CAPITAL STRUCTURE OF FIRMS AFTER AN INITIAL PUBLIC OFFERING (IPO)

by

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(Under the Direction of Annette B. Poulsen)

ABSTRACT

The objective of this thesis is to investigate the capital structure after an Initial Public Offering (IPO). For this purpose, the topics concerning capital structure and IPO's are introduced before a data set is analyzed. It seems that an IPO's characteristics affect a firm's capital structure since it determines the demand for capital and how much capital future new issues can raise.

INDEX WORDS: Capital Structure, Trade-off Theory, Pecking-order Theory, IPO, Underpricing, Hot issue, Long-run underperformance

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CHAPTER 1

INTRODUCTION

Initial Public Offerings (IPOs) are used as one of many tools to raise capital for a firm so that it can acquire additional financial resources. There has been some literature investigating the effect of capital structure on IPOs. Researchers argue that debt influences the level of asymmetric information which affects the IPO's offering price. The issuance of debt reveals private information to the public, and thus investors' estimate of the firm's value are more accurate. Therefore they would settle for a lower underpricing of the new issue.

This raises the question whether the influential relationship goes the other way, too. Do IPO's have other effects on the capital structure than the anticipated fund raising effect? Maybe firms return to their routine of searching for profitable projects and balancing their capital structure after an IPO. The attempt to answer the question above requires a better understanding of IPOs and capital structure in the first place. This is covered with Chapter 2 Long-Term Financing, Chapter 3 Capital Structure Models and their Determinants and Chapter 4 Initial Public Offerings. Subsequently, a data set with 20 firms whose IPO's took place in 1995 or 1996 is examined in Chapter 5 Empirical Study and findings summarized in Chapter 6 Conclusion.

CHAPTER 2

LONG-TERM FINANCING

Firms need financing for capital expenditures, working capital and other long-term uses. Most funding is provided by internally generated cash flows. Only 25% of funding in the U.S. is raised with new debt and equity. But firms in Japan have always relied heavily on external financing which seems to work either.[1] In the 1980s until now, U.S. firms bought back massive amounts of equity with new debt. This chapter will contain only a short description of Initial Public Offerings since they are explained in Chapter 4.

2.1 Debt

When issuing long-term debt securities, firms are giving out certificates of debt which commit them to pay interest on the borrowed amount and to repay the principal in the future. Short-term securities have maturities of less than one year which means the debt will remain outstanding for that period.[2] Long-term debts can be categorized into publicly issued securities and privately placed debt. They can be characterized by their type of security, ratings, protective covenants and way of repayment. The three security types are notes, debentures and bonds. Bonds are secured by collateral whereas notes as well as debentures are unsecured corporate debt. Collateral can be stocks of another firm or mortgages on a single facility or entire long-term

[1] Ross, Westerfield and Jaffe (2002), p. 432
[2] Short-term debt is also called unfunded debt and long-term debt is referred to as funded debt.

assets of the debt issuer. Holders of notes or debentures only have claims on firm property which do not serve as collateral. The difference between notes and debentures lies in their maturity as notes have a maturity of less than ten years. Although most publicly available debt securities are debenture they are often referred to as bonds.

2.1.2 Publicly traded debt

During the process of debt issuance and exchange of cash against bond certificates, a written agreement (indenture) between the issuing firm and the bondholders is prepared. The bondholders are represented by a trust company who ensures the firm's compliance with terms of indenture, manages the sinking fund and represents bondholders in case of the firm's bankruptcy. The indenture describes the nature of indebtedness, maturity date, interest rate, collateral, protective covenants, sinking fund arrangements and call provisions. The protective covenant contains all restrictions lenders want to impose on the firm's action. Negative covenants specify prohibited actions such as the issuance of more debt, offering listed collaterals to other lenders or exceeding a maximum amount of dividends. Positive covenants can require the firm to maintain a minimum level of working capital or deliver special financial data.

Bonds are usually offered in units of $1000 which is called the face value, principal value, or denomination of the bond. The par value of a bond nearly always equals its face value. Demand and supply for the bonds set the price of a bond which is generally quoted as a percentage of the principal. The bond price is influenced by the general level of interest rates, time to maturity, default risk, expected inflation and other market factors. Since interest payments are semiannual, bonds accrue interest in the meantime which is also incorporated in the bond price. In order to simplify the payment of interest and principal, bond holders can be

registered at the trust company so that the amount is sent to the owner's recorded address. But bonds can also appear in bearer form where bond ownership is unknown and the owner has to send in the coupon which is attached to bond certificate in order to receive interest payment. Holders of bearer bonds are exposed to the risk of lost or stolen bonds and coupon but might be able to avoid tax payments on the interest. Still, unregistered bonds cause complications especially if its principal is repaid in regular amounts over the bond's life instead of as a single amount at the end of maturity. Payment in installments is called amortizations which are arranged with the sinking fund.

Instead of amortizations, firms might be interested in repaying their debt immediately which can be done if the bond is callable. This is desirable if interest rates fall, bond prices increase and the firm can buy back bonds at the call price which is always higher than the par value price. Then new bonds with lower interest payments can be issued. Usually, lenders are protected from such actions during the first 5 to 10 years of a bond's life. Since the call option is valuable for firms and investors forfeit receiving high interest payments, callable bonds need to offer higher interest rates than noncallable bonds. Some argue that in efficient markets, firms could not derive a gain from callable bonds since they would be offset by higher interest payments. Since callable bonds do exist there must be incentives for issuing them. Firms may be able to give a better forecast on interest rates because of insider knowledge. A company might choose to issue callable bonds because it wishes to deduct more interest payments in order to reach a lower tax bracket. Another explanation is delivered by the protective covenant's restriction on the firm. Its limitations can prevent the firm from realizing a highly profitable project which could easily cover the costs of buying back all bonds. In the end, the call option will reduce the sensitivity of bond prices toward interest rate changes.

Debt ratings of firm are indicators for the bankruptcy probability and the offered collateral in case of default of a firm. Low bond ratings tend to increase interest payments although stock and bond prices do not change notably around days of rating publications. As ratings are based on publicly available data like financial statements of firms, ratings might not reveal new information and, therefore, fail to induce market reactions.

A bond's interest payment can vary over different types of bonds. Floating-rate bonds can adjust their coupon rates according to different interest-rate indices like Treasury-bill interest. Relating the coupon rate to current interest rate reduces inflation risk for issuers and bond holders. As the name of zero-coupon bonds indicates, this kind of bond does not pay interest at all. Instead they are offered at a deeper discount to the face value and are repaid at the end of maturity. Income bonds only pay interest if the firm's income allows it. Thus, a firm's bankruptcy probability is not affected by these bonds since omission of interest payments does not result in the bond's default. But firms have good reasons not to issue such bonds because they signal increased probabilities of financial distress and create agency costs.

2.1.2 Privately placed debt

Private debt placements with financial institutions account for 50% of all debt. One of the two basic forms is private placement of bonds. Although private bond placements may have more restrictive covenants, it is easier to renegotiate terms with a few investors and saves distribution costs. The other form is term loans which are business loans with maturities between 1 and 15 years. Direct loans save costs of registration with the Securities Exchange Commission (SEC). Lenders are commercial banks or insurance companies and terms loans are usually amortized over time.

2.2 Equity

Equity issuance follows the same rule as debt issuance and can also be separated to public and private issues. Public issues can be either a general cash offer or a rights offer where cash offers sell shares to all interested investors. In rights offers, shares are only sold to existing shareholders. If a firm is issuing stocks for the first time, it is called initial public offering (IPO) as well as unseasoned new issue. A seasoned new issue is held by firms where stocks were already issued and can either be a general cash offer or a rights offer.

2.2.1 Type of security

The type of stock which is usually offered is common stock which simply represents an ownership unit of the firm. It bears voting rights with which the shareholders can elect the board of directors who selects the corporate officers. Common stocks can also be of different classes where the differentiation lies in unequal voting right. It is possible that one class of stocks comprise 20% of total outstanding stock but own 50% voting rights. Thus, firms can use equity financing without forfeiting major control. A firm can choose to distribute excess earnings to shareholders in form of dividends. These dividends are return on capital which shareholders contributed by holding common stocks. Since dividends are not deductible, they are taken from the firm's after-tax earnings and are taxed for a second time at personal level since dividends are ordinary income to individuals. This habit of double taxation has been the target of a lot criticism and can provide incentives for firms not pay out dividends.

Another type of equity share is preferred stock which is more similar to debt than to common stocks. Holders of a preferred stock usually do not have voting rights which is offset by

their superior claims on dividends and liquidated assets over common shares. But this claim is not equal to claims of bonds on regular interest payments. A firm can not default because of unpaid preferred stock dividends. If a firm's director chose to defer dividends, preferred shares often are granted voting rights.

2.2.2 Private equity issue

As long shares are sold to fewer than 35 investors, the offering is classified as a private issue which does not have to be registered at the SEC. But there are significant restrictions to resale of unregistered securities such as minimum holding periods. Sometimes firms choose private issuance of equity in order to avoid expensive and time consuming public offerings. Other firms do not have this choice but have to rely on the private equity market because they are either too small or too indebted for the public market. Thus, the market can be divided into venture equity for start-ups and non-venture equity for firms in financial distress. Lenders in private equity market are either large institutional investors like mutual or pension funds or venture capitalists. At least four types of venture capital suppliers can be differentiated. A few wealthy families have a history of financing start-ups and private partnerships have been formed that raise funds from insurance companies or funds in order to support a certain start-up sector. Renowned industrial and financial corporations have founded venture capital subsidiaries. Lastly, there are individual investors called angel investors. Venture capitalist play an important role in IPO's since there is evidence that they are able to initiate an IPO when the firm's value is highest. Lerner(1994) examined the timing of IPO's and private financing with venture capital. Their sample of 350

firms from 1978 to 1992 shows that IPO's are correlated to high equity value. Furthermore, more experienced Venture Capitalists show more accuracy in timing IPO's.[3]

2.2.3 Public equity issue

General cash offer

Although one might expect firms to only seek new long-term financing if they have found profitable investment projects which will increase their value, the announcement of new equity issuance in general has a negative effect on market value of the firm. This paradox can be explained by following arguments.[4] First, managers can estimate their firm's market value under asymmetric distribution of information more accurately than investors. In order to maximize benefits of existing shareholders, they will choose to issue shares only if the firm is overvalued. Such a behavior is anticipated by new investors who will take a discount from the stock's price. Another thought concerns the debt capacity of firms. A firm might choose to issue equity because a high probability of bankruptcy does not allow further debt financing.

