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Kai Rudolph

Bargaining Power Effects in Financial Contracting

A Joint Analysis of Contract Type and Placement Mode Choices

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Kai Rudolph

Bargaining Power Effects in Financial Contracting

A Joint Analysis of Contract Type and Placement Mode Choices

With 25 Figures
and 99 Tables

Springer

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Preface

This work was accepted as a dissertation by the University of Muenster, Germany, in 2004. It was written while I was a teaching and research assistant at the Department of Banking.

I own many debts – personal and intellectual – to Professor Dr. Andreas Pfingsten, my doctoral adviser, for his overall support while I was writing my dissertation. This thesis benefited much from his constructive criticism. I am also grateful that Professor Dr. Klaus Röder, Department of Finance, University of Regensburg, Germany, acted as my second advisor.

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Thank you all very much.

Kai Rudolph, Muenster, May 2006

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Symbols / Notation

AC	$\in [0, \infty)$	Agency costs
B		Borrower
D°		Public debt
$D^{\bullet}$		Private debt
DP	$\in [0, 1]$	Default probability
E°		Public equity
$E^{\bullet}$		Private equity
f_y	$\in [0, 1]$	Project return distribution
h	$\in [0, y_{max}]$	Fixed repayment obligation (debt financing)
h^*	$\in [0, y_{max}]$	Optimal fixed repayment obligation (debt financing)
h^*_j	$\in [0, y_{max}]$	Optimal fixed repayment obligation given that j optimizes contracts' conditions (debt financing)
$h^*_{j,\text{ i-type contractual partner}}$	$\in [0, y_{max}]$	Optimal fixed repayment obligation given that j optimizes contracts' conditions conditioned on the i-type contractual partner (debt financing)
IR	$\in [0, \infty)$	Informational rent
L		Lender
LPM^1_h	$\in [0, \infty)$	Lower partial moment 1
mc	$\in [0, \infty)$	Monitoring costs (equity financing)
nc	$\in [0, \infty)$	Negotiation costs (private placement)
$\overline{P}_j$	$\forall j \in \{L, B\}$	Investment/financing alternative of j
P^+_j	$\forall j \in \{L, B\}$	Positive investment/financing alternative of j
PB	$\in (-\infty, \infty)$	Borrower's expected profit
$\widetilde{PB}$	$\in (-\infty, \infty)$	Borrower's expected profit when his project is financed by the lender

PL	$\in (-\infty, \infty)$	Lender's expected profit
$\widetilde{PL}$	$\in (-\infty, \infty)$	Lender's expected profit when the borrower's project is financed
q	$\in [0, 1]$	Proportional return participation (equity financing)
q^*	$\in [0, 1]$	Optimal proportional return participation (equity financing)
q_j^*	$\in [0, 1]$	Optimal proportional return participation given that j optimizes contracts' conditions (equity financing)
$q^*_{j,\text{ i-type contractual partner}}$	$\in [0, 1]$	Optimal proportional return participation given that j optimizes contracts' conditions conditioned on the i-type contractual partner (equity financing)
$S(\widetilde{y})$	$\in [0, \infty)$	Spread of return distribution
vc	$\in [0, \infty)$	Verification costs (debt financing)
$\mathrm{Var}(\widetilde{y})$	$\in [0, \infty)$	Variance of project return
$\widetilde{y}$		Risky project return
y	$\in [y_{min}, y_{max}]$	Project return realization
y_{max}, y_{min}	$\in [0, \infty)$	Maximum, minimum project return
$\widehat{y}$	$\in [y_{min}, y_{max}]$	Project return proclaimed by the borrower
ΔPB		Change in the borrower's expected profit due to a bargaining power redistribution
ΔPL		Change in the lender's expected profit due to a bargaining power redistribution
λ_j	$\forall j \in \{L, B\}$	Probability of the A-type contractual partner (j)
$\widehat{\lambda}_j$	$\forall j \in \{L, B\}$	Expected probability of the A-type contractual partner (j)
$\lambda_j \vert x$	$\forall j \in \{L, B\}$	Conditional probability of the A-type contractual partner (j)
$\widehat{\lambda}_j \vert x$	$\forall j \in \{L, B\}$	Conditional expected probability of the A-type contractual partner (j)
μ	$\in [0, \infty)$	Expected project return
ζ	$\in [0, \zeta_{max}]$	Relative return disparity/risk
ζ_{max}	$\in [0, 1]$	Maximum relative return disparity/risk
ζ_{crit}	$\in [0, 1]$	Critical relative return disparity/risk
$\wedge$		And
$\vee$		Or
$\max_j$		Maximization with respect to j
s.t.		Subject to
$\big\vert_{X=x}$		For $X = x$

$Prob(X = x)$		Probability of $X = x$
x	$\in [x_1, x_2)$	$x_1 \leq x < x_2$
x	$\in [x_1, x_2]$	$x_1 \leq x \leq x_2$
x	$\in \{x_1, x_2\}$	$x = x_1$ or $x = x_2$
$\forall$		For all
$\in$		Element of
$x \succ y$		Strict preference for x over y
$x \prec y$		Strict preference for y over x
$\sim$		Indifference between x and y

Abbreviations

AOB	Alternating offer bargaining
ARD	American Research and Development
A-type	Party with a positive profit/financing alternative
B	Borrower
BCOC	Borrower's contract offer condition
BCOC(NL)s	Borrower's contract offer condition satisfied for N-type lender
BCOC(AL)s/ns	Borrower's contract offer condition for A-type lender satisfied / not satisfied
BM	Basic model
BPC	Borrower's participation constraint
BPCb/nb	Borrower's participation constraint binding / non-binding
BS^a	Borrower scenario with absolute power
BS^r	Borrower scenario with restricted power
C	Candidate
Ct	Contract type
Cts	Contract types
Ct/pm	Contract type / placement mode
CDr/nr	Case distinction between risky / riskless debt
EM	Extended model
FCC	Feasible contracting constraint
IMF	International Monetary Fund
L	Lender
LCOC	Lender's contract offer condition
LCOC(NB)s	Lender's contract offer condition satisfied for N-type borrower
LCOC(AB)s/ns	Lender's contract offer condition for A-type borrower satisfied / not satisfied
LPC	Lender's participation constraint
LS^a	Lender scenario with absolute power
LS^r	Lender scenario with restricted power

