

Corporate Control and Capital Structure
– Essays on Property Rights and Financial Contracts



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Corporate Control
and
Capital Structure
– Essays on Property Rights and
Financial Contracts

Erik Berglöf

"University men, like so many hide-bound calves in a pasture, tarry out our time, wither away as a flower ungathered in a garden, & are never used: or, as too many candles, illuminate ourselves alone, obscuring one another's light, & are not discerned here at all ... if after long expectation, much expense, travail, earnest suit of ourselves and friends, we obtain a small Benefice at last, our misery begins afresh; we are suddenly encountered with the flesh, world, and Devil ... we change a quiet life for an ocean of troubles, we come to a ruinous house ... else we are insulted over and trampled on ... banished from the Academy, all commerce of the Muses, and confined to a country village ... and daily converse with a company of idiots and clowns."

Burton, Robert (1628; 1st Folio), The Anatomy of Melancholy, Tudor Publishing Company, New York (Part. I, Sect. I, Memb. 3, Subs. 15)

Preface

This thesis is jointly published by the Institute of Economic Research (EFI) and the Institute of International Business (IIB), both at the Stockholm School of Economics. The thesis was written while Erik Berglöf was a doctoral student at the Department of Financial Economics and a research associate at IIB. The research was generously funded by the Swedish Council for Research in the Humanities and Social Sciences (HSFR). This support is gratefully acknowledged.

Stockholm, February 1991

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the commission alerted me to the gap between reality and the world of our models, but also taught me the need for a theoretical base in policy-related research.

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AFS Alma Mater, Stockholm in February, 1991

Erik Berglöf

CORPORATE CONTROL AND CAPITAL STRUCTURE

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1.1 Thesis Statement

A firm may be defined by its physical assets and the allocation of property rights to these assets (Hart, 1989). This is the view held by the new property rights research program. Property rights include the rights to determine how assets are used, control rights; and the rights to the cash flows generated by these assets, return rights; as well as the right to sell these rights (Alchian & Demsetz, 1972). The question of how to allocate the property rights of the firm most efficiently is a fundamental question of economics. This thesis focuses on the role of the allocation of property rights in mitigating conflicts among the firm's investors.

According to the new property rights research program, property rights to corporate assets are specified in the firm's financial contracts. The firm's capital structure, the aggregation of the financial contracts, then defines the allocation of control and returns among the firm's capital suppliers. Capital structure here refers to both the composition of different types of financial contracts (e.g., of debt and equity) and to the distribution of these contracts among investors (e.g., between an entrepreneur and an external investor)¹. This definition of capital structure is broader than that used in the traditional literature on capital structure where the term refers to the ratio of debt to equity.

This thesis consists of four essentially self-contained essays which share a common theoretical and methodological base in the new property rights approach, and a common subject matter: the allocation of control and cash flows in the corporation. The purpose of the thesis is to explore how the cash flow and control characteristics of the standard financial instruments, debt and equity, complement each other in the firm's capital structure. We focus on the complementarity in terms of control and on the interrelationship between control and return aspects of the firm's contracts. This

¹ Capital structure also has a time dimension, i.e., contracts mature at different points in time. The maturity structure is viewed as subsumed under the composition of different types of financial instruments.

basic complementarity, in turn, helps explain why financial contracts are combined and distributed across investors in particular patterns.

Chapter 2 describes the new property rights approach to capital structure and discusses its relationship to the agency literature. In Chapter 3, the complementarity between debt and equity is explored in the context of a formal model where an entrepreneur and an external investor contract in the presence of an external market for corporate control. Chapter 4 analyses the complementary roles of debt and equity in the context of an international comparison of six countries. Finally, Chapter 5 discusses the complementarity of debt and equity in a particular institutional arrangement, the corporate groupings in Japan.

This thesis is not primarily concerned with capital structure per se, but with capital structure as defining the allocation of control rights, and rights to return streams, among the firm's capital suppliers. Control is difficult to define in a sufficiently precise way; a number of parallel definitions exist in the literature and several terms denoting approximately the same phenomenon are used by different authors². Here we use control to mean the right to make strategic decisions in contingencies not explicitly covered by contractual arrangements (Grossman & Hart, 1986; for a formal definition, see Chapter 2)³. This abstract definition provides a helpful theoretical construct which is applicable to a wide range of situations. Formally, this definition has primarily been applied to stylized bilateral relationships, for example, between an entrepreneur and

² We distinguish "control" from "ownership". Ownership here refers to the entire set of property rights associated with a contract; individuals can own both rights to returns and control rights, and both debt and equity.