In most cases, public cash offers are assisted by investment banks who offer a large choice of services and the necessary expertise. These financial intermediaries find the optimal issue method for a firm, help with pricing as well as selling the new stocks.

One method of issuance for public cash offers is firm commitment where one or several investment banks agree to buy all of the to be issued securities and before they are sold. Thus, the issuing firm shifts all risks to the bank that is also called the underwriter. In order to minimize risk, the underwriter can form underwriting groups (syndicates) who help by selling shares to their clients. However, investment banks request incentives to do so which are granted

[3] Lerner (1994), p.294
[4] Masulis and Korwar (1986), p. 93

by the issuing firm's discount. Underwriters buy all shares for less than the offering price and can keep the spread. Sometimes they receive non-cash compensation like warrants or the stocks themselves. If the investment bank cannot sell all stocks (under subscription), it might have to reduce the stock price and suffer the losses. But the probability of this happening is quite low because the investment bank itself set the offering price after it investigated the market's receptiveness toward this issue. Seasoned new issues should be priced more accurately since the new issue's price can be based on data from former issuances.

The second issuance method is the best effort method where the underwriter is only taking over the tasks of an agent and does not buy the whole issue. The investment is legally bound to sell the shares at the agreed-upon price and its compensation depends on the amount of sold shares. Stocks which cannot be sold at the targeted price are withdrawn.

Empirical evidence shows that best-effort is generally used for small IPO and firm-commitment for large IPO's.[5] Under both methods, the principal underwriter can buy shares if the stock price falls below the offering price to support the market. If the issue cannot be sold for a longer period, members can leave the syndicate and sell their shares at any price they want. Many underwriting contracts contain an option where members of the underwriting group can purchase additional shares at the offering price. This allows the investment bank to meet excess demand or oversubscription. The option lasts 30 days after issuance and is limited to 15% of newly issued shares. Such an option can be used against the issuing firm if the stocks market price exceeds the offering price within 30 days and an arbitrage opportunity for the underwriter is offered.

[5] Ritter (1987), p. 280

Rights offer

Since new equity issuance is likely to affect existing shareholders negatively, firms may offer new shares to them first. Besides the already mentioned decreasing stock prices, new common stocks also reduce the proportionate ownership of existing shareholder. If each shareholder is offered an option to buy new stocks at a certain price within a specified time their ownership fraction as well as the price of each share can be adjusted to the new situation. During the process of the rights issuance, each stock is assigned with a right which the stockholder can sell, let expire or collect more of and buy new shares with them. Usually more than one right combined with the subscription price is needed to buy the new stock. There is also the risk of under subscription for rights. Stockholders can let the right expire or bad news can push stock price below the subscription price. This risk can also be mitigated by arranging a standby underwriting where a firm-commitment is made. For a standby fee the underwriter will purchase the remaining stocks at a price less than the subscription price. Firms might be able to save these fees by allowing other stockholders to purchase the unsubscribed shares.

A cost comparison between equity issues with underwriting, rights offer with standby fee and a pure rights offer shows that the lowest priced alternative, even after accounting for different issue sizes, is the pure rights offer.[6] Under the assumption of rational behavior, pure rights issues should be dominant. Instead it can be observed that 90% of new issues are underwritten. This paradox is called "right puzzle" although underwriters might offer a range of advantages which would offset the cost savings of pure rights issue. For one thing, underwriters can realize a higher offering price with higher public confidence and their selling force. Underwriters also provide insurance for the issuer with firm-commitment and enable a faster access to proceeds. In the end, stockholders might be not receptive to rights because they are

[6] Smith (1977), p.276

regarded as nuisance. Smith (1977) could not find convincing evidence for any advantages of involving underwriters but acknowledged in a later work that an investment bank can serve as a certification of fair prices. Due to the investment bank's inside information it is capable of estimating the firm's true value. It can use its reputation as a guarantee of providing a just offering price. [7]

Costs of issue

There are many different costs of security issuance which have been listed at various occasions in this chapter. Following, is just a listing of costs in order to provide a better overview. First of all, there are the spread or underwriting discount and other direct expenses. Other direct expenses include filing fees, legal fees, etc. and do not belong to the underwriter's compensation. Indirect expenses are management time spent on the security issue. There are abnormal returns caused by stock price decreases due to the announcement of issue. IPO's are often underpriced which creates additional costs. In the end, the option with which underwriters can buy more stocks can used to the issuers disadvantage. Thus, these options are an additional cost to the firm.

[7] for more information see Booth and Smith (1986)

CHAPTER 3

CAPITAL STRUCTURE MODELS AND THEIR DETERMINANTS

The value of a firm is determined by the value of its debt and the value of its equity. This combination of a firm's value is often depicted with a pie diagram. The way a pie is separated into debt and equity is the capital structure of a firm. If the capital structure affects a firm's value, financial managers should try to find the ratio of debt to equity which maximizes the value of the firm. By maximizing a firm's value, managers maximize the benefits for the firm's shareholders.[8] Theories which advocate consideration of Stakeholders or criticize negative effects of pure firm value maximization are ignored.

3.1 Irrelevance theory

Modigliani and Miller (1958) introduced a model which can be characterized by not integrating the existence of taxes, bankruptcy costs and other agency costs. They later acknowledged that, with corporate income taxes, interest payments on debts can be deducted from the corporation's income and therefore create gains. However, under the initial assumptions, they show that the value of a firm is not influenced by its capital structure but rather by the expected return of investments.[9] The irrelevancy of capital structure is proved by an arbitrage argumentation. If firms with the same expected return have different values due to their capital structure, rational

[8] Ross, Westerfield and Jaffe (2002), p.392
[9] Modigliani and Miller (1958), p. 268

investors can sell shares of the overvalued firm and borrow money in order to buy shares of the underpriced firm. For this to be true, individuals must be able to borrow at the same rate corporations do.[10] The authors also found the overall cost of capital to be independent from the firm's capital structure although debt might be cheaper than equity financing. As the debt level increases, the firm's equity becomes riskier and increases the cost of equity capital. Thus, the amount saved by financing investments with low-cost debt is offset by the higher cost of remaining equity.

3.2 Trade-off theory

The trade-off theory balances the advantages and disadvantages of using debt. There are several reasons and benefits for firms which induce them to choose a higher debt level. But excessive debt financing is not always profitable since higher indebtedness causes higher interest rates for new loans and bankruptcy probability. This theory implies that every firm has an optimal amount of debt which considers benefits due to debt and costs of financial distress.[11] Following are several determinants of a firm's debt level.

3.2.1 Taxes

As the assumption of no taxes is not a realistic one, there are a large number of models and papers investigating the effect taxes have on a firm's debt level. In 1963 Miller and Modigliani added corporate taxes to their model and came to the conclusion that due to tax regulations debt financing has permanent advantages which can not be ignored. As mentioned before, companies

[10] Modigliani and Miller (1958), p. 270
11 Ross, Westerfield and Jaffe (2992), p.433 and Scott (1976)., p. 35

can deduct interest payments on debt from their taxable income which reduces tax payments and create a tax shield where corporate tax payments can be saved.

Graham (2000) tried to detect the size of tax benefits which is difficult because of problems in determining corporate tax rates. Tax rates are hard to come by because of problems with the data and complexity of the tax code. Besides this, there are different approaches to quantify tax benefits. In the traditional approach, the deduction of one dollar interest reduces the tax payments by the marginal corporate tax rate t_c. The annual tax benefit is $t_c \cdot i \cdot D$, whereas i is the interest rate on debt D. As it is assumed that tax shields are as risky as the debt that generates them, the benefits are discounted with i. In case of perpetual debt and fully usable tax shield, tax benefit can be expressed with $t_c \cdot D$. [12] Another approach uses a more complicated formula because it accounts for corporate and personal taxes. Graham (2000) quantified the tax benefits with both approaches and made further adjustments by defining a tax benefit function whereas the area under that function equals the firm's tax benefit. Given a specific level of interest deduction, the tax function determines the MTR. The MTR is the amount of taxes you would have to pay for earning an additional unit. Thus, a firm's MTR determines how advantageous is debt financing. If a firm's marginal tax rate is 35%, the deduction of one dollar interest reduces the tax obligation by 35 cents.[13] The lower the marginal tax rate the lower are the interest deductions and the less attractive is debt financing. In this mode, each MTR contains the effects of non-debt tax shields, Tax Loss Carry Forwards (TLCF), alternative minimum tax and the probability that the interest tax shield will be used (no tax exhaustion).[14] In the beginning, the tax function is flat and starts sloping downward as deductions grow larger. Marginal benefits of additional debt decline because larger interest deductions do not only reduce taxable income but

[12] Graham (2000), p. 1903 f.
[13] Rosen 2002, p. 20
[14] Graham (1996), p.42

also the probability that the firm is and will be fully taxable in the future. This inflexion point is used to separate firms into aggressive and conservative debt users. According to Graham, large, profitable and liquid firms use debt conservatively although they have low costs of financial distress. Almost half of these firms with growth options, few tangible and excess cash positions could double their debt and still receive full benefits from interest rate deductions.

Of course, there are arguments which diminish effects of tax benefits. Miller (1977) pointed out that deducted interest payments are taxed at the personal level since they are distributed as profits to equity holders in the end. He shows that the personal tax penalty offsets the corporate tax advantage in equilibrium of aggregated supply and demand for corporate debt. Thus, he argues against any debt financing advantages for individual firms.[15] The problem of his model is the assumption of firms having the same Marginal Tax Rate (MTR). A firm's MTR can vary because interest deductions might reduce the income to such extend that the firm falls into a different tax bracket.[16] In an extreme case, a firm can already have deducted its entire earning so that additional debt would not save tax payments anymore. The higher a firm's TLCF, the likelier tax exhaustion will occur and the unlikelier debt is used.