NoN	Non-negativity constraint
N-type	Party without a profit/financing alternative
PC	Parameter constellation
Pm	Placement mode
Pms	Placement modes
S1	Strategy 1
S2	Strategy 2
SCCE	Set of consistent conditional expectations

1

Introduction

Bargaining power plays an important role in financial contracting when determining which firms / projects are financed and how the value created is distributed between firms and their financiers (cf., e. g., in case of venture capital financing Fairchild (2004)). A bargainer possesses bargaining power if he can affect the bargaining outcome in a way desirable for him.

The aim of this dissertation is to examine bargaining power effects in financial contracting. In particular power effects on firms' choices of contract type (debt vs. equity) and placement mode (public offering vs. private placement) are considered.

The motivation for this research is presented in Section 1.1, while Section 1.2 discusses the methodology applied and describes the structure of the dissertation.

1.1 Motivation

In their pioneering work on capital structure Modigliani and Miller (1958) showed that in a simple world, with no taxes, no incentive or information problems, and a given profitability, the way a firm is financed is irrelevant for the value of the firm. However, subsequent empirical research revealed that in reality capital structure does matter.[1]

---

[1] For example, Rajan and Zingales (1995), Hovakimian et al. (2001), Antoniou et al. (2002), and Frank and Goyal (2003a) discover systematic factors which influence firms' debt-equity choice.

According to Harris and Raviv (1991) and Hart (2001) the forces driving firms' financing decisions basically belong to one of the following categories.[2] These are the desire to

- minimize the burden due to corporate and personal taxes;
- influence corporate control contests;
- convey private information to capital market participants to mitigate adverse selection difficulties (the asymmetric information approach);
- ameliorate conflicts of interests among various claim holders to the firm's resources (the agency approach) and
- affect competition in the product/input market.

However, the empirical validity of these forces, respectively of their underlying factors, has been intensively discussed. For example, while Titman and Wessels (1988, p. 17) find that,

> "results do not provide support for an effect on debt ratios arising from non-debt tax shields, volatility, collateral value, or future growth,"

Harris and Raviv (1991, p. 334) observe that

> "leverage increases with fixed assets, non-debt tax shields, growth opportunities, and firm size and decreases with volatility, advertising expenditure, research and development expenditure, bankruptcy probability, profitability and uniqueness of the product."

Myers (2003, p. 217) concludes so far[3]

> "There is no universal theory of capital structure, and no reason to expect one. There are useful conditional theories, however [...] Each factor could be dominant for some firms or in some circumstances, yet unimportant elsewhere."

Now recently, Röell (1996) and Pagano et al. (1998) revealed that a primary reason for a firm's initial stock market listing, i. e. for a firm's decision to go public, is to increase competition among potential fund suppliers. Hence, going public improves a firm's bargaining position with fund suppliers.[4] They empirically observe that a firm's strategic decision to go public actually increases competition among banks providing loans and other potential sources of finance. Pagano et al. (1998) find that firms after their initial stock market listing borrow from more banks, obtain better terms of loans even after controlling for leverage effects due to their increased equity base, and reduce the concentration of their borrowings. Such bargaining power effects have to be considered in a firm's decision to go public or not, as otherwise the immense costs of such a decision can not be justified (cf. Ellingsen and Rydqvist (1997)).[5]

---

[2] Of course, the following broad categorization is far from being free of overlaps among the categorized forces since many interdependencies among the forces driving firms' financing decisions exist. However, the categorization helps to illustrate the wide range of forces on which firms' capital structure choices depend.

[3] As the notion in Myers (1984) shows, his opinion nearly did not change over the last nineteen years, see Myers (1984, p. 575):

> "How do firms choose their capital structures? [...] the answer is 'We do not know'."

Independently, if bargaining power considerations possess such a big impact on a firm's decision to go public or not, they also affect a firm's financing decision in general.

The significance of bargaining power considerations in a firm's financing decision is also confirmed by Gompers and Lerner (1996). They find for the United States that venture capital funds can reduce the number of restrictive covenants imposed by investors when the supply of venture capital is high. Moreover, Inderst and Müller (2004) show that the distribution of bargaining power between start-up firms and venture capitalists affects the financial contracts negotiated, the final contract agreement probability as well as the value created in the start-up firm.

Inspired by Röell (1996) and Pagano et al. (1998), this dissertation examines how bargaining power affects a firm's choices of contract type (debt vs. equity) and placement mode (public offering vs. private placement). Inderst and Müller's venture capital focus is relaxed by incorporating the firm's market segment choice in the decision process. The dissertation deals with firms which already have access to private as well as public debt and equity markets.

The primary objective of this dissertation is to demonstrate that a firm's financing decision depends among other things on bargaining power considerations and to illustrate potential reasons for this dependency. Thereby, the importance of bargaining power considerations for corporate finance is emphasized. Firms planning to raise funds have to be aware about their current bargaining position when negotiating with potential fund suppliers. Firms should know whether and how they can improve their bargaining position.

---

[4] Further benefits of going public are, for example, to overcome borrowing constraints (e. g. credit rationing by banks), to decrease agency problems between shareholders and management by market discipline (e. g. managers have to fear takeovers by superior rivals) and to obtain the option to change corporate control (e. g. sell the company), see Röell (1996) and Pagano et al. (1998).

[5] Ritter (1987) and Barry et al. (1991) estimate that twenty cents per dollar raised at a stock market introduction is a reasonable measure for an average company's total costs.