³ The concept of control used in this thesis is close to that of "corporate governance" Williamson (1975; and 1985). The role of ex post governance is "to affect adaptation" in situations not covered by contracts and includes a broader range of arrangements such as arbitration (Williamson, 1990). Here the concept of corporate governance refers to particular allocations of control rather than control itself (see, for example, Holmström & Tirole (1989) who view the firm as a particular way of allocating control, i.e., as a form of corporate governance, when contracts are incomplete).

an external investor. Of course, the exact nature of control depends on the properties of the individual firm and on the context in which it operates.

Control is closely tied to the game theoretic concept of commitment which denotes a promise to pay a reward or a threat to implement a costly punishment strategy (Hirschleifer, 1987). The crucial problem is to make such commitment credible, i.e., to make other players believe that a party actually will pay out the reward or implement the punishment. A commitment is only credible when the costs of not implementing the strategy are higher than the costs of implementation (cf. the concept of "renegotiation-proofness" in Chapter 2). For example, an entrepreneur, by giving up control over strategic decisions in certain future contingencies, may credibly commit himself to spending time and energy realizing an idea for which he has received money; the mere threat of losing control in the future may affect his behavior in the present.

The rest of this chapter discusses the relevance of the subject matter and approach chosen for the thesis, and relates the thesis to previous literature. In Section 1.2, we indicate the significance of studying corporate control and capital structure. Section 1.3 discusses the assumptions underlying the new property rights approach in the context of the socialist economies of Eastern Europe. Section 1.4 relates the new property rights approach to other strands in the economic literature, and Section 1.5 confronts it with criticisms from other disciplines which have addressed similar issues. The final section, Section 1.6, summarizes the results of the chapters of the thesis.

1.2 The Relevance of Capital Structure

Casual observation and in-depth empirical studies indicate that capital structure as it is defined here varies substantially across industries and countries, as well as over time. For example, certain industries in the United States, such as drugs and electronics, have low ratios of debt to equity, whereas others, such as airlines and electric utilities, have high leverage ratios (see, e.g., Bradley et al. (1984); and Kester (1986)). Evidence also suggests that leverage increases in the proportion of fixed assets (see, e.g., Long

& Malitz (1985)) and decreases in firm volatility, profitability, and R & D expenditures (see, e.g., Bradley et al. (1984); Kester (1986); and Long & Malitz (1985), respectively). Debt levels also appear to be higher in Japan, France and Germany than in United States and United Kingdom (see, e.g., Rutterford, 1988). In addition, leverage ratios in the United States have increased over time (see, e.g., Taggart, 1985), and there are significant variations in capital structure over the life cycle of the firm and between small and large firms (see, e.g., Marsh (1982)). Developmental patterns also seem to differ across countries (see, for example, the comparison of the United Kingdom and West Germany in Mayer & Alexander (1990)).

Variations in ownership patterns of equity, and in particular of debt, are less well documented. However, ownership concentration typically decreases in firm size. Data from the United States indicate that equity holdings are more concentrated in certain industries such as media firms and sport clubs, and less concentrated in regulated industries and in the financial sector (Demsetz & Lehn, 1985). Concentration seems to be positively correlated with R & D expenditures, and with the volatility of the firm's environment (see, e.g., McEachern & Romeo, 1978; and Demsetz & Lehn, 1985). Some preliminary evidence indicates that, when compared to holdings in the United Kingdom and the United States, ownership of debt and equity is more concentrated in France, Germany and Japan (see, e.g., Berglöf (1988) and Chapter 4 of this thesis). Equity concentration in large US firms decreased between 1929 and 1974 (Herman, 1981). Institutional shareholdings have increased in importance at the expense of individual ownership in, among others, France, Germany, Japan, Sweden, United Kingdom and United States (Berglöf, 1988).