3.2.2 Agency Costs

Two different types of conflicting interests are examined. First, conflicting interests between managers and equity holders can develop because there is an uneven distribution of gains and losses due to the manager's activities. If he succeeds in increasing the firm's earnings, he has to share this gain with shareholders whereas he alone is held responsible for losses due to his activities. Managers can also use funds to increase their personal benefits instead of maximizing

[15] Miller (1977), p.269
[16] Cordes and Scheffrin (1983) give further evidence of different effective corporate tax rates across

the firm's value.[17] This inefficiency can be reduced by binding the manager's personal benefit more tightly to the firm's fate. For a constant investment of the manager in the firm, his equity share can be increases by increasing debt. With the issuance of debt, the firm needs to pay out excessive cash and reduces the amount of "free" cash flow with which the manager can pursue his own interest.

Stulz (1990) and Harris and Raviv (1990) describe conflicting interests on different operating decisions. Harris and Raviv analyze a situation where managers always want to continue the firm's operation whereas debt holders would considers liquidation under certain circumstances. This problem can be solved if investors receive the option to enforce a firm's liquidation if cash flows do not reach a benchmark. As higher debt levels make default more likely, it is desirable for investors. However, the solution involves higher investigation costs for producing information used in for liquidation decision. Stulz(1990) depicts a situation where managers always wants to invest all available funds even though there are not enough profitable project and paying out profits would be better for investors. By using debt, managers are forced to pay out excessive cash so that overinvestment can be avoided. On other side, cash flow can be reduced to such an extent that profitable investments can not be realized.

The second type of conflict arises between debt holders and equity holders and is referred to as the asset substitution problem. The reason of this conflict is rooted in the debt contract. For profitable investments, equity holders realize any returns which are larger than the debt's face value. If an investment fails, debt holders have to bear the losses because shareholders have limited liability. Although equity holders can lose the value of their shares, they can benefit from financing very risky projects with very high payout by using debt. Such investments decrease the debt's value and offset equity holders' potential losses through risky projects. But such behavior

[17] Jensen and Meckling (1976), p. 312 f.

will affect the prices of future debt issues or was already anticipated by debt holders causing equity holders to receive less money than the debt value. According to Diamond (1989), these costs give an incentive for firms to invest in safe projects and to build up a good reputation. If a firm has a long history of repaying debt, its borrowing cost is lower than new and not yet established firms. Hirshleifer and Thakor (1989) mention a manager's reputation as a reason for choosing safe projects. The manager can choose between a risky and a safe project where failure of either the same loss. But the risky project generates higher returns for shareholders whereas there is no difference for the manager. Therefore, the manager maximizes the probability of success by choosing the safe project although shareholders would have preferred the risky one. Such manager behavior reduces agency costs and induces a higher debt level than the firm otherwise would have. It is stated that managers of firms where takeovers are more probable are more likely to consider the reputation effect.

3.2.3 Market Interactions, Input or Output of a Firm

Models relating capital structure to the theory of industrial organization can be separated into two groups. One approach looks at strategies with which firms compete in product market. Traditionally, literature in industrial organization focused on finding product market strategies which maximize total profits. Some research took finance literature into consideration and considered the effects of capital structure on product market strategy. Brander and Lewis (1986) set up a model with two phases where firms chose their financial structure in phase 1 and their output level in the second phase. A random variable determines demand for the product which sets the price and profit. If a firm can not pay debt claims with operating profit, it becomes insolvent and its assets are given to bondholders. Debt allows firms to produce more than in the

Cournot oligopoly which might be advantageous if this forced the rival to produce less.[18] But as both firms choose a positive debt level, they are worse off because of overproduction. In this model, capital structure affects equilibrium strategy and payoffs. Maksimovic (1988) pointed out that firms can have tacit conclusions where they limit debt in order to reach a more favorable equilibrium. He also found out that debt capacity increases with demand elasticity.

A different approach tries to identify product or product market features that interact with capital structure. Titman (1984) describes the situation where the liquidation of a firm can create costs for customers since they are not able to obtain the product anymore. Customers rationally assess insolvency probability and anticipate these costs by demanding a discount before buying such a specialized product. The discount will be larger the more durable the good is.[19] This gives firms incentives to incorporate these future costs into their liquidation policy and choose not to liquidate until net gains of liquidation exceed the non liquidation value. But the liquidation decision is made by investors of the firm who ignore these costs in order to maximize their value. Therefore, equity holders are facing the problem of time-inconsistent policy where they specify future actions which are not consistent with the preferences of decision makers in the future.[20] The author shows how the choice of a certain capital structure can determine in which state of nature liquidation decisions are made by investors and ensure a value-maximizing liquidation in the future. The method of pre-positioning includes the issuance of short term debt and preferred stock and causes the firm to default only in situations where the net gain of liquidation exceeds the cost of customers.[21] Further, it is stated that firms in the automobile and computer industry, which can impose high costs on their consumers, choose to have relatively low debt/equity

[18] Brander and Lewis (1986), p.963
[19] Titman (1984), p. 139
[20] concept of inconsistency appeared in Strotz (1955) for the first time.
[21] Titman (1984), p. 148

ratios. This is consistent with the thought that firms offering rather unique products should use debt conservatively since they have higher liquidations costs due to their specific assets and skills. On the contrary, hotels and retail businesses have a high debt/equity ratio because they impose low costs on customers in case of liquidation.

In a subsequent paper, Maksimovic and Titman (1991) show that even producers of goods which are neither unique nor durable can choose their capital structure according to characteristics of their product market. They depict a situation where firms can produce goods of high or low quality any time and where consumers cannot differentiate between the product's qualities after consumption. Although production at low quality would save costs in the short run, firms may choose to produce high quality goods because of its reputation which allow for higher long-term earnings. But debt financing can reduce incentives to keep up high quality production because a reduction in quality would increase shareholders immediate earnings on bond holders' expense. Current cash flows would increase because production is cheaper and customers have not recognized the lower quality yet. Shareholders receive the additional earnings of that period but would share the negative consequences of following periods with bondholders.[22] Investors who are aware of this possibility would refrain from financing such firms which result in a lower debt level.

Sarig (1988) relates debt to bargaining power with input suppliers in a working paper. It is argued that bond holders bear a large part of losses caused by bargaining failure but receive only a small share of earnings due to bargaining success. Thus, bond holders provide insurance for stockholders against failing negotiations with suppliers. The higher the leverage the better the insurance and equity holders dare to negotiate better terms which increase the firm's value. Inferentially, a firm with high bargaining power has either a wider supplier choice or a higher

[22] Maksimovic and Titman(1991), p.182

debt level. Analogous to this reasoning is that highly unionized firms will have more debt to strengthen the firm's bargaining power. The same is true if workers have highly transferable skills. As soon as firm-specific supplies are involved, a high leverage has the opposite effect. [23] Employees with firm-specific skills have high bargaining power because their refusal to work can cut the firm off any work supply and increase the firm's bankrupt probability. The higher a firm's leverage the higher is its bankruptcy probability and the wish not to add to it. Therefore, firms with highly specialized employees will seek low debt levels to not worsen its bargaining power with its employees.

3.2.4 Corporate Control Considerations

Facing avid takeover activities in the 1980's, it became more interesting to investigate how corporate decisions interact with capital structure. Situations where firms are facing takeover attempts and the effect of short-term changes in the capital structure are being investigated. The literature uses the fact that common stocks, unlike debt, carry voting rights.[24] Harris and Raviv (1988) as well as Stulz (1988) argue that capital structure can influence the results of takeover attempts with its effect on the distribution of votes. It is shown that capital structure has an even larger effect on the distribution of votes which belong to the firm's manager.

In the model of Harris and Raviv (1988), the shares of a debtless firm are hold by its manager *M* and its passive investors who do not compete with the manager for controlling the firm. For this purpose, there is an outside rival *R* who tries to take over the firm by buying shares from passive investors. As long as *M* controls the firm, he receives a certain level of private benefits which he would loose to his rival in case of a takeover. The firm value *Y* depends on the

[23] Sarig (1998)
[24] Harris and Raviv (1988), p.56

manager's abilities to run a firm and can reach two different levels whereas Y_1 is larger than Y_2. All parties know that the manager and rival do not have the same level of abilities but it is not observable who has higher skills. The rival's appearance induces the manager to change the stake of his initial investment *I* in the firm by adjusting the debt-equity ratio. *M* can increase his fraction of the firm by repurchasing equity from outside equity owners with debt. Since debt reduces equity value, he would own a larger stake with the same amount. Or he can choose to reduce his stake by selling his stocks. After the manager has adjusted his ownership share *R* he will buy stocks from passive investors in order gain enough voting rights to win the majority vote which decides over the takeover's success. Of course, manager and rival would vote for themselves whereas passive investors will decide between the two of them. Passive investors will receive additional information on their abilities before making a decision and will vote for the one they think has higher abilities.[25] There are three possible outcomes to the majority vote. Either the manager's equity share is so large, that he will maintain his power even though he has low abilities or his stake is so small that the rival will take over for sure. In the first case, Y_M and in the latter case Y_R is realized. Depending on *M* and *R*'s ability they generate the high firm value Y_1 or low firm value Y_2. For mediocre levels of *M*'s equity share, the passive investors expected of having high abilities will gain control. The authors refer to this situation as a proxy fight and it is supposed to ensure the better management to take control who can realize Y_1. As Y_1 is always at least as good as when not even better than Y_M or Y_R, proxy fights maximize the firm's value for passive investors and mediocre levels of *I* are optimal. As *I* is chosen by the manager it will be set at a level which maximizes *M*'s payoff who receives private benefits of control. Thus, the manager would not choose a low level of *I* and surrender unless the costs of maintaining control exceed the private benefits. Since fending of the rival, *M* would have to issue more debt which

[25] Harris and Raviv (1988), p.62

increases bankruptcy probability and may impose restrictions to *M*'s control or private benefits.[26] As private benefits of control decrease with debt level, *M* chooses the lowest debt level in all three possible states. This implies that if surrendering is more profitable for *M*, the firm would have no debt at all. For proxy fights, some debt is needed and targets of takeover attempts which seek protection will issue even more debt. Since, the value of firms which issue debt will either increase to Y_1 after a proxy fight or stay at Y_I, debt issues are followed by stock price increases on average.