Additionally, bargaining power considerations might help to reduce the gap between theoretical capital structure predictions and empirical evidence.

The dissertation highlights, for example, that

- the advantages of debt financing increase with a firm's bargaining power since e. g. the (agency) costs of debt financing decrease due to reductions in the firm's repayment obligation while the (agency) costs of equity financing are unaffected by variations in the lenders' proportional return participation,
- the favorability of private placements in comparison to public offerings increases with a firm's bargaining power since the cost difference between a public and a private placement is lower from the firm's than from the lenders' perspective,[6]
- a firm's contract type and placement mode choice are interrelated and must be treated jointly and not separately; from our analysis it becomes obvious that the cost differences of the available placement modes depend on the underlying contract type choice which implies that the optimal placement mode choice depends on the contract type choice and vice versa,[7]
- in the presence of an ex-ante informational asymmetry about the firm's financing and the lenders' profit alternatives the contract agreement probability depends (in a non-monotonous way) on the firm's bargaining power.

1.2 Methodology and Structure

Bargaining problems between agents about splitting gains from trade have a long history in economic analysis, see, for example, the contract curve in the Edgeworth box (cf. Edgeworth (1881)). But due to the difficulty of these problems the assumption of perfect competition is widely used in economic theory (cf. Roth (1985b)). Perfect competition represents an idealized case in which strategic aspects of economic interactions are reduced to negligible proportions by market discipline. However, in typical bargaining situations the interaction between the bargainers is essential for the bargaining outcome and the market simply determines the range of possible outcomes (cf., e. g., Canning (1989)).

---

[6] In our model private placements are assumed to be more expensive than public offerings despite all occurring transaction costs like road shows and investment banking fees. This assumption is empirically confirmed by Hertzel and Smith (1993) and Wu (2004) for equity and by Best and Zhang (1993) as well as Krishnaswami et al. (1999) for debt financing, see p. 40 for details.

[7] Gomes and Phillips (2005) empirically support that a firm's choices of contract type and placement mode are interrelated. In their sample they observe that conditional on issuing in the public market the pecking order of contract types as developed by Myers and Majluf (1984) and Myers (1984), see p. 11 for details, holds. However, in the private market they find a reversal of this pecking order.

Basically, two different approaches have emerged to cope with bargaining problems, i. e. to predict their outcome. Both are based on the game theoretic foundations laid by von Neumann and Morgenstern (1944), showing that each game consists of the following elements: (i) the number of players; (ii) the structure of the game, i. e. who moves when and which actions are available;[8] (iii) the payoffs related to the players' actions / strategies[9] and (iv) the distribution of information among the players (complete vs. incomplete; symmetric vs. asymmetric). The *first approach*, i. e. the *non-cooperative (or strategic)* game theoretic method, is due to Nash (1950, 1951). This approach assumes the absence of coalitions among the bargainers; each bargainer acts independently without communicating with the others. To determine bargaining outcomes each player's strategy to maximize his own profit given the others' strategies are held fixed must be examined. Potential bargaining outcomes are found when *each* player's strategy is optimal against those of the others. The *second approach*, i. e. the *co-operative (or coalition)* game theoretic method, is due to Nash (1953). This approach allows the players / bargainers to discuss their situation and agree on a rational enforceable joint plan of action. In this case bargaining outcomes can be determined by a particular set of postulates or axioms about the relationship of the bargainers' predicted utility outcomes to the set of feasible utilities.[10]

In this dissertation we apply the first approach to explore how bargaining outcomes depend on the bargaining power of the involved parties. We are interested in the strategic choices of the involved parties under a given set of bargaining rules (contract negotiation game). The explicit structure of the contract negotiation game assigns bargaining power to the bargainers. Our analysis is set in a principal-agent setting with a lender (principal) and a borrower (agent) bargaining how to finance the borrower's risky project. The lender and the borrower are risk neutral and are maximizing their expected profits. Informational asymmetries cause difficulties in financial contracting since the lender anticipates adverse selection and moral hazard problems. We distinguish between ex-ante, interim and ex-post uncertainty.

- There is an *ex-ante informational asymmetry* if information relevant for financial contracting is private knowledge of either the lender or the borrower prior to contract agreement (hidden characteristics).

---

[8] An action refers to a particular choice available to a player at a specific (decision) point in the game.

[9] A strategy is a complete listing of the player's actions to be taken at every (decision) point in the game, i. e. the player's contingency plan.

[10] An alternative solution mechanism for co-operative games is proposed by Nash (1951). He proclaims that nearly all co-operative games can be transformed in non-cooperative games (the "Nash Program") and hence latter's' solution techniques become available. However, up to now the "Nash Program" works only in particular, restrictive circumstances (cf. Serrano (2004)).

- There is an *interim informational asymmetry* if the borrower's behavior during the duration of the contract is unobservable for the lender (hidden action).
- Finally, in the case of an *ex-post informational asymmetry* the borrower's project return cannot be observed by the lender at zero cost (costly state verification).

The contract negotiation game is analyzed for *four altenative bargaining power scenarios* while power effects are determined by a pair-wise (binary) comparison of the optimal contract choices in the alternative bargaining power scenarios. It seems reasonable to employ our bargaining power analysis in an asymmetric information framework as informational asymmetries are crucial for bargaining outcomes (cf. Crawford and Sobel (1982)).[11]

The remainder of this dissertation is divided into five chapters.

Related literature is reviewed in *Chapter 2*. Section 2.1 focuses on a firm's contract type / placement mode-choice in the presence of an ex-ante, interim or ex-post informational asymmetry. Section 2.2 demonstrates in which areas of financial contracting bargaining power aspects have previously been considered. Section 2.3 concludes this chapter by summarizing the contributions of the current study for research in the areas of financial contracting under asymmetric information or under alternative bargaining power scenarios.