A better understanding of these and other observed variations in capital structure is essential not only for policymakers in the developed world, but also for those in developing countries, and for countries, which in transition from central planning to market economy, face fundamental choices of institutional design. A theory of capital structure should provide insight into the role of capital market imperfections in economic development, and should have implications for a host of macro-economic issues. In addition, a theory could contribute to public finance by guiding taxation of

different financial instruments. Finally, a theory of capital structure should illuminate a number of issues facing regulators of financial markets and financial institutions, as well as managers of corporations. While this thesis ultimately addresses these normative questions, the primary aim is positive, i.e., to understand existing allocations of ownership and control.

A vast literature has attempted to explain variations in capital structure. Most contributions have treated the two dimensions of capital structure - the composition of financial instruments and their distribution among investors - as independent. While some observations may be explained in this manner, this thesis takes as a starting point that in many cases the composition of financial instruments and patterns of ownership of these instruments are interrelated; some of the empirical results can only be understood when both control and cash flow characteristics are taken into account. This thesis is particularly concerned with international variations in capital structure, and the interrelationships between the two dimensions of capital structure. International comparisons may contribute toward more general analytical concepts that extend beyond particular contexts; a function which in one economic system is associated with markets can in another system be performed by an organization⁴. Comparative study increase variations in both context and institutional arrangement at the expense of control.

A comparative property rights approach to capital structure can be useful in understanding, for instance, effects of current transformations of the financial system in the United States and of the homogenization of regulations and institutions within the European Community (see Chapter 4). Another urgent and challenging task for such an approach is to provide a unified framework for comparative analysis that can assist countries in Eastern Europe in their transformation to market economies.

⁴ Contract theory, like economics in general, is basically functionalistic. While the frequent use of the term "institutional design" in the literature suggests intention, institutions are explained by their function, not by their cause or intention; functionalistic approaches do not rule out intentions but do not view them as necessary.

1.3 The Approach and Its Assumptions - The Case of Eastern Europe

The formal analysis within the property rights approach relies on specific assumptions about the context in which contracting takes place. This section uses the property rights allocation of Eastern Europe - an example where these assumptions are not met - to make explicit what is tacitly assumed in the approach of this thesis. This example also illustrates the relevance of attempts at designing efficient allocations of property rights. The problems associated with the socialist system as it manifested itself in Eastern Europe are well-known; assets are inefficiently allocated between sectors of the economy and wastefully employed within enterprises; and decision-makers at all levels lack incentives to minimize costs, to care about the net value of assets, to seek new profit opportunities, and to innovate. While the static efficiency properties of these economic systems are poor, their failure to transform in response to changing circumstances is even more conspicuous. A consensus is now forming among external observers and among government policymakers of these countries that many of these problems can be attributed to weaknesses of existing property rights arrangements, and that previous economic reforms failed largely because these weaknesses were not addressed (for a survey, see Grosfeld (1990)).

Property rights are residual in nature and only defined by the system in which they are applied⁵; their full implications can only be understood in this larger context. Contract theory, and the new property rights framework in particular, take for granted many of the institutions associated with a market economy. Property rights are assumed to be reasonably well-defined and their allocation transparent. By definition, socialism implies that property rights to productive assets are held by the state. However, these rights are nominal. In practice, the state does not have the information and enforcement capacity necessary to exercise control over its vast estate; property rights are ill-defined and contested. The ambiguity of property rights demarcations has been

⁵ In this sense, control rights are residual; thus the notion of residual control rights is redundant. However, following the rest of the literature, we frequently use the two terms together.

a source of constant friction between central and local authorities, and between bureaucrats and enterprise managers in Eastern Europe.

The weaknesses of the de facto allocation of control and returns have been exposed as the state has yielded its nominal control over corporate assets (Dhanji & Milanovic, 1990). Enterprise managers or, in some cases, individual bureaucrats at various levels of the ministries have reinforced their actual control. In addition, employees of the state-owned enterprises consider themselves the legitimate owners of these assets; after all, the employees maintain physical assets and ensure that they are used productively. Finally, to make the de facto allocation of property rights even more complex, many assets are claimed by their owners prior to state expropriation. In many Eastern European countries, there is strong political pressure to recognize rights of previous owners.