Stulz(1988) set up a model similar to Harris and Raviv(1988) with the differentiations that the manager will not surrender and the rival obtains a random benefit of control instead of inheriting the manager's. Furthermore, passive investors demand different prices for selling their shares to the rival. Investors' willingness to sell their equity increases with the offered price. If the stake of *M* is high, *R* would need to buy more stocks which increase equity prices and offer *M* a higher premium in the case of successful takeover. But at the same time, the probability of takeover declines because it gets unlikely that *R* is able to offset high stock prices with his benefit of control he would gain with such a strategy. Like in Harris and Raviv (1988), *M*'s stake can be increased with leverage and targets of takeovers will have more debt. But in this model, higher leverage would also result in value maximization for outside investors which increases stock prices.[27]

Israel (1991) receives similar results concerning increasing premium and lower probability to realize this premium. He uses the argument that shareholders of the targeted firm and the acquiring firm bargain only over gains which are not committed to debt holders who receive a contractually fixed amount. Higher debt values would decrease the amount of takeover

[26] Harris and Raviv (1988), p.58
[27] Stulz(1988), p.2

premium which targeted and acquiring shareholders will split.[28] As, the ratio of gains to investments falls, profits for acquiring shareholders decreases which implies a value increase for targeted shareholders. But low profits for the acquiring firm reduces takeover probability that a synergistic acquisition will occur and targeted shareholders would not receive any fraction of the takeover premium. Thus, debt level is the result of a trade-off between decreasing takeover probability and increase in share of synergy gains for targeted shareholders.

3.2.5 Cost of Financial Distress

Many of the above mentioned capital structure considerations advocate an increased level of debt. When Miller and Modigliani (1963) extended their initial model with tax benefits, they did not fail to point out benefits of debt financing do not imply maximization of debt usage. First, other financing forms like retained earnings may be cheaper. Moreover, there are restrictions to the use of debt imposed by lenders and the "need to preserve flexibility".[29] But they acknowledge that tax benefit may lower the optimal size of such a reserve.

Expected costs of financial distress depend on default probability and the value to be lost in case of bankruptcy. They include direct costs like professional fees for lawyers as well as accountants or managerial time to administer bankruptcy and indirect costs like lost sales, lost profits and difficulties to obtain further debt. Myers (1977) also describes a situation where debt issuance forces a firm to realize suboptimal future strategies which reduces present market value.[30] Literature in this area advises risky firms to borrow less whereas risky firms are identified by high variance rates of their assets' market value. It is further noticed that firms with

[28] Israel (1991), p. 1392 ; the takeover premium is the rise in firm value due to the fact that the better management team gained control
[29] Modigliani and Miller (1963), p. 443
[30] Myers (1977), p.149

tangible asset and a corresponding active second hand market tend to have less debt. Firms with specialized, intangible assets or valuable growth opportunities would have high debt levels. Myers and Rajan (1998) argue that firms might receive good borrowing terms even with illiquid assets. Although creditors receive less by seizing an illiquid asset, there is a higher probability that borrowers have not already sold the asset at creditor's expense.[31] Large firms might have low ex-ante costs of financial distress, because they are better equipped to overcome difficult periods with their diversification or size. Firms which can offer valuable collaterals often have more favorable borrowing terms and therefore lower costs.

Miller (1977) raised the question of the importance of financial distress which can, partly, be explained by then high corporate tax rates of 48%. He compared this with estimated bankruptcy costs which were about on average 5.3% of the assets' value. But this number is taken out of Warner (1976) and refers to a sample of 11 large railroad companies. Miller justified his reliance on Warner (1976) as being the only study of bankruptcy costs for large, publicly-held corporations.[32] But when Warner published his paper in 1977, he considered the applicability of his data to other industries. In this paper, Warner quoted distress costs to be 1% of the firm's market value as of was seven years before bankruptcy. As default approaches, average costs were 2.5% of market value as of 3 years before default.[33] Warner (1977) mentioned industry-specific magnitude of costs and the active role of the Interstate Commerce Commission (ICC) in railroad bankruptcies. Altman (1984) obtained different numbers in his studies of 19 industrial firms which become insolvent in 1970-1978. In many cases, costs

[31] Myers and Rajan (1998), p.734
[32] Miller(1977), p.263
[33] Warner(1977), p. 343

exceeded 20% of firm value. Averaging this with data of a more recent sample, the author suggested costs ranged from 11% to 17%. [34]

3.3 Pecking-order theory

This theory states that firms have a preference set concerning their funding sources which induces them to choose internal over external financing and debt over equity issues.[35] Since there is only a differentiation between internal and external sources and firms prefer not to use debt, there is no defined debt ratio to be targeted.[36] The pecking-order also suggests preferences concerning dividend payout ratios which will not be described in detail in this work. If a firm has to use external funding and costs of financial distress are ignored, it will issue the safest security first. Thus it starts issuing debt then hybrid securities like convertible bonds, and equity as a last resort. Under consideration of bankruptcy costs, firms may issue equity to reduce debt if equity issuance is not too costly. Otherwise, debt will remain very high or profitable investments are not realized.

An explanation for this preference is the ability to save issuance. Internal financing does not have any and debt is less expensive than equity issuance. This argument of saving issuance costs seems very weak since it can be easily offset by tax benefits offered in the trade-off theory. But there are two more arguments for the pecking-order theory. First, managers tend to avoid external funds because of the possible restrictions on their scope of actions. Second, asymmetric distribution of information contributes to the preference of debt over equity which is explained in the following paragraphs.

[34] Altman (1984), p. 1087
[35] Myers and Majluf (1984), p. 209
[36] Myers (1984), p. 576

In general, it is expected that there are firm managers or insiders who have private information about many aspects of the firm due to their involvement. For example they are better informed about the nature of a firm's return stream or investment opportunities. Ross (1977) and Leland and Pyle (1977) started a model where choice of capital structure can signal insiders information to outside investors and narrow the gap. In the model by Ross (1977), only managers know the true distribution of firm return which is ordered by first order stochastic dominance. Larger debt levels stand for higher quality of the firm. Managers benefit from high stock value and are penalized if the firm goes bankrupt. Firm with low quality imitate high value firms because of the higher marginal expected bankruptcy costs at all debt levels: Issuing more debt would increase the probability of bankruptcy and penalty for managers.[37] Thus, a firm's debt value expresses firm value. Leland and Pyle (1977) argue that the willingness of people with private information to invest in the firm indicates the firm value. If managers or insiders hold shares from the firm their shares will rise in value as the debt level rises. Thus, managers will finance a project with debt and increase their investment in the firm if the project is profitable.[38]

In another research area, Myers and Majluf (1984) and Myers (1984) examine the effect asymmetric information has on investment decisions and how it influences capital structure. They model a situation where firms need capital to fund new investments and observe that equity issuance is not a favored choice. Equity financing creates a problem similar to Akerlof (1970) where buyers of used cars will demand a discount if they are running the risk of buying a lemon.[39] In the model of Myers and Majluf (1984), managers have private information on the true value of the project and of the offered shares. Since investors risk buying overvalued stocks to finance a bad project, they undervalue the equity price which discourages firms from issuing

[37] Ross (1977), p. 28
[38] Leland and Pyle (1977), p.371
[39] Akerlof (1970), p.489

stocks. Another negative effect of new security issuance is its negative effect on existing stocks prices. The larger the issue size the more prices of existing stocks drop which is confirmed by Krasker (1986).[40] Any level of equity issue undervaluation reduces the project's profitability. Mispricing might be so severe that it can not be offset by the project's return it is supposed to finance. If the firm does not have other funding opportunities than equity, its managers would pass on realizing this investment.[41].

Narayanan (1988) come to the same results of preferences with different approaches. In his model, information asymmetry only concerns the value of the new project. Since managers do not know the true value of a project even debt contains risks and overinvestment is possible. Since firms can not be separated by profitability of their projects, there will be a pool of projects with different values. Thus, equity issues will be priced with the average of all available projects. As firms with less or not profitable projects can benefit from selling overvalued stocks, overinvestment is the result. In equilibrium, equity financing does not seem to generate any gains for firms with profitable projects because the return is consumed by underpriced equity. Besides, equity issuance has an additional negative value on existing stockholders. Therefore, Narayanan (1988) advocates permanent debt usage to exclude inferior firms. Projects expected to be inferior will not use debt financing because possible losses can not be offset this way. Acceptance of new projects turns in to good news signalling that a profitable project has been found. Since new projects are always financed with debt, debt issuance becomes good news and increases the market value if the firm.[42]

[40] Krasker (1986), p.102
[41] Myers and Majluf (1984), p. 219
[42] Narayanan (1988), p. 46

3.4 Trade-off theory versus Pecking-order theory

This section presents empirical studies which tried to find evidence for both theories. Possible effects of debt on capital structure were mentioned in Modigliani and Miller (1958) and further discussed in Modigliani and Miller (1963) as well as Miller (1977). Management preference of internal funds was mentioned by Donaldson (1961) and did not induce a model until Myers (1984) and Myers and Majluf (1984).

However, there are many empirical studies which investigate the tax effects on debt and obtained different results. Some papers do not support the idea of large tax benefits while others have mixed results[43]. Then some studies found that financing choices are influenced by tax effects.[44] Rajan and Zingales (1995) investigated capital structure of 8000 companies from 31 countries and found negative relationships between the debt ratio and past profitability. This is the opposite of what the trade-off theory predicts. DeAngelo and Masulis (1980) present a model where the marginal tax benefit of interest deduction varies with the firm's leverage. The capital structure is influenced by the corporate tax rate, personal tax rate and a non-debt related corporate tax shield which consists of depreciation deductions and investments tax credit.[45] Since optimal leverage also depends on the firm's non-debt tax shields, these non-debt tax shields can substitute for the tax benefits offered by debt. Large non-debt tax shields increase the probability of not being taxed at all and decrease the interest tax shield's payoff. Thus, firms with large non-debt tax shields relative to their cash flow will have low debt.