The basic model to examine bargaining power effects is developed and analyzed in *Chapter 3*. Section 3.1 describes the basic principal-agent setting where a lender (principal) and a borrower (agent) bargain about how to finance the borrower's risk project when interim and ex-post uncertainty cause moral hazard difficulties. No ex-ante informational asymmetry is considered. The contract negotiation game is assumed to be a three stage (sequential) game where firstly the contract type (debt vs. equity) and the placement mode (public offering vs. private placement) choices have to be made before the respective contract conditions can be determined. Finally, at the last stage the contract conditions can either be accepted or rejected. If they are accepted the borrower's project is financed. Otherwise, the game ends and the lender as well as the borrower are left with their outside options, i. e. their profit / financing alternative (if they have any). For this contract negotiation game four alternative bargaining power scenarios are defined where the power to determine contract type / placement mode and the right to set contracts' conditions are either assigned jointly or separately to the lender or to the borrower. The resulting expected profits are defined in Section 3.2. However, before bargaining power effects can be determined by a pair-wise (binary) comparison of the optimal contract choices in the alternative bargaining power scenarios, see Section 3.5, the contract negotiation game has to be solved for the alternative power scenarios (Sections 3.3 and 3.4). According to the backward-induction principle, firstly all feasible contract type / placement mode-choices, i. e. satisfying the lender's and the borrower's participation constraints, are defined in Section 3.3 before a profit comparison of all feasible choices reveals the optimal choice for the alternative bargaining power scenarios (Section 3.4).

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[11] For bargaining under asymmetric information see, e. g., Roth (1985a), Chatterjee (1985), Fudenberg et al. (1985) and Canning (1989).

The basic model is extended in *Chapter 4* by an ex-ante informational asymmetry about the lender's profit and the borrower's financing alternative. The lender, respectively the borrower, possesses either a positive outside option (A-type) or not (N-type). Hence, the lender and the borrower are unaware of the contractual partner's outside option when negotiating about financing. Such an ex-ante uncertainty limits the lender's, respectively the borrower's, rent extraction opportunity resulting from the assigned bargaining power. The chapter is structured in accordance with the previous chapter. In Section 4.1 the ex-ante informational asymmetry is defined. In Sections 4.2 and 4.3 the contract negotiation game is solved for the alternative bargaining power scenarios before bargaining power effects are determined in Section 4.4. Due to the ex-ante uncertainty about the contractual partner's outside option the feasible contract type / placement mode-choices now depend on the lender's, respectively the borrower's, (ex-ante) private information since they know their own type but are unaware of the partner's type. The robustness of the derived bargaining power effects is examined in Section 4.5.

Chapter 5 copes with possible methodological concerns. Section 5.1 states the main concerns while Section 5.2 presents our methodological justification.

Finally, *Chapter 6* concludes this dissertation by summarizing the obtained bargaining power effects in Section 6.1 and discussing their economic relevance in Section 6.2.

2

A Review of Related Research

In this chapter we review studies on financial contracting under asymmetric information (Section 2.1) and show in which areas of financial contracting bargaining power aspects have previously been analyzed (Section 2.2). To demonstrate the main ideas, we concentrate on the most prominent studies in these areas.

More comprehensive reviews can be found, for example, in Harris and Raviv (1991) and Hart (2001), while Schmid-Klein et al. (2002) focus on informational aspects in a firm's financing decision. Graham and Harvey (2001) even present evidence about the significance of informational and bargaining power aspects in a firm's financing decision from the chief financial officer's perspective.

At the end of this chapter we point out how this dissertation is related to the studies conducted so far in the areas of financial contracting under asymmetric information and under alternative bargaining power constellations (Section 2.3).

2.1 Financial Contracting Under Asymmetric Information

Assuming a basic financial contracting problem, i. e. a firm (the borrower) has a project but insufficient funds to finance the project while an investor (the lender) has funds to invest but no project, our aim is to examine whether a contract will be agreed upon and, if so, how the project will be financed. The outcome of the project is uncertain. Informational asymmetries between the lender and the borrower can exist ex-ante, interim and/or ex-post, causing difficulties for financial contracting. Since the objective of this section is to become familiar with difficulties caused by different types of informational asymmetry, each type is considered separately.

Depending on the type of informational asymmetry between the lender and the borrower when bargaining if and how to finance the borrower's risky project, either "private information" or agency problems are caused for financial contracting. "Private information" problems arise when the borrower possessing private information e. g. about his investment opportunities tries to raise funds from potential lenders, i. e. uninformed capital market participants.[1] In such a situation "private information" problems create adverse selection difficulties for financial contracting. Apart from "private information" problems, agency problems, i. e. problems due to a conflict of interest among the lender (principal) and the borrower (agent), arise when the consequences of the borrower's (agent's) actions are mainly borne by the lender (principal).[2] The latter problems are essential elements of the contractual view of the firm, developed by Coase (1937), Jensen and Meckling (1976), and Fama and Jensen (1983). The problems for financial contracting due to informational asymmetries and their implications are discussed in more detail in Sections 2.1.1 and 2.1.2.

As the aim of this dissertation is to examine how the (ex-ante) distribution of bargaining power affects a firm's financing decision, we do not determine a (new) contract which copes optimally with a particular informational asymmetry, but base our analysis on a set of predefined contracts. Therefore, we restrict the following review to studies about these contracts, i. e. to debt and equity contracts which are either publicly or privately placed. The implications of informational asymmetries for a firm's contract type choice are discussed in Section 2.1.1, while Section 2.1.2 deals with a firm's placement mode choice.

The empirical evidence on theoretical predictions in financial contracting under asymmetric information is far from conclusive, i. e. not consistently supporting one theory (cf. Schmid-Klein et al. (2002)). Hence, we only state exemplary findings which we take at face value. We do not question e. g. the methodologies or the data sets used.