The ambiguity of property rights allocation is also closely associated with the absence of legitimacy of existing institutions. When legislating and enforcing institutions are contested by a large section of society, stipulated rights are also challenged and their effectiveness weakened⁶. Furthermore, the lack of legitimacy undermines the morality of a society. Contractual analysis typically assumes a basic legitimacy of legal institutions and the existence of accepted moral codes constraining the behavior of individual actors in the economy. This is not say that actors are assumed to always stick to given promises and never utilize loopholes in agreements. On the contrary, as we will demonstrate, the existence of such opportunism determines contractual design and gives property rights a role. However, contractual analysis typically assumes some constraints on the type of contracts allowed, e.g., slavery is prohibited, and on the dimensions of contracts, i.e., there are limits to what a controlling party can do with his control (e.g., individually enforced capital punishment); without such restrictions, an

⁶ A "paradox" of these systems is that the absence of legitimate enforcing institutions and of a consistent legal framework reinforces the problems associated with the ambiguity of the property rights allocation; since control rights, by definition, are residual in nature, the importance of control increases when very little can be written into enforceable contracts because of the inadequacy of supporting institutions.

individual would never enter into contracts which entail subjecting oneself to the control of another party.

The economic significance of the lack of legitimacy of existing institutions and of common moral codes has often been underestimated in the analysis of socialist economies. A general sense of the absurdity of the system has given rise to wide-spread cynicism, with devastating effects on entrepreneurial efforts and work morale; this cynicism may have been the single most important source of x-inefficiency in organizations under the socialist systems of Eastern Europe. North (1981) has argued that the existence of common moral codes is a precondition for the emergence of modern capitalism. The analysis of moral codes is generally beyond the scope of contract theory.

Another related assumption is that the "rules of the game" remain constant throughout the duration of the game. For example, contract theory normally assumes the absence of political interference in individual contracts. Furthermore, the legal structure and enforcement of these laws are assumed not to change during the game. In other words, government behavior must be reasonably predictable. The lack of such predictability, a result of inherent weaknesses of public principals but also caused by repeated attempts at reform, has been a major obstacle to entrepreneurial activities and has fostered wide-spread risk-avoidance among decision-makers at all levels of the socialist economies (Grosfeld, 1990). The ability to affect the rules, and introduce additional uncertainty into decisions by economic actors, has been a powerful, and frequently used, instrument in the hands of the central authorities; this ability is even more powerful when held by one of the contracting parties.

The analysis of this thesis assumes the existence of basic financial instruments, in particular standard debt and equity contracts, and of markets where these instruments (at least equity) are traded. In addition, the analysis takes for granted the legal frameworks associated with these instruments, such as corporation law, debt law, bankruptcy law and takeover codes. While financial instruments are used by name in many socialist economies, their roles are radically different since the associated legal

structures are weak or non-existent and property rights vaguely defined. When an enterprise does not issue financial instruments, it has no capital structure (stretching the term, a firm has an all-equity capital structure with the state holding all the shares). As a result, financial control in these systems, in particular the control associated with debt finance, is not effectively used to influence the use of corporate assets; budget constraints are "soft" (Kornai, 1981).

The problems associated with the absence of financial control become particularly severe when enterprises require thorough reorganization or liquidation. In any economic system, existing clusters of assets grow obsolete and should be liquidated or transferred to better uses elsewhere in the economy. Contractual analysis is basically static in nature; little is said about what happens between contracts, i.e., about dynamic efficiency. However, the new property right approach allows for some sense of dynamics in that the firm's financial contracts and consequently its capital structure specify mechanisms for achieving such reorganizations; equity makes possible takeovers and debt can trigger bankruptcy. These mechanisms have not been available in the socialist economies of Eastern Europe. In addition, ambiguous property rights have allowed employees and local governments to exert considerable influence hampering firms' abilities to adjust to changing circumstances.

Contractual analysis, at least when applied to financial contracting, typically also assumes that contracting takes place in reasonably competitive markets, with at least one of the parties exposed competition (see further in Chapter 2). This assumption is also likely to imply existence of anti-trust and other legislation supporting these markets; the problems of private property rights in the absence of such a body of law are clearly visible in the current transformation of many Eastern European countries (for examples, see Grosfeld (1990)).