MacKie-Mason (1990) criticized studies which did not find clear evidence of substantial tax effects for not focusing on incremental financing decisions. Instead debt ratios that are the

[43] Myers(1984); Bradley, Jarell and Kim (1984)
[44] MacKie-Mason(1990), p.1486
[45] DeAngelo and Masulis (1980), p. 4

result of cumulative years of separate decisions are studied.[46] Graham (2000) measured the size of tax benefits with his empirical study. The data shows that in the early 1980s firms were able to increase their firm value by 28% and in 1993 by 8 % if they increased their debt level to the inflexion point. Accounting for the personal tax penalty, firm value still could be increased by 10% and 4.5% respectively. Averaging over the sample period, a firm could have increased its value by 15% or 7.5% if the personal tax penalty is taken into account.[47] This contradicts Miller's theory that in equilibrium corporate tax benefits are fully offset by personal taxation of those deductions. Still, Graham pointed out that there are other costs and benefits not related to taxes he did not account for but influences the choice of capital structure. Graham and Harvey (2001) conducted a survey among CFO's of Fortune 500 firms and members of Financial Executive Institute (FEI). Of the 392 responses, only 19% did not have a target debt ratio whereas 37% had a flexible, 34% a ranging and 10% a fixed ratio. They also found little evidence of personal tax consideration by firms when they decide over debt levels.[48]This is also supported by managers' concern of earning volatility when deciding over debt policy which is consistent with the trade-odd theory.

Donaldson (1961) offers empirical evidence for the pecking-order theory by observing that managers prefer internal funds and mostly avoid external funds except for unavoidable "bulges". The majority of his sample of large corporations did not issue equity during the past 20 years and were not planning to do so. [49] But the fact that there are many firms which issued stocks although they could have issued debt speaks against the pecking-order theory. Frank and Goyal (2003) used a very large data set of American companies from 1972-1998 to test the

[46] Mac-Kie-Mason (1990), p. 1472
[47] Graham 2000, p.1934
[48] Graham and Harvey (2001), p. 211
[49] Donaldson (1961), p.67, 70

several implications of the pecking-order theory. The authors tried to copy the way Myers and Shyam-Sunders (1999) methodology in order to compare the results with each other. For easier comparison they split the sample into one sample period from 1971 to 1989 which matches Myers and Shyam-Sunders (1999) and one sample period with more recent data from 1990 to 1998. One of the study's results is that internal funds do not cover investment spending on average which. Furthermore, debt financing does not dominate equity financing. However, a subset containing large firms in the earlier years does show evidence of a pecking-order. The evidence declines over time which is explained with the larger number of small publicly traded firms in the 1980s and 1990s as compared to the 1970s. Since small firms do not follow the pecking-order, the overall average moves further from the pecking-order. But even a sample with the largest quartile of firms show declining evidence for the pecking-order theory over time.

Shyham-Sunder and Myers (1999) set up two simple models of the pecking-order and trade-off theory to test which model was able to explain a bigger part of the given data. The authors differentiate themselves from former publications which only focused on finding evidence for one theory but did not compare both theories or show whether the trade-off or pecking-order theory is dominant. Their simplified pecking-order model issues debt when internal funds do not meet a firm's real investment and dividend commitments. Equity is only used when only junk debt can be issued and costs of financial distress are high. Consideration of bankruptcy costs will result in difficulties to distinguish between pecking-order and trade-off theory for highly levered firms. The trade-off model is testing mean-reverting behavior because managers are supposed to target a certain ratio. As random events will bump firms from their target ratio, they should gradually approach that point again. The data set contained all industrial Compustat files. Financial firms, regulated utilities, firms involved in major mergers or firms

missing data on funds-flow or balance-sheet variables were excluded. The sample period starts in 1971 because Compustat add flow of funds in its database that year, and ends in 1989. Finally, firms had to meet requirements for continuous data which were specified in previous tests of target-adjustment models.[50] Continuous data is needed for the simulation of cumulative debt issues or retirement predicted by both theories. In order to test the trade-off theory, the authors would generate a capital structure pattern with the pecking-order theory. This simulated data is then tested against the target-adjustment hypothesis of the trade-off theory. However, the continuous data requirement reduces the sample to 157 and may contain more large firms since small firms show a higher tendency of exclusion. If such a bias exists, it is most likely to only affect the target-adjustment hypothesis negatively. [51] After careful selection of their sample and test-runs, evidence of the trade-off theory as well as the pecking-order theory can be found. But the pecking-order theory can explain a bigger part of the given debt level and wins by a narrow margin. In succession, the statistical power of these tests is examined by using Monte Carlo method to simulated hypothetical data. The result is that the target-adjustment model generates statistically highly significant results even when the hypothetical data is generated by following the pecking-order theory. However, the pecking-order hypothesis was rejected when hypothetical data was generated with the trade-off theory. This supports the dominance of the pecking-order theory. Although the existence of debt ratios cannot be denied, managers did not show much effort in targeting them. The authors admit that the pecking-order theory would not have been so dominant in a sample of growth firms with intangible assets. Further more, the simplicity of their models capture only a few implications of each model.

[50] see Jalilvand and Harris (1984) and Titman and Wessels(1988)
[51] Shyham-Sunder and Myers (1999), p.227

CHAPTER 4

INITIAL PUBLIC OFFERINGS

An Initial Public Offering (IPO) is when a security is sold to the public for the first time. The term usually refers to the offering of equity although it is equally valid for debt. An IPO is usually launched after a company has been successful over a period of time and its demand for equity capital cannot be met by a few investors anymore. Public offering of stocks allow the firm to reach more diversified investors which increases the stock's liquidity and, hence, reduce the firm's cost of raising capital. By closer observations of IPO's, three patterns can be identified.

4.1 Underpricing

This pattern is characterized by large initial returns of the stocks shortly after issuance. Stocks could not gain value so fast if they had not been issued at a lower price in the beginning. The IPO underpricing phenomenon can be observed on stock markets all over the world and can be explained with a number of reasons. A very well investigated one is called the winner's curse. Rock (1982) introduced a model where investors can choose to inform themselves and are able to price shares correctly. The choice depends on some prior information and since acquiring information is costly some investors prefer to stay uninformed but continue to invest. Informed investors impose adverse selection costs on uninformed investors. All investors have the same wealth and utility but the informed investor will only buy underpriced stocks. Since uninformed

investors buy all issues, they will receive all overpriced shares but only a portion of underpriced shares due to competition with informed investors. The problem for uninformed investors is that they will receive all shares they ask for if informed investors do not want them. Thus, the expected return on their received shares will be lower than the anticipated expected return when they submitted purchase orders. Therefore, uninformed investors will choose to submit orders only if IPO's mispricing is large enough to offset their biased allocation.[52] The model was later refined by Rock (1986) and Beatty and Ritter (1986). Firms with large uncertainty concerning firm value are better off using best-efforts method. As unsubscribed offers are withdrawn, uninformed investors face less adverse selection problems and will settle for a smaller underpricing compensation. These results are supported by Ritter(1987) who investigated cash offers from 1977 to 1982 in the United States. He observed price increases of firm-commited IPO's by 15% on their first trading day on average. Best-efforts IPO'S even rose by 47.8%.[53]

Other reasons are derive from benefits of low pricing. It can be desirable to underprice the issue for attracting initial buyers who would induce a bandwagon effect or a cascade where subsequent investors' wish to purchase is independent from their own information. The more interest is attracted towards the issue and stocks can distribute stocks to a larger number of small shareholders. This increases the stock's liquidity in the market and makes takeovers more difficult. The more investors holding the IPO the larger is the group seasoned equity offers can be marketed to. Lower offering prices can offer an insurance against lawsuits since firms would be less likely to be sued for misstatements in contracts.[54] But mispricings can also be induced by investment banks at the expense of issuing firm. Underwriters can reduce marketing efforts or pass heavily underpriced issues on to favorable customers.

[52] Beatty and Ritter (1986), p. 215
[53] Ritter (1987), p. 273
[54] Ibbotson (1975), p. 264

4.2 Hot issue market

Ibbotson (1975) introduced the term of hot issue markets. Hot issues are, issues whose initial performance is higher than average. Hot issue markets are periods where initial returns are abnormally high. The author examined the serial dependence of new issue performance of one month with the previous month. It was found that a hot market for the next month can be expected if the market in current month is hot. Since the series is stationary, the hot market will vanish at some point. Theoretically, investors could try to predict hot issue markets and heavily invest during this period while avoiding investments from "cold issues". Such a behavior is not feasible because new offerings are rationed and are oversubscribed. If all investors can predict hot issues, demand for shares will exceed supply by many times and profits opportunity is eliminated. However, issuers can consider past data to time their offering. Firms could obtain the highest prices by issuing after months of low initial returns.[55]

Ritter (1984) tried to explain the existence of hot issue markets with Rock (1986)'s winner's curse model. He tried to explain hot markets with a temporarily positive relation between risk and return as well as changing risk compositions of IPO's. For this purpose, data from 1977 to 1982 were examined. The implications of Rock's model were not able to explain hot issues but it was observed that the hot issue market in 1980 is mainly due to natural resource issues. The abnormal observations were explained by pricing lags, speculative investments and investment banks. If offering prices are calculated in the beginning of the issue process and prices increased before offering, the issue is relatively underpriced and has the potential of generating higher initial results. Issues from natural resource companies could have performed so well because speculators drove prices up. Underpricing can also be induced by underwriters who

[55] Ibbotson (1975), p.1037

then pass the issue on to favored customers. This explanation is especially reasonable since those were concentrated around Denver in 1980. Recommendations of this model are to buy issues from sectors which are exploited by underwriters if the winner's curse problem is tolerable. As for issuers, recommendations are difficult because of the long issue process which takes three to 12 months. Unlike Ibbotson (1975), Ritter found a relationship between high initial returns and volume. IPO volume tends to be large after periods of high stock market returns. At the end of a hot issue market, IPO volume is high but average initial return is low. Low return is either due to low demand which marks an inferior issue time or due to high offering prices where less mispricing occurs.