2.1.1 A Firm's Contract Type Choice Under Asymmetric Information

This section focuses on a firm's contract type choice, i. e. debt vs. equity financing. The distinction is motivated by the observation that debt financing typically involves a fixed repayment obligation to outside investors which is supported by a conditional right to liquidate the firm's assets if the obligation is not fully satisfied. On the other hand, equityholders are promised a fractional return participation after debtholders' obligations are satisfied. This fractional right is supported by an unconditional right to engage in the firm's decision making (cf. Myers (2000)).[3]

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[1] Harris and Raviv (1991) refer to this approach to financial contracting as the asymmetric information approach.

[2] Harris and Raviv (1991) refer to this approach to financial contracting as the agency approach.

2.1.1.1 Contract Type Choice in the Presence of an Ex-ante Informational Asymmetry

Ex-ante asymmetric information between lender and borrower has distinct effects on a firm's (the borrower's) debt-equity choice depending on whether the firm's investment decision is considered to be endogenous (see, e. g., Myers and Majluf (1984)) or exogenous (see, e. g., Ross (1977)).

For example, Myers and Majluf (1984) assume a manager needs capital to finance a project. The project can be valuable, i. e. possessing a positive net present value. The manager has private knowledge about the firm's value and the project's prospects and acts in the interest of the current shareholders. Therefore, he only issues new shares to finance the valuable project

- if the firm is overvalued since a new issue transfers wealth from the new to the current (old) shareholders, since the new shareholders pay more for their rights than they are actually worth, or
- if the firm is undervalued, which implies that a new issue transfers wealth from the old to the new shareholders, only equity financing is possible, and the current (old) shareholders' wealth loss due to the transfer is overcompensated by their project return participation.

Otherwise the valuable project is not financed by equity. On the other side, a project with a negative net present value is only financed if the firm is overvalued and the wealth transfer due to the equity issue overcompensates current (old) shareholders' loss of wealth due to the bad project. Anticipating this behavior potential investors interpret an equity issue announcement as a bad signal and adjust their expectations since they assume being exploited. They can not separate information about the new project from information about whether the firm is under- or overvalued. This expectation adjustment affects the price investors are willing to pay and therefore the firm's issue-investment decision.

To avoid such difficulties, Myers (1984) suggests the pecking order for external finance. Projects should be financed by retained earnings and riskless debt before issuing (risky) equity to avoid the dilemma of either passing up valuable projects or issuing undervalued shares. Therefore, capital structure emerges dynamically over time to mitigate inefficiencies in a firm's investment decision, i. e. as a solution to the problem of underinvestment due to the dilution costs of selling underpriced securities.

A different approach is illustrated by Ross (1977). He assumes that the firm's investment decision is fixed and capital structure is designed to signal (private) insider information to investors to optimize market valuation.

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[3] See Titman and Wessels (1988) for a study considering further contract type distinctions such as short-term, long-term and convertible debt.

In Ross's model, managers know the true distribution of the firm's returns while investors do not (ex-ante uncertainty) and managers benefit from high market valuation of the firm's securities. However, managers are penalised if the firm goes bankrupt. Hence, the managers try to signal the firm's prospects by their capital structure choice. A large debt level is taken as a signal for good firm prospects (high quality). Firms with poorer prospects have higher marginal expected bankruptcy costs for any debt level and, therefore, managers do not imitate higher quality firms by issuing more debt, i. e. a separating equilibrium exists.

Both models provide rich sets of empirically testable hypotheses, see, e. g., Harris and Raviv (1991). The results of the hypotheses' tests are mixed. In total neither the pecking order theory nor signaling models seem to be a good description of reality (cf. Schmid-Klein et al. (2002)).

For example, according to Myers and Majluf (1984) and Myers (1984)

- leverage should increase with reductions in the firm's free cash flow; this hypothesis is empirically confirmed by Chaplinsky and Niehaus (1993),
- dividend-paying firms are expected to hold more debt since dividends are part of the firm's financing deficit (cf. Shyam-Sunder and Myers (1999)); this hypothesis is rejected by Frank and Goyal (2003b),
- leverage should be negatively related to the firm's profitability; this hypothesis is widely confirmed, see, e. g., Titman and Wessels (1988), Rajan and Zingales (1995), and Frank and Goyal (2003a,b).

According to Ross (1977)

- a firm's stock price should increase on the announcement of a debt issues; this hypothesis is empirically confirmed by Masulis (1983),
- leverage is supposed to be positively related with firm value; Israel et al. (1989) confirm this prediction,
- contrary to Myers and Majluf (1984) leverage should increase with a firm's profitability; this hypothesis is rejected by Titman and Wessels (1988), Rajan and Zingales (1995), and Frank and Goyal (2003a,b).

Finally, both models share the prediction that

- a firm's stock price decreases on the announcement of an equity issue; Masulis and Korwar (1986) confirm this expectation.

2.1.1.2 Contract Type Choice in the Presence of an Interim Informational Asymmetry

Interim informational asymmetry can exist between bondholders and shareholders and between shareholders and managers. Therefore, two moral hazard problems can arise since the agent, e. g. the manager, maximizes primarily his own profit which implies in the presence of market imperfections like asymmetric information that the principals, e. g. the bond- and/or shareholders, have to incur agency costs to keep the agent in line, e. g. by monitoring his behavior or by designing particular incentive schemes (cf. Jensen and Meckling (1976)). Agency costs arise due to a conflict of interest among agent and principal. Firstly, in this section we focus on agency problems between shareholders (agents) and bondholders (principals), neglecting potential difficulties between shareholders and managers. I. e. we assume that the managers' interests are fully aligned with the shareholders' interests. This assumption is then relaxed and we focus, in particular, on agency problems between shareholders (principals) and managers (agents). Overall, we see that the value of the firm is not fixed and depends on the ownership, i. e. the capital structure, of the firm.

In the context of an interim informational asymmetry between bondholders and shareholders, firstly, Myers (1977) demonstrates that the resulting agency problems affect a firm's investment decisions and thereby the value of the firm. He shows that (long-term) debt financing provides shareholders with a potential incentive to surpass positive net present value projects since shareholders only receive the profit remaining after debtholders' obligations are satisfied. This behavior results in an underinvestment problem by shareholders, which bondholders anticipate and hence demand an appropriate compensation.