These arrangements, taken for granted in contractual analysis, are those that representatives of the Eastern European countries refer to when they declare their intention to transform into "market economies". Yet, this goal is insufficiently specified. As we demonstrate in Chapter 4, the economic systems denoted as market economies

span a wide range of institutional arrangements. Variations in the degree of legitimacy of these systems and their moral codes will affect the analysis. However, to the extent that they reflect specific economic or legal institutions, variations could be subsumed under the analysis; certain contractual arrangements may be more conducive to the emergence of legitimacy and moral codes than others.

The problems of privatizing previously state-owned assets also highlight another analytical limitation, which is the lack of consideration of distributional issues in contracting. The basic criterion for evaluation of contracts is that of Pareto-optimality: one contract is superior to another if it makes at least one of the parties better off without worsening the situation of other parties. In the analysis of this thesis, the problem of how the surplus is distributed is not discussed. Much of the complexity of the transformation process in Eastern Europe results because policymakers cannot ignore these distributional issues.

In addition to these general limitations of contract theory, the analysis within the new property rights approach adds some further restrictions (Chapter 2 discusses these restrictions more exhaustively). Formal tools have so far only been developed for very specific situations. The generalizability of the results obtained in these situations remains very much in doubt. In particular, the leap from the bilateral bargaining game in the small venture capital firm to the complex multilateral, multidimensional negotiations in the widely held firm is, at best, speculative. The contracts examined have been simple, primarily standard debt and equity, and more complex instruments have yet to be explored. The analysis in the new property rights literature has also been confined to the allocation of control among capital suppliers; other stakeholders such as employees, customers, suppliers and government are only included in the analysis to the extent that they have financial claims on the firm. Of course, these stakeholders may affect strategic decisions of the firm. Furthermore, the connection between corporate capital structure and organizational form has yet to be adequately addressed (see Aoki (1990)). As we adopt the methods here, the state of development of the new property rights literature is reflected in the considerable gap between the

formal treatment in Chapters 2 and 3 and the application of the approach to existing institutional arrangements in Chapters 4 and 5.

In addition, the formal analysis in the new property rights, as in much of the agency literature on finance, has focused on conflicts arising from liquidation and reorganization of corporate assets; the focus on such "crisis" situations highlights certain conflicts in organizations. However, interpretations based on this framework may exaggerate the significance of these states of nature and of the associated mechanisms for control transfer. The allocation of ownership and control is also important under more normal circumstances; potential conflicts are not confined to low profitability states.

As should be evident from the chapters of the thesis, the belief is here that the persistent pursuit of a single perspective, as opposed to eclectic approaches, benefits academic exchange. This thesis (in particular Chapter 3) should primarily be evaluated in terms of the new property rights framework. Like most research programs, this approach has formulated, explicitly or implicitly, criteria for how to evaluate research contributions within its own tradition (Lakatos, 1970). Chapter 2 attempts to make explicit these criteria and to use them to characterize the state of the art within the new property rights literature. Ultimately, however, the limitations of a particular perspective can only be judged when confronted with other points of view and when applied to specific observations. The following two sections relate the new property rights approach to other strands in the economics literature and to alternative approaches in other disciplines.

1.4 The Approach and Its "Relatives"

Our focus on the control aspect of financial instruments has guided selection of the theoretical framework for the thesis. Only a small segment of the vast literature on capital structure is discussed (for a textbook survey, see Brealey & Myers (1988)). In particular, the capital structure literature in the Modigliani & Miller (1958) tradition and the ensuing tax and bankruptcy cost literature are referred to only briefly. This

body of work is concerned with the optimal allocation of return streams; optimality of contracts in this thesis refers not only to the allocation of return streams, but also to the allocation of control. The exclusion of the literature on the role of taxes is arbitrary; taxes are likely to be of empirical significance in explaining existing allocations of control, but their implications for theory are less interesting.

The new property rights research program has grown out of two, partly overlapping, strands in the literature: the traditional property rights school and the agency approach (for surveys of the two approaches, see De Alessi (1983) and Harris & Raviv (1990), respectively). Both these traditions have been influenced by and, to some extent, have reacted against, the claim in the early managerial literature that shareholder control has all but lost its meaning as a result of the emergence of a class of professional managers (see, for example, Berle & Means (1932)). While recognizing the agency problems associated with the diffusion of shareholdings and the importance of management, the agency and property rights approaches maintain that shareholder control does matter. As a result, these approaches may have less to say about large widely held corporations where no dominating shareholder or group of shareholders can be identified.