4.3 Long-run underperformance

IPO's also show the pattern of poor stock price performance in the long run. Ritter (1991) examined 1526 firms who had IPO's during 1975-1984. They generated a cumulative return of 34.47% in three years after offering. In comparison, a control group of already listed stocks with matching industry and market value produced an overall return of 61.86% over the same period.[56] Long run underperformance can increase the firm's costs of raising more capital with seasoned equity.

There are at least three theories regarding the long-run underperformance of IPO. Investors who are most optimistic about an IPO are the buyers. With high uncertainty about the value of the IPO, optimistic valuations will be much higher than pessimistic ones and widening the divergence of opinion. As time passes, more information is revealed and investors can come to a higher level of agreement which causes market price drops.

[56] Ritter (1998), p. 12 f

Underpricings of IPO's are compared to fads[57] where investment banks underprice stock in order to create the appearance of excess demand. It is predicted that firms with highest initial returns have the lowest subsequent return. This trend is especially accurate for smaller issues.[58]

If there are hot markets where investors are extremely optimistic about growth potential of IPO's, the cycle of large volume might represent attempts by managers to time their IPO's. This offers a valuable addition to the explanation of cyclical IPO volume with mere business cycle fluctuations. With consideration of timing IPO's there is a window of opportunity where volume is high and issues tend to be overvalued.

There is empirical evidence that issues during high volume periods have the lowest long-run returns. While Keloharju (1993) could not find any industry specific long run underperformance, Ritter (1991) observed varying performance levels in different industries.[59] Financial institutions showed the best performance during the initial three years after their IPO which is partly due to declining interest rate in 1985-1986. Oil and Gas firms underperformed significantly because of substantial oil price drops from 1981-1983. In the end, only 3 out of 14 industries did not underperform in the long run which advocates the second explanation of fads. Long run performance of IPO's was also related to reputation of investment bank it the result is that firms with more prestigious underwriter showed better performance.[60] Brav and Gompers found out that IPO's of firms financed by venture capital outperformed nonventure-backed IPO in 1972-1990. Especially small, non-venture backed and low book-to-market firms show underperformance which can be explained with their inability to absorb unexpected shocks in the

[57] Shiller (1990), p. 63
[58] Ritter (1991), p.15
[59] Keloharju (1993), p. 273 and Ritter (1991), p.18
[60] Carter et al. (1998), p.302

early and middle 1980s. Earnings declined for all firms but only small firms were not able to recover.

CHAPTER 5

EMPIRICAL STUDY

A data set containing 21 firms which went public either in 1995 or 1996 are examined in order to find some evidence of the presented theories or other patterns. The firms have been randomly taken out of a data sheet I received from Dr. Poulsen. It contains data about debt issuance and repayment from the year before the IPO until five years later. Firms from the subset belong to the medical, multimedia, internet, services, raw material and garment sector. The size of their assets ranges from $10,000 to $7 billion. I complemented this information with balance sheet information from the firms in the period 1996-2002 in order to determine their long-term debt to market value ratio. The balance sheets were taken out of SEC filings. Data on outstanding market shares and corresponding prices were obtained with Compustat. Following are short description of the firms with yearly details on stock price (in $), outstanding stocks (in millions). total asset (in $1,000) and debt to value ratio (in %).

5.1 Description of data

Aksys Ltd is a manufacturer of medical equipment for patients with chronic-kidney disease failure which was founded in 1991. It developed a Personal Haemodialysis (PHD) System which enables patients to perform frequent haemodialysis at alternate sites. In 2003, the Food and Drug Administration gave the permission to market the PHD system in the United States. While total

assets of the firm steadily declined, debt to value ratio shows a positive trend. Both numbers reversed their direction in 2000 where stock prices soared up by 300% in comparison the previous year and increasing market value abruptly. Overall, Aksys almost had no debt with an average debt to value ratio of 0.12%.

Table 5.1.1: Aksys Ltd

	1996	1997	1998	1999	2000	2001	2002
Stock price	8.63	5.75	4.31	4.88	16.50	4.65	5.30
Shares outstand.	13.709	14.003	14.759	15.077	18.318	22.098	25.500
Total assets	50,148	36,647	25,942	18,811	22,188	14,455	16,509
Debt to MV	0.017	0.096	0.193	0.199	0.052	0.155	0.109

Arthro Care Corp is a medical device company that develops, produces and markets products based on its patented Coblation technology with which soft-tissue can be removed surgically. Among others, it offers surgery products to neuro-, cosmetic, head or neck surgery markets. Similar to Aksys Ltd, this firm in the medical sector does not have much debt either. Although its average debt to value ratio of 0.253% is twice as high as Aksys, it is almost debt free. Total assets declined after its IPO until it increases dramatically due to tripled stock prices. Since long-term debt stayed about as large, debt to value ratio decreased because of very high market value. In the following year, the firm increased its assets by increasing its long-term liabilities position and pushing debt to value ratio to former level.

Table 5.1.2: Arthro Care Corp

	1996	1997	1998	1999	2000	2001	2002
Stock price	7.25	13.13	21.75	61.00	19.50	17.93	9.85
Shares outstand.	8.778	8.869	8.972	10.691	22.216	21.855	21.172
Total assets	33,297	26,675	27,760	110,039	140,462	133,697	135,952
Debt to MV	0.279	0.135	0.149	0.0348	1.087	0.014	0.077

Carrizo Oil & Gas, Inc. is an independent energy company in the natural resources sector. Its main branch is the exploitation of onshore sources in Texas or Louisiana. The company increased its total assets continuously and shows a positive trend for debt to value ratio. A look at its balance sheet tells that it generated a lot of capital with its IPO but not with the two following seasoned issues. Stock prices plunged although the amount of issued shares did not change much. This affected Carrizo's debt policy, as the debt to value ratio was quite high for the two worst years of stock price in 1998 and 1999. Debt decreased rapidly after a successful seasoned issue with the highest stock price so far. The average debt to value ratio is 34.3%.

Table 5.1.3: Carrizo Oil & Gas, Inc.

	1997	1998	1999	2000	2001	2002
Stock price	7.88	1.38	2.00	9.13	4.43	5.27
Shares outstand.	10.375	10.375	14.011	14.055	14.064	14.177
Total assets	53,658	64,988	83,666	93,000	117,392	135,388
Debt to MV	11.147	43.818	54.546	17.971	39.748	38.437

CCC Information Services Group, Inc. is a provider of services, software and information concerning automobile claims. Its products facilitate the communication between automobile insurances, repair facilities and customers as well as management of claims. The average debt to value ratio is 6.6%. Its total asset value grew until 2000 and reaches its highest ratio. CCC started to accumulate more long-term debt in 1998 as it also experienced higher stock prices and market value. Its debt was the highest in 2000, and its stock price plunged and cut market value in half. Although stock prices did not recover in the following years, debt was almost extinguished.

Table 5.1.4: CCC Information Services Group, Inc.

	1996	1997	1998	1999	2000	2001	2002
Stock price	16.00	19.75	17.25	17.13	6.25	6.18	17.73
Shares outstand.	23.360	24.460	23.700	21.992	21.759	25.504	26.075
Total assets	58,268	83,494	79,018	84,549	97,859	62,194	67,843
Debt to MV	1.579	1.158	3.668	6.948	25.054	6.791	0.695

CNET Networks, Inc. is a global media company providing databases related to technology and commerce. It operates a branded internet network, prints publications and produces TV as well as radio programs. It is also the primary information provider for computer and electronics sales and distribution channels. After its IPO, CNET has almost doubled its total assets every year with the exception of 1999 where assets grew by than 1200%. CNET was able to issue four times as much stock in 1999 than the previous year at a slightly higher price. Since debt grew even by a larger rate, the debt to value ratio increased. After 2000, total assets declined dramatically but the firm maintained a high debt to value ratio. Stock prices of the company fell below its offering price.

Table 5.1.5: CNET Networks, Inc.

	1996	1997	1998	1999	2000	2001	2002
Stock price	29.00	29.50	53.25	56.75	16.00	8.97	2.71
Shares outstand.	13.281	14.662	17.060	73.923	134.096	137.198	138.145
Total assets	39,842	58,262	88,357	1,230,311	2,862,361	814,780	377,295
Debt to MV	0.150	0.600	0.063	4.095	7.945	12.985	24.519

Cost Plus, Inc. is a retailer of living and home entertaining products. Its first store opened 1958 in San Francisco and the entire company was sold in a leveraged buyout in 1987.

Its number of stores rose from 9 during IPO to 23 in 2002. Its store location is primarily in metropolitan and suburban markets. With an average debt to value ratio of 6.76% Cost Plus has a low debt level. It had continuously decreased its debt level with 1999 being the most successful year. That year it doubled the amount of outstanding shares and maintained its high stock price. The result was a very high, market value which pushed debt ratio down. As stock prices fell, the firm increased its debt to enable further growth of total assets.

Table 5.1.6: Cost Plus, Inc.

	1996	1997	1998	1999	2000	2001	2002
Stock price	19.13	29.00	31.38	35.63	29.38	26.50	28.67
Shares outstand.	8.100	8.688	8.861	20.522	21.005	21.550	21.556
Total assets	128,198	152,000	173,141	214,699	252,865	317,940	374,659
Debt to MV	11.625	7.978	7.003	2.865	3.442	7.011	7.426

CSG Systems International, Inc. provides customer care and billing solutions worldwide for the communications markets. Its customers include cable television, direct broadcast satellite ("DBS"), telephony, on-line services and others. CSG shows a strict positive trend for total assets with a severe upward jump 2002 where it doubles its asset. Until then CSG usually increased its asset by $60,000 to $100,000 on average. In 1997 and 2002, larger assets were financed with higher debts. The ratio is especially high in 2002 because stock prices forfeited 60% of its value and debt reached it peak in the same year. Debt to value ratio dropped significantly because stock prices doubled in 1998. The average debt to value ratio is 7.97%.

Table 5.1.7: CSG Systems International, Inc.