Another incentive problem arises from interim uncertainty among bond- and shareholders due to the firm's limited liability in debt financing. This property of debt financing can encourage the firm's shareholders to unobservably increase the firm's risk, i. e. engage in asset substitution (cf. Jensen and Meckling (1976)).[4] Asset substitution can be attractive to shareholders since they fully participate from the return's upside potential while the downside potential is limited. Anticipating the shareholders' adverse behavior the bondholders demand compensation (ex-ante) for the costs incurred to mitigate this problem, e. g. writing restrictive covenants and monitoring the firm's investment policy.

Therefore, debt financing can cause different kinds of agency problems, i. e. costs in the presence of interim uncertainty among bond- and shareholders.

So far any potential interim informational asymmetry between shareholders and managers has been neglected, but such an informational asymmetry can cause agency costs of equity financing when managers (agents) are able to maximize their utility at the the expense of the shareholders (principals). Therefore, shareholders have to monitor the managers to ensure that they act in their interest. Jensen and Meckling (1976), for example, assume that managers have the opportunity of consuming "non-pecuniary" benefits (perks) like fancy offices, etc. These benefits are attractive to managers while the costs of these benefits are born at least partly by others, i. e. shareholders. These benefits are not in the interest of shareholders since they reduce the value of the firm.

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[4] Alternatively, one can refer to the asset substitution problem as debt financing's risk-shifting incentive. While the former considers the case in which the borrower can unobservably choose among different risky projects in the latter case the borrower sticks to the same project but can unobservably vary the risk of the project.

Jensen and Meckling show that the optimal debt-equity mix, i. e. the firm's capital structure is determined at the point where the marginal benefits of keeping the manager from taking perks is offset by the marginal costs of causing risky behavior.

Furthermore, Jensen (1986) finds that if a firm has sufficient "free cash flow", i. e. its managers may "build empire" or make inefficient investment decisions, debt financing with its fixed obligation helps to discipline firms' management.

The benefit of debt financing is therefore to mitigate any potential conflict between equityholders and managers.

The empirical evidence concerning all hypotheses from these theoretical models is again non conclusive (cf. Harris and Raviv (1991), Schmid-Klein et al. (2002)).

However, empirically confirmed are the following exemplary selected predictions by Jensen and Meckling (1976),

- leverage should increases with lack of growth opportunities (see Titman and Wessels (1988), Chaplinsky and Niehaus (1993)), and
- covenants prohibit asset substitution in bond financing (see Smith and Warner (1979)),

while the hypothesis by Jensen (1986) that

- leverage increases with increases in "free cash flow" has not been confirmed by Chaplinsky and Niehaus (1993).

2.1.1.3 Contract Type Choice in the Presence of an Ex-post Informational Asymmetry

Finally, the most obvious moral hazard problem occurs in the presence of ex-post informational asymmetry between lender and borrower since the borrower always has the opportunity to understate the firm's, i. e. the project's, return in order to minimize his repayment obligation.

Assuming that the decision to verify the return stated by the borrower follows a deterministic scheme[5], debt contracts dominate equity contracts (cf. Townsend (1979), Gale and Hellwig (1985) and Williamson (1986)). In debt financing verification is only necessary in the proclaimed default state while equity financing requires that the lender always verifies the proclaimed return since cheating is always profitable for the borrower.

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[5] A verification scheme is called deterministic when before the borrower's return announcement the lender has to define under which circumstances, e. g. return announcements, he will verify the borrower's proclamation.

However, studies by Bernanke and Gertler (1989) and Mookherjee and Png (1989) question the "classical" debt contract's optimality. They show that stochastic verification mechanisms are Pareto-superior, i. e. reduce the verification costs and still prevent the borrower from cheating.[6] Stochastic mechanisms also cope with the deterministic verification mechanism's shortcoming of lacking subgame completeness, i. e. to verify the project return (ex-post) even if the potential gains exceed the costs.

Furthermore, by relaxing the assumption that debt and equity contracts cause identical verification costs recently Hvide and Leite (2002) integrate equity contracts in the costly state verification setting and show that an optimal debt-equity mix exists. Hvide and Leite argue that the verification costs of equity financing are lower than the costs for debt financing since debt- and equityholders possess different control rights which implies that their incentives to invest in "cheap" monitoring technology ex-ante differ. According to Habib and Johnsen (2000) the verification costs differ since equityholders care about the firm in its primary use, i. e. the firm's operating value, while debtholders are concerned about the firm's alternative use, i. e. the firm's liquidation value.

Hvide and Leite (2002) point out that the implications drawn from such extended costly state verification frameworks are consistent with observed empirical regularities like strategic defaults of debt obligations and low debt ratios for high risk projects.

2.1.2 A Firm's Placement Mode Choice Under Asymmetric Information

In this section a firm's placement mode decision under asymmetric information is analyzed. We focus on the choice of public offering vs. private placement. The distinction is motivated by the fact that typically a borrower can either negotiate privately with a small group of investors (private placement) or issue the securities publicly to a large number of dispersed investors (public offering).

Firms with the intention to raise debt can either issue a corporate bond publicly or place a bond privately by selling the debt contract directly to a small group of investors (cf. Kwan and Carleton (2004)). Private lenders are mainly institutional investors such as commercial banks and insurance companies which are specialized in the assessment of credit quality before a debt issue and in monitoring the firm's performance after an issue (cf. Krishnaswami et al. (1999)).[7] We abstract from further placement mode distinctions, i. e.

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[6] A verification scheme is called stochastic when the lender can decide after the borrower's return announcement whether to verify the return or not.

[7] Best and Zhang (1993) empirically confirm the expectation that private lenders have in comparison to public lenders superior firm-specific information.

we treat a bank loan like a privately placed corporate bond since in both circumstances the borrower and the lender(s) negotiate personally.