The property rights literature and the agency traditions share a view of institutional design as determined by a desire to economize on agency costs. Despite the significance of the traditional property rights literature in initiating the analysis of control in economics, this body of work is not reviewed extensively. The relevant insights from this research program have been clarified by and integrated into the more recent property rights literature. The agency literature has been the main alternative approach in the capital structure literature. However, since this literature does not explicitly consider the allocation of control rights, it is here represented only by a small number of contributions (Chapter 2 distinguishes this approach from that of the agency literature). In particular, we largely exclude the literature assuming that contracting parties can perfectly commit to contractual agreements *ex ante* (see, for example, Townsend (1979); and Gale & Hellwig (1985)); contractual design is here

viewed, not as an outcome of, but as a device for achieving credible commitment when contracts are incomplete.

The large body of work discussing capital structure as determined by incentive considerations (see, e.g., Jensen & Meckling (1976); and Myers (1977)) is only briefly discussed; indirect influence on behavior through incentives is here regarded as important but not sufficient in reducing agency costs. In addition, since we are concerned with the ex post agency problem, i.e., moral hazard, the sizeable literature on ex ante asymmetric information and adverse selection is not included (see, e.g., Ross (1977); Leland & Pyle (1977); and Myers & Majluf (1985)). We have also excluded a set of contributions discussing the use of financial instruments as anti-takeover device (Harris & Raviv, 1988a; and Stulz, 1988); these contributions take existing instruments as given and do not directly consider control. Finally, while related to our interests, recent work on the interrelationship between input/product markets and capital structure is not included (see, e.g., Brander & Lewis, 1986; and Bolton & Scharfstein, 1990a); we regard this literature as falling outside the main focus of the thesis.

1.5 The Approach and Its Critics

The new property rights approach to capital structure has developed largely in response to perceived weaknesses in the economic literature, and its contribution should primarily be related to the analysis in that tradition. In developing a theory of capital structure, and more generally a theory of the firm this approach has learned from perspectives in other disciplines, particularly from the literature on authority and power, and from the legal literature. However, many concerned with issues of control are still likely to regard the approach chosen for this thesis as a narrow one. The basic methodology of contract theory has been extensively criticized, mostly by disciplines outside economics. While some of this criticism is justified, other objections seem premature. This section discusses some of the issues brought up by the critics and how the proponents of the new property rights approach have attempted to address the weaknesses in the earlier literature.

One important objection to contract theory, in particular to agency theory but also to the traditional property rights school, is that it ignores asymmetries in contractual relationships, e.g., between employer and worker (Putterman, 1984). The term "contract" is said to be misleading when we are concerned with an authority relationship where one party exerts power over another; the employer can fire the worker, but the worker usually cannot dismiss his employer⁷. Furthermore, Perrow (1986), himself a sociologist, claims that economists, in particular those working with agency theory, study only one side of this relationship; only agents shirk or lie.

While relevant for some of the early agency and transaction cost literature, this criticism is less valid when applied to the new property rights approach which attempts to incorporate features of authority, or power⁸. The theory of the firm advanced by the new property rights approach does not treat the employer-employee as symmetric; unlike the employee, the employer possesses property rights to the physical assets and can determine how these are used (Hart, 1989). Furthermore, the analysis is not one-sided; principals may behave with "guile" (the term used by Williamson (1975) to denote ex post opportunism), for example, by selling the firm against the interest of the agent (in general, as shown in Chapter 2, the principal-agent relationship is less clear-cut in this literature). The role of asymmetries in contractual arrangements may also be less important, or at least play a different role, when contracting parties

⁷ Contract theory is viewed as particularly naive when applied to bargaining in labor markets. However, while asymmetries are real, an employee usually is not entirely at the mercy of the employer. He may punish him, for example, by leaving the firm, by striking or simply by not exerting effort. Translated to an example from financial contracting this reciprocity in punishment capability implies that a debtor may punish a creditor by not meeting debt repayments and that the creditor can retaliate by declaring the debtor in default or by refusing further contributions of capital.

