2015). *Frequently Asked Questions About Initial Public Offerings*.

PwC. (2011). *Roadmap for an IPO*.

PwC. (2014). *Navigating new territory Internationally Mobile Employees International Assignment Services Taxation of International Assignees Country – Germany.*

Sanders, W. M. G., & Tuschke, A. (2007). The Adoption of Institutionally Contested Organizational Practice: The Emergence of Stock Option Pay in Germany. *Academy of Management Journal*, *50*(1), 33–56.

Staiman, J., & Tompson, K. (1998). Designing and Implementing a Broad-Based Stock Option Plan. *Journal of Composite Materials*, *16*(4), 928–940.

Thomas, T. A. (2001). The New Marital Property of Employee Stock Options. *Family Law Quarterly*, *35*(3), 497–525.

Valimaki, M. (2003). Dual Licensing in Open Source Software Industry. *Systemes d'Information et Management*, *8*(1), 63–75.

West, J. (2003). *How Open is Open Enough? Melding Proprietary and Open Source Platform Strategies*. *Research Policy* (Vol. 32).

West, J., & Dedrick, J. (2001). Proprietary vs . Open Standards in the Network Era : An Examination of the Linux Phenomenon. *System Sciences*, *360*(c), 1–10.