Firms with the intention to raise equity can also choose between a public offering or a private placement. The choice is even more complex since different types of public equity offerings exist. A firm can e. g. choose between a regular offering or an (uninsured) rights offering.[8, 9] Further alternatives are an (insured) underwritten rights offering (an underwriter has a standby commitment to purchase any unsubscribed shares) or a firm-commitment underwritten rights offering (the underwriter agrees to purchase all new shares for resale to public).[10] However, all public offerings have in common that the securities are offered publicly to a large number of dispersed investors, while in a private equity placement new shares are sold to a small group of current or new investors.

The structure of this section is related to the structure of the previous section. Firstly, we examine the implications of a potential ex-ante informational asymmetry between lender and borrower for a firm's placement mode choice before considering the effects of an interim asymmetry.[11] The factors affecting debt's placement decision are similar to the factors influencing equity's placement mode choice while differences arise due to equityholders' right to control the firm in the non-default state, i. e. when debtholders' claims are satisfied.

2.1.2.1 Placement Mode Choice in the Presence of an Ex-ante Informational Asymmetry

2.1.2.1.1 Debt's Placement Mode

Each firm's debt placement mode choice is affected by ex-ante informational asymmetries between lender and borrower, since each borrowing decision causes adverse selection difficulties for financial contracting (cf. Leland and Pyle (1977)).

These difficulties can arise since the managers, acting in the interest of the current shareholders, only issue securities to new investors if investors

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[8] See, e. g., Heron and Lie (2004) for a comparison of a regular and an (uninsured) rights offering's information content.

[9] In a rights offering current shareholders obtain a short term option, i. e. right, to purchase the new shares issued on a pro rata basis at the exercise price. Rights offerings are used to prevent any potential wealth transfers from current to new shareholders.

[10] See, e. g., Cronqvist and Nilsson (2003).

[11] The effects considered in this section are separated according to their origin. For interdependencies among the stated effects see, e. g., Diamond (1991). Diamond examines a firm's choice between bank loan and public debt in the presence of ex-ante and interim uncertainty.

are willing to pay as much or more than the managers believe the securities are worth. The managers try to prevent any wealth transfer from current shareholders to new investors. Therefore, the managers, i. e. respectively the firms, care about who provides their funding because different providers have different information and expectations about the firm's prospects. Hence, their valuations of the securities offered differ. Investors who believe they have poorer information than managers anticipate the managers' behavior and pay less for new securities than better informed investors do since they assume to be exploited (cf. Mackie-Mason (1990)). Thus the firm prefers to obtain funds from investors which are better informed and do not require a large premium as compensation for potential adverse selection.[12]

Additionally, Ramakrishnan and Thakor (1984) demonstrate that private lenders have a comparative advantage to public lenders in producing firm-specific information since they possess information which is not publicly available. Hence, firms with greater ex-ante uncertainty such as younger firms will issue more private than public debt, since private lenders mitigate the contracting costs due to adverse selection difficulties.

This hypothesis is empirically confirmed by Blackwell and Kidwell (1988). They find that firms with only private debt are significantly younger and have higher levels of ex-ante informational asymmetry than firms which issue public debt. Furthermore, Mackie-Mason (1990) reveals that problems due to ex-ante informational asymmetry are a significant determinant of a firm's placement mode choice even after controlling for the security type (debt or equity).

However, Rajan (1992) damps the placement mode prediction obtained by the consideration of potential adverse selection difficulties. He points out that private lenders can obtain information monopolies about their borrowers in the long-run due to their monitoring and relationship lending. Such information monopolies increase private lenders' bargaining power in financial contracting enabling the lenders to extract excess returns from project financing. In such circumstances, Rajan argues, public debt is beneficial to reduce the private lenders' ability to extract rents.

Another aspect is put forward by Dhaliwal et al. (2003). The authors argue that public offerings are not only costly due to potential adverse selection difficulties. In addition, the public disclosure of information may convey information to the firm's competitors harming the firm's prospects. Of course, an optimal level of public disclosure exists balancing the costs and the benefits of public disclosure (cf. Verrecchia (1983)). However, if public disclosure has to be increased above this level further information relevant to the firm's competitors is revealed and causes the firm to lose its competitive advantage or bargaining power (cf. Admati and Pfleiderer (2000)). Any information disclosure above the optimal level is harmful for the firm. Yosha (1995) finds that private placements help to protect valuable firm-specific information from being publicly disclosed. Additionally, private lenders are less likely to reveal their private information since they are concerned about the borrower's success.

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[12] This consequence of an ex-ante informational asymmetry has firstly been illustrated by Akerlof's "market for lemons" (cf. Akerlof (1970)). Akerlof demonstrated that the market for used cars can collapse if the sellers are better informed about the quality of their cars than the potential buyers since the buyers anticipate their disadvantage and are only willing to pay a price for an expected average quality car. Hence, the sellers of high quality cars leave the market since their cars are worth more than the buyers are willing to pay. Again this is anticipated by the buyers. Finally, only cars with the poorest quality remain in the market.

2.1.2.1.2 Equity's Placement Mode

Similar to debt financing, the presence of ex-ante informational asymmetry between a firm, i. e. respectively its managers, and potential investors causes adverse selection problems if equity is issued regularly to outside investors.

This is shown by Myers and Majluf (1984). As already mentioned, they demonstrate that managers only issue equity if the firm is overvalued and any potential wealth loss due to a negative net present value project is overcompensated by the wealth transfer from new to current shareholders; or if the firm is undervalued while the wealth transfer from current to new shareholders is overcompensated by shareholders' project return participation. This issuing behavior is anticipated by the investors. Therefore, investors fear to be exploited and demand an appropriate compensation which in turn affects the firm's issue-investment decision. An underinvestment problem occurs.