⁸ Perrow (1986) defines power as "the ability of persons to extract for themselves valued output from a system in which other persons or groups either seek the same outputs for themselves or would prefer to expend their efforts toward other outputs". Power may be exercised to alter the initial distribution of outputs, to establish an unequal distribution or to change outputs. In sharp contrast to the property rights treatment of control in this thesis, he emphasizes the fundamental "zero-sum"-nature of the game.

operate in competitive capital markets. In addition, what at first glance appears to be motivated by power considerations could also be explained by efficiency.

Power can be important in an *ex ante*, exogenous sense through the initial endowments of contracting parties, and in an *ex post*, endogenous sense reflecting the bilateral monopoly situation created in a particular relationship. Of course, initial endowments may also affect the bargaining situation *ex post*. Undoubtedly, asymmetries in initial endowments do influence contractual design, and contract theory may have failed in recognizing their full significance. However, initial endowments are part of the analysis. Indeed, many of the more interesting contracting problems stem from differences in initial endowments. For example, one party may be endowed with an entrepreneurial idea and another with capital; the distribution of gains from trade is assumed to reflect the markets for ideas and capital, respectively. In a competitive capital market, the entrepreneur captures most, or all, of the surplus. If ideas are abundant and easily traded but capital is scarce, the party with capital takes the bulk of the surplus. In fact, initial endowments may have rather unexpected effects. For example, as demonstrated in Chapters 2 and 3, the fact that one party lacks capital may improve his ability to commit to a particular contractual arrangement.

While the significance of initial endowments may have been underestimated in contractual analysis, power in the *ex post*, endogenous sense is at the heart of the new property rights approach. The *ex post* distribution of power is affected by differences between parties in terms of, for example, amounts of specific resources contributed and their potential to dilute resources from the relationship. Asymmetries in information may also affect bargaining strength. Contractual arrangements are viewed as devices to mitigate *ex post* conflicts arising from these differences.

A more fundamental criticism of the treatment of control in this literature is that it only conceives of the concept in a very narrow sense. Lukes (1974) identifies three forms of power: (1) the power to force someone to do something; (2) the power to influence the agenda of decisions to be made; and (3) the power to influence the preferences of other parties. Furthermore, he distinguishes between observable and

latent conflicts, the latter referring to situations where contradictions exist between those exercising power and the real interests of those excluded. Real interests also incorporate interests which those controlled of are unaware of or do not express. In terms of Lukes' typology, the analysis in the new property rights literature only discuss control in the sense of influencing actions⁹; the dimensions of control and the parties' preferences are treated as exogenous. In principle, the latter two forms of power could be analysed formally using the tools of contract theory. However, since the understanding of control in the more limited sense is still very incomplete within economics, such attempts are premature; some of the more complex features of authority relationships will probably never be appropriately modelled formally.

The limitations of the control concept in the new property rights literature become particularly apparent when applied to the exercise of authority within organizations; organizational design may serve to influence actors directly but also indirectly by determining the dimensions of control and by affecting preferences. Understanding is still limited of why firms adopt particular patterns of organization and sizes (for attempts at formal treatment, see, e.g., Tirole (1985) and Felli (1990)). Control is perceived of in a hierarchical sense; more sophisticated notions of control in large corporations have not been addressed (see Hedlund (1990), for a critique of hierarchical approaches). Furthermore, the understanding of a number of organizational issues related to control are still rudimentary at best (e.g., the role of rules and conventions, and the significance of multiple and conflicting goals (Cyert & March, 1963; and Cohen et al., 1963); the constraints imposed by technologies (Lawrence & Lorsch, 1967); and the importance of routines and skills (Nelson & Winter, 1982)).