	1996	1997	1998	1999	2000	2001	2002
Stock price	15.38	40.00	79.00	39.88	46.94	40.45	13.65
Shares outstand.	25.489	25.480	25.733	51.639	52.530	52.664	51.727
Total assets	114,910	179,349	271,496	274,968	332,089	374,046	731,317
Debt to MV	6.872	12.400	5.104	2.832	1.332	0.014	27.271

Digital Generation Systems, Inc. runs a multimedia network which provides electronic delivery to broadcast industry by assigning program providers with radio and television stations. The company is already established in the market of audio spot advertisement radio stations and has entered the market for distributing video spots to television stations, cable systems and networks. Around its IPO time, 5000 radio stations and 200 radio stations were customers. In 2002 these numbers increased to 7500 radio stations and 875 Television stations. Total asset and debt to value ratio fluctuate significantly for this company. The average debt to value ratio is 10.09% and its sudden increases in 1997 and 2001 can be explained with poor stock price performance or much more debt respectively.

Table 5.1.8: Digital Generation Systems, Inc.

	1996	1997	1998	1999	2000	2001	2002
Stock price	8.38	2.50	5.56	7.13	2.13	1.11	1.07
Shares outstand.	11.654	12.123	26.240	27.530	28.236	70.784	70.811
Total assets	45,248	60,697	49,792	41,766	36,387	235,457	97,205
Debt to MV	8.007	28.104	5.994	1.265	2.801	18.575	11.589

Eclipse Surgical Technologies develops, produces and distributes laser-based surgical products and disposable fiber-optic accessories. They are used for cardiovascular disease where

surgery is performed on the beating or non-beating heart. With an average debt to value ratio of 0.3%, this company belongs to the low debt group. After years of declining total assets, Eclipse tried to reverse the trend by issuing more equity and debt. The number of outstanding share doubled while stock priced remained constant and long-term debt grew 6 times. Due to higher market value, higher debt was balanced and debt to value ratio just tripled. But when shares were only worth 15% of preceding year's stock price the debt to value ratio grew by 5 times. After this year, total asset value and debt were reduced what puts debt to value ratio in its usual range again.

Table 5.1.9: Eclipse Surgical Technologies

	1996	1997	1998	1999	2000	2001	2002
Stock price	8.75	5.88	7.31	7.38	0.84	1.17	0.38
Shares outstand.	16.172	16.858	17.615	29.437	30.836	36.507	37.121
Total assets	58,706	43,474	26,243	34,019	16,965	11,309	7,755
Debt to MV	0.014	0.010	0.088	0.374	1.533	0.075	0.007

Fortress Group, Inc. is a regional house-building company who designs, builds and sells single family home in five different regions. In 2002, it offered houses with the size from 1,100 to 5,000 square feet in the price classes from $110,000 to $600,000. Its customer segments cover first-time buyers, move-up buyers and semi-custom homebuyers. Fortress had the highest average debt to value ratio of 88.36% in the sample. It acquired high long-term liabilities almost immediately after its IPO and maintained a high level of debt. Combined with ever decreasing stock prices, it was not able to control debt to value ratio and defaulted in 2002.

Table 5.1.10: Fortress Group, Inc.

	1996	1997	1998	1999	2000	2001
Stock price	6.00	4.25	2.50	0.69	1.75	1.98
Shares outstand.	11.761	11.629	11.908	12.231	3.095	3.117
Total assets	193,733	331,327	449,903	451,181	409,915	227,451
Debt to MV	66.509	81.838	90.772	97.301	98.139	95.655

Kendle International, Inc. is a contract research organization ("CRO"). It offers clinical research and drug development services to pharmaceutical and biotechnology industries. Its services include clinical trial design and management, clinical data management, biostatistical analysis, medical writing and regulatory consultation and representation. The company maintained a rather fixed amount of long-term liabilities until 2002. Before this, the debt to value ratio fluctuated with its stock price which jumped from $24 per share in 1998 to $10, reached its old value in 2001 in order to drop again. It is interesting that two years of low market value did not affect the firm's debt nor had significant negative effects on total assets. One would expect more debt if equity can not raise capital on favorable terms due to low prices. Only in 2002 did low market value coincide with a surge of absolute and relative debt value.

Table 5.1.11: Kendle International, Inc.

	1997	1998	1999	2000	2001	2002
Stock price	16.75	23.38	9.88	9.94	20.16	8.80
Shares outstand.	7.582	10.955	11.489	11.763	12.382	12.842
Total assets	79,623	153,240	184,382	176,519	204,051	155,397
Debt to MV	2.855	1.857	4.161	4.251	3.093	13.817

Kos Pharmaceuticals, Inc. is a pharmaceutical company specialized in the development of proprietary prescription pharmaceuticals for the treatment of certain chronic cardiovascular and respiratory diseases. Initially, the firm had a very low debt to value ratio. But when it increased outstanding stocks by 3 Million, stock prices lost 75% of their value and debt was taken out in 1998. The ratio continued to increase when stock prices did not allow for equity financing until 2001. After this year, the absolute amount of debt as well as the ratio in 2002 declined constantly. The average ratio is 13.81%.

Table 5.1.12: Kos Pharmaceuticals, Inc.

	1997	1998	1999	2000	2001	2002
Stock price	15.44	5.88	5.63	17.63	34.60	19.00
Shares outstand.	14.773	17.720	18.026	19.947	20.492	20.808
Total assets	65,106	21,570	26,258	29,648	82,941	69,441
Debt to MV	0.010	8.151	37.978	16.999	11.825	7.924

Mossimo, Inc. is a corporation founded 1995 in Delaware and is a designer as well as licensor of apparel and related products. In 2000 Mossimo entered into a licensing and design service agreement with Target Corporation. It has approval rights for product design, marketing and advertising materials. Mossimo branded products sold in the United States have to go through the production and distribution channels of Target. Apart from design service fees and license royalty fees, Target pays fees based upon net sales of Mossimo brand products. The company had maintained a very low ratio of debt which did not exceed 1% during five years. Until 2000, it gradually reduced its long-term liabilities where varying debt to value ratios are due to fluctuations in stock prices. When the firm suffered from a very high amount of long-term payables in 2000, its stock prices plunged to its lowest level then and created a negative equity

for shareholders. The payables of nearly $5.7 Million accounted for half of its total assets in 1999. Debt to value ratio that year was 6 times larger than its average ratio of 3.4%. When Mossimo entered into the Target agreement and started to extinguish its debt with a creditor plan, stock prices and ratio recovered.

Table 5.1.13: Mossimo, Inc.

	1996	1997	1998	1999	2000	2001	2002
Stock price	12.38	3.56	10.06	8.06	1.63	3.50	5.50
Shares outstand.	15.00	15.00	15.01	15.08	15.08	15.33	15.49
Total assets	50,754	36,824	17,359	10,736	1,964	9,294	20,536
Debt to MV	0.691	0.892	0.221	0.177	18.807	2.889	0.224

Radiant Systems, Inc. is a provider of automation solutions to the retail industry. Its systems allow firms to interact electronically with consumers, manage site operations, logistics, vendors and credit networks. With an average debt to value ratio of 1.16%, it kept up a low debt level. It realized its largest debt ratio in 1998 when its stock prices plunged. Although the absolute amount of debt did not increase, the firm might have sent out negative signals. Current liabilities, total assets and working capital declined that year which might indicate higher probabilities of financial distress. For some reason, stock prices surged and the company issued equity to capitalize on this. Although it issued more equity in the following years it did not increase it market value. Evidently, it raised enough capital to retire all long-term liabilities immediately in 2000. The following year, outstanding shares were reduced with debt since stock prices dropped substantially.

Table 5.1.14: Radiant Systems, Inc.

	1997	1998	1999	2000	2001	2002
Stock price	28.50	7.38	40.19	20.50	11.50	9.63
Shares outstand.	15.424	15.506	16.984	27.648	27.512	28.022
Total assets	93,515	84,166	111,999	131,261	125,162	145,256
Debt to MV	0.914	3.466	0.619	0	0.362	1.652

Realnetworks, Inc. provides media delivery and digital distribution solutions for the Internet. Audio, video, text and animation are distributed. It developed and commercialized the streaming media systems that enable the real-time delivery and playback of multimedia content. The company increased outstanding shares by 3 million one year after its IPO in order to benefit from surging stock prices. Next to a higher market value, the decreased absolute amount of debt helped to reduce the debt to value ratio. It initiated an even larger increase in outstanding stocks in 1999 and capitalized on the 350% increase of stock price. All long-term liabilities were repaid and the amount of total assets tripled. In 2000, outstanding shares doubled again but the internet bubble busted and stock prices were just worth 7% of last year's stock price. From this time on, debt was increased while stock prices continue to decline and outstanding resource were slightly reduced.

Table 5.1.15: Realnetworks, Inc.

	1997	1998	1999	2000	2001	2002
Stock price	13.88	35.88	120.31	8.69	5.94	3.81
Shares outstand.	30.866	33.574	74.824	159.214	159.844	157.681
Total assets	116,704	128,774	411,124	578,408	567,860	462,101
Debt to MV	3.702	0.563	0	1.058	2.608	5.924

Renal Care Group, Inc. provides dialysis services to patients with chronic kidney failure. In 1996 this company was formed by a leading doctor in this field: His objective was to offer a full range of care for such patients on a cost-effective basis. The company shows a steady total asset growth accompanied by increased debt until 1999. It kept issuing equity independently from either rising or declining stock prices. However, increased debt level coincides with falling stock prices and increased outstanding amount of stocks. Long-term liabilities were reduced when stock prices increased in 2000. Although equity was issued in 2000 and 2001, fewer shares were issued than from1997-1999 where prices dropped. When stock prices fell again in 2002, outstanding amount of shares were decreased on expense of rising debt. The mean average debt to value ratio is 3.4%.

Table 5.1.16: Renal Care Group, Inc.