One solution to this underinvestment problem is suggested by Eckbo and Masulis (1992) and Eckbo and Norli (2005). They suggest to allow current shareholders to participate in public equity placements by rights offerings. However, the adverse selection and hence the underinvestment problem prevails when the firm expects that less that 100% of their shareholders participate in the equity issue. In such situations where the expected participation rate is below 100% only underwritten rights issues can ease the adverse selection difficulties. Underwriters perform a certification role to mitigate any informational asymmetry between managers and potential investors. Based on these ideas and bearing in mind that underwriting services are costly, Frank and Goyal (2005) derive a pecking order of equity floatation method choices: Firms expecting low shareholder participation in an (uninsured) rights issue prefer underwritten rights offerings while firms expecting high shareholder participation favor (uninsured) rights offerings.

An alternative solution to this underinvestment problem is put forward by Hertzel and Smith (1993). They incorporate the possibility of private placements in the Myers and Majluf's framework. Private placements enable the investor to reveal the true value of the firm at some costs. Therefore, undervalued firms prefer private placements as long as the net present value of their investment opportunity exceeds the costs of information production borne by the private investors.

Cronqvist and Nilsson (2003) empirically confirm that adverse selection costs affect a firm's equity placement structure. They observe that firms which are potentially undervalued depend significantly on private financing.

As for debt financing, the aspect of costly information disclosure, put forward by Dhaliwal et al. (2003), is relevant for the firm's equity placement mode choice. Increased public disclosure above the optimal level might decrease the firm's competitive advantage and/or bargaining power (cf. Admati and Pfleiderer (2000)). Therefore, private equity placements become preferable to conceal valuable information from the firm's competitors.

An argument against private equity financing in the presence of an ex-ante informational asymmetry à la Rajan's argument against private debt financing (cf. Rajan (1992) or Section 2.1.2.1.1) does not exist since shareholders are the residual claimholders anyway. However, in the presence of an ex-ante informational asymmetry between the firm's management and its shareholders similar considerations have to be taken into account.

2.1.2.2 Placement Mode Choice in the Presence of an Interim Informational Asymmetry

2.1.2.2.1 Debt's Placement Mode

Similar to the effects of an interim uncertainty on a firm's contract type choice, the lender's potential interim uncertainty about the borrower's, i. e. the firm's, behavior can cause two moral hazard problems which affect the cost of financial contracting and, thereby, the firm's preferred debt placement structure (see, e. g., Krishnaswami et al. (1999)).

Firstly, the asset substitution problem might arise since the borrowing firm's limited liability causes an adverse incentive for the firm's risk taking behavior. Due to limited liability the firm's shareholders and managers have an incentive to undertake riskier projects than previously agreed since they fully participate from the project return's upside potential but not from the return's downside potential (cf. Jensen and Meckling (1976)). Galai and Masulis (1976) illustrate the same difficulty by considering a leveraged firm's equity as a call option on the firm's underlying assets. An increase in the firm's cash flow risk therefore increases the value of the firm's equity while decreasing the value of the firm's debt. Debtholders who are unable to monitor the firm's behavior (interim uncertainty) anticipate this (adverse) debt financing response and demand a compensation for the firm's potential risk adjustment.

The second moral hazard problem, the problem of underinvestment, results from the fact that the firm's shareholders only receive the cash flows which remain after debt financing's obligations are satisfied. Therefore, a firm with debt outstanding only undertakes projects when returns exceed the face value of debt instead of considering all projects with a positive net present value (cf. Myers (1977)). The lenders anticipate this behavior and want an appropriate compensation.

Monitoring the firm's behavior and restricting it by covenants are options to mitigate both moral hazard problems. Therefore, privately placed debt is preferable to public debt since private lenders generally possess a stronger incentive to monitor the firm's behavior since the number of lenders is smaller which implies that the average default risk is higher (cf. Nakamura (1993)). Additionally, private lenders have a comparative advantage to public lenders in enforcing bond covenants since formal bankruptcy proceedings are not always optimal to cope with covenant violations (cf. Smith and Warner (1979)). Alternative private renegotiations are easier among a small number of private lenders than among a large number of dispersed public investors (cf. Chemmanur and Fulhieri (1994)).[13]

Krishnaswami et al. (1999) observe that firms with greater moral hazard problems hold higher proportions of private debt. They conclude that better monitoring incentives and stricter covenants of privately placed debt help to mitigate the agency costs of debt financing.[14] Denis and Mihov (2003) find as well that private lenders' concentrated holdings and superior access to information constrain managerial discretion.

2.1.2.2.2 Equity's Placement Mode

As it has been put forward by Cronqvist and Nilsson (2003) a new equity issue obviously affects a firm's control structure and thereby the firm's controlling parties' ability to use their discretion over the firm's decisions to extract private benefits. Furthermore, a private investor is probably a "large" shareholder with the incentive to monitor the firm's management and their use of the proceeds (cf. Shleifer and Vishny (1986)). Additionally, the usually lower liquidity of privately placed equity further increases the investor's incentive to monitor (cf. Maug (1998)). Therefore, private equity placements improve monitoring incentives even if the firm's ownership structure remains nearly unaffected. Hence, a private placement can reduce the value reducing managerial discretion.

The emerging hypothesis that corporate control considerations are a significant determinant of a firm's equity placement mode choice is empirically confirmed by Cronqvist and Nilsson (2003). They find that large controlling shareholders who enjoy significant private benefits of control are "control-dilution averse". A firm's ownership concentration is negatively related to the probability of a private placement. Current controlling shareholders are in particular control dilution averse if their control margin is small.

Another potential moral hazard problem affecting a firm's equity placement mode choice is related to strategic alliances in the product market.

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[13] Private renegotiations and in particular the number of creditors become important in financial distress, see e. g. Bolton and Scharfstein (1996).

[14] This finding is supported by the observation that regulated firms tend to have lower private debt proportions than non-regulated since the former have alternative monitoring mechanisms (cf. Krishnaswami et al. (1999)).