	1996	1997	1998	1999	2000	2001	2002
Stock price	31.63	32.00	28.81	23.38	27.42	32.10	31.64
Shares outstand.	14.182	24.897	40.922	44.764	47.087	49.497	48.193
Total assets	18,098	131,812	248,083	416,132	482,384	582,672	652,257
Debt to MV	0.045	2.082	6.460	7.437	5.225	1.084	1.479

Suiza Foods Corporation is a manufacturer and distributor of fresh milk, dairy products, frozen food, plastic packaging and packed ice. Since its IPO in April 1996, it has pursued an acquisition strategy in order to add complimentary product lines and increase economies of scale as well as operating efficiencies. 40 firms were acquired in this course of which many are leading competitors in their market and have an established reputation. Since such a large number of acquisitions require a lot of capital, Suiza Foods Corporation increased its asset by eight times within six years after the IPO. With assets worth of $7 billion in the end of 2003, it is

the company which issued most debt in the sample. Suiza Foods Corp maintained a debt to market value ratio of 52.73% which was among the highest in the data set. It increased debt gradually over the years and reduced it only in years of declining stock prices.

Table 5.1.17: Suiza Foods Corporation

	1996	1997	1998	1999	2000	2001	2002
Stock price	20.25	59.56	50.94	39.63	48.00	68.20	37.10
Shares outstand.	10.742	30.463	33.598	29.288	27.286	43.936	88.641
Total assets	833,624	1,403,462	3,013,783	2,658,922	3,780,478	6,731,897	6,582,266
Debt to MV	67.643	30.897	51.247	57.896	65.456	57.662	53.251

U S Liquids, Inc. provides liquid waste management and services like collection, processing, recovery and disposal. It focuses its 45 facilities on industrial and commercial waste water in 13 states and Canada. The average debt to value ratio is 49.02% The company kept increasing its ratio, absolute amount of debt and total assets until 1999. It issued more shares in 1998 where it was able to benefit from high stock prices. But when stock prices dropped in 1999 and 2000, the company increased its number of outstanding stock by a smaller amount. With low stock prices, the firm increased its long-term debt which was not retired until 2002. Due to recovery of stock prices, the debt to value ratio fell just to increase again next year due to very poor stock price performance.

Table 5.1.18: U S Liquids, Inc.

	1997	1998	1999	2000	2001	2002
Stock price	14.13	22.50	8.38	2.19	5.68	0.41
Shares outstand.	7.303	12.498	15.781	15.819	16.032	16.095
Total assets	55,016	252,165	369,083	352,177	320,876	154,999
Debt to MV	20.990	24.583	49.768	77.346	54.322	67.132

Waste Industries, Inc. provides solid waste management in North and South Carolina. It collects, transfers, recycles, processes and disposes of solid waste. It already had a high level of debt during its IPO with long-term debt accounting for more than half of its total assets. The debt level never declined but almost doubled every year. Despite high debts, Waste Industries issued stocks in 1998 but refrained later from this possibility as stock prices were too low. An interesting point is its large position in property and equipment which is not surprising for the firm's industry. In 2000, decided to reorganize and merge into Waste LLC and form Waste Holdings, Inc.. After more acquisitions and restructuring, the company is known as Waste Industries USA, Inc.. today.

Table 5.1.19: Waste Industries, Inc.

	1997	1998	1999
Stock price	18.63	17.25	11.31
Shares outstand.	11.591	13.381	13.854
Total assets	108,258	176,201	249,204
Debt to MV in %	0.20740	0.29062	0.49518

Westaff, Inc. offers temporary staffing services primarily in suburban and rural markets in the United States and selected international markets. It has a network of franchise agents, self owned and licensed offices with which it serves businesses and government agencies. The firm was founded in 1948 and went public in 1995 with a moderate debt level with 15% of its total assets are long-term liabilities. The absolute amount of debt changed little in 1996 and accounted for only 3.67% of market value. Although stock prices doubled by the end of 1997, debt was used to reduce number of outstanding shares during that year. The attempt to capitalize on high stock prices by increasing outstanding shares in the following year, caused prices as well as its

market value to drop substantially and the firm accrued even more debt. All this induced a rise of the debt to value ratio to 31.11% while the average ratio is 18.14%. Rising stock prices and partial debt retirement improved the debt ratio before it reached 54.1% in 2000 due to very low stock prices. Despite low stock prices it increased outstanding shares in order to repay all debt in 2001.

Table 5.1.20: Westaff, Inc.

	1996	1997	1998	1999	2000	2001	2002
Stock price	9.13	16.88	6.25	8.25	2.00	2.50	2.50
Shares outstand.	10.338	10.262	15.840	15.876	15.819	15.914	15.972
Total assets	120,780	154,530	197,145	190,830	183,072	123,175	121,955
Debt to MV	3.679	9.240	31.110	24.109	54.073	0	4.770

Yahoo!, Inc. is an internet media company that provides World Wide web programs for millions of users around the world. Its navigational guide is leading in terms of traffic, advertising, household and business user reach and is one of the most recognized brands associated with the Internet. After its IPO in 1996, it did not issue long-term debt until a huge issue of $750 million in 2003. The average debt to value ratio of 0.189% is due to other long-term liabilities but debt issue. When stock prices were extraordinarily high in 1998 and 1999, it kept a very small amount of long-term liabilities. But when stock prices plunged, Yahoo increased other liabilities gradually. Independent from stock prices or other liabilities, it increased it total assets and current liabilities which indicate that its business processes were not affected.

Table 5.1.21: Yahoo!, Inc.

	1996	1997	1998	1999	2000	2001	2002
Stock price	17.00	69.25	236.94	432.69	30.06	17.74	16.35
Shares outstand.	26.577	45.013	99.510	266.399	561.651	575.520	594.860
Total assets	110,255	141,884	781,019	1,469,821	2,269,576	2,379,346	2,790,181
Debt to MV	0	0	0.029	0.011	0.190	0.233	0.862

5.2 Evaluation

Dividing the firms into groups according to their debt to value ratio shows that almost all firms in the medical production sector are in the group with the lowest ratio. Only Renal Care Group and Kendle International show higher ratios between 3% - 5% on average. They have a high demand for capital because of their highly specialized tangible assets. Their fluctuating stock prices make equity financing less attractive because of difficulties to estimate costs and benefits of a new issue. These two arguments advocate debt usage but the firm do not take out large amounts of debt. Another argument against equity financing is the low average stock value during the initial 5 years after their IPO. Only Arthro Care and Yahoo! Inc had an average stock price which exceeds the initial offering price significantly. While average stock prices for Digital Generation Systems matched, Aksys Ltd and Eclipse Surgical Technology were below their initial offering price. This means that a bigger part of firms were not able to get over the usually undervalued IPO price. Thus, the amount of capital raised with issuing stocks does not increase or even shrinks. Still, these 5 firms belong to the 75% of the entire data set which has increased outstanding shares at least by 100%.

Equity financing at low debt level can be a contradiction to the pecking order theory. Firms applying this theory often choose to exhaust their borrowing potential before issuing stocks. But it is not clear whether firms had chosen or were forced to avoid debt usage. Since these firms have highly intangible assets like patents and are operating in newer markets, they might encounter problems in finding favourable borrowing terms. However, their IPO did not induce a common trend concerning debt usage which seems more correlated to stock prices. Absolute amount of debt tends to increase a little in years with low stock prices.

The group with moderate debt level have debt to value ratios from 1% to 20%. Half of the data set falls into this group which is a variation of firms in the medical, multimedia, apparel and special services sector. Their average total assets range from $250 million to $750 million. They show the same tendency of acquiring more long-term liabilities if stock prices fall.

The group with the highest debt to value ratio has firm which have high costs for doing business. U. S. Liquids and Waste Industries need expensive equipment and facilities whereas Fortress Group has capital invested in houses which have not been sold. Suiza Foods Corp. has a high level of debt because of its acquisition strategy. But high debt to value ratios can jeopardize the business and result in termination of business similar to the case of Fortress Group or enforce reorganization like Waste Industries had to conduct.

The distribution of debt to value ratios indicates that firms prefer not to have any long-term liabilities or a low level unless they have a very high capital demand. There is no evidence that firms lever up in order to gain from tax shields or that firms prefer debt over equity. A closer look at the spreadsheet about their debt issuance and retirement behaviour show more than a half of the firms retired more debt than they issued during the initial five years after an IPO. Firms which issued more debt are those with high maintenance costs.

CHAPTER 6

CONCLUSION

The balance sheet data points out that firms avoid high level of long-term liabilities after the IPO. Although liabilities show a positive trend sometimes, 75% of all firms keep their debt to market value ratios below 20% and 60% of firms have ratios of less than 10%. Firms with high ratios have high costs of maintenance or pursued a capital consuming strategy. Fortress Group which had the highest average debt to market value ratio of 88% defaulted 7 years after its IPO.

Considering a low debt ratio with the fact that 60% of the firms retired more debt than they issued during the initial 5 years after their IPO, the pecking order theory is unlikely to apply those firms. Statements about the trade-off theory can not be made with the observed data because they do not reflect taxes. Low debt levels can be explained with low benefits of tax or shareholders imposed restrictions on a firm's borrowing capacity. As Chapter 3 points out, there are many determinants of capital structure. Whether the process of going public increased the influence of one determinant could not be detected.

However, since stock prices affect the fund raising capability of equity financing and therefore the demand for debt, IPO's can affect their firm's capital structure with their pattern of equity financing. If the offering price is substantially underpriced, an IPO may not raise enough capital and force a firm to use debt. Similarly, if firms can time their issue date and offer their stocks in hot issue markets, they can raise enough capital to retire all debt and keep future demand for debt low. The stock price in 2000 was 4 times as large as the stock prices in the

previous year. Realnetworks doubled its amount of outstanding stocks and realized a debt to value ratio of 0 that year. Yahoo! did not issue debt until 2003. But Chapter 4 shows that in some empirical studies, stocks issued in hot markets are very likely to have long-run underperformance. In this case, future seasoned issues for raising equity become less attractive because investors will consider the IPO's bad performance and take further discounts from the offering price of future new issue. This can make equity financing less attractive than debt. Only 30% of the firms had higher average stock prices that exceeded their IPO offering price which might indicate long-term underperformance. But the debt to value ratio of these firms ranges from 0.189% (Yahoo! Inc) to 52.74% (Suiza Food Corp) which make it impossible to derive any explanations.

In order to receive more definite results, studies should consider marginal tax rates, other performance measure and restrictions to debt usage imposed by the process of going public.

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