Critics have also pointed out that relationships are more complex than implied by the contracting literature. Essential non-economic information, such as trust, is communicated in relationships, and contracts are embedded in political, ethical and cultural values (Granovetter, 1985); economic modelling, it is claimed, simply cannot capture the richness of such interactions. Some limitations of contract theory have

⁹ When related to the behavioral literature, this notion of control is closest in spirit to "behavioral control", i.e., the "direct influence on actions" (March & Simon, 1958).

been addressed earlier in this chapter. While formal analysis still does not allow for much complexity in contracting, trust and embeddedness are not ignored in the new property rights literature. On the contrary, much of the analysis is concerned with the creation of institutional arrangements mitigating conflicts in situations not covered by contracts. The desire to achieve credible commitment is at the heart of much of the contracting literature. For example, Chapter 5 demonstrates how trust may emerge out of the interaction between self-interested individuals. Various implicit and explicit norms, as well as formal and informal enforcement mechanisms that influence individual behavior in contractual arrangements can be analysed in a similar fashion.

The property rights approach is also criticized for exaggerating the importance of legally codified rights and for giving economic transactions an unwanted legalistic meaning (Williamson, 1990). Macaulay (1963) noted that formal contracts play a subsidiary role in most economic transactions. However, contractual analysis is not confined to explicit contracts. The significance of legal restrictions is also hard to measure; economic interaction takes place in the "shadow of the law". The fact that the legal apparatus is not more involved in transactions may, in fact, reflect the predictability of its operation and the ability of contracting parties to ex ante mitigate potential conflicts. Furthermore, while property rights are assumed to be legally codified throughout the thesis, control rights derive their role partly from the imperfections of the legal system in enforcing specific rights, i.e., from the existence of contractual incompleteness. It is also recognized that contracting parties often design private arrangements to avoid costly involvement by public courts, so-called private ordering (see Chapter 5). However, to the extent that there are inherent differences in the significance of legal rights and in the perception of rules and conventions across economic systems, such differences may distort international comparisons of property rights.

The response to contract theory from the legal profession has been more favorable. However, legal scholars complain that economists extend the use of the contract concept beyond recognition; contract law is an established field in law which looks for standard indicia of contract formation, offer and acceptance (Gordon, 1988). While the

economists' use of the contract metaphor may lead to confusion, there is no doubt that contract theory has brought economic analysis closer to that of law. In general, the new property rights approach has improved our understanding of the firm more as a legal entity than as an organization.

1.6 Brief Summary of Findings in Essays

Chapter 2 presents the general methodology for the thesis and defines formally the concept of control as it is used in the essays. The chapter describes the new property rights approach to capital structure and relates it to the agency literature. We emphasize the role of the allocation of control rights as an additional device for achieving commitment between the firm and its capital suppliers. Unlike the traditional agency literature, the new property rights approach allows control to be shifted between the initial contracting parties contingent on some event. This is the fundamental control property of the standard debt instrument. The return rights associated with this instrument, fixed repayments, are viewed as a means of achieving a control transfer; when payments are not met creditors take over control. Furthermore, the allocation of control rights and rights to return streams, i.e., the determination of capital structure, is shown to be affected by the existence of an external market where these rights may be traded. The state of the new property rights research program is then evaluated using the program's own criteria. We find that whereas this body of work has been reasonably successful in explaining some central features of the standard debt contract, it has not generated a capital structure containing both external equity and debt. Furthermore, the analysis has primarily been confined to small venture capital firms with an entrepreneur and an external investor; the widely held firm remains virtually unexplored by this literature. More complex instruments such as convertible contracts or other derived securities have not been examined.

In Chapter 3 an entrepreneur seeking outside funds has to share control and returns with an external investor. The contracting parties know that control over the firm may be sold in the future with potentially positive and negative effects for the party not

having control. The choice of financial contracts affects the compensation to the initial contracting parties in the event a rival management team appears. The mere possibility of a future sale may thus give rise to conflicts between the initial contracting parties and lend importance to the allocation of control. The contracting parties may choose between the standard contracts, debt and equity. An all-equity contract could either give all control, and the right to sell control, to the entrepreneur or to the external investor. If standard debt is used, control is transferred to the external investor when debt repayments are not met. Debt repayments are set to ensure that control transfer occurs in states of nature when the firm should be liquidated. The cash flow characteristics of debt contracts thus influence how much is extracted from a rival in two distinct ways: by affecting total revenues through the transfer of control to the external investor and by determining how much of these revenues are paid out to the external investor.

Unlike previous models in the new property rights literature, Chapter 3 demonstrates a fundamental complementarity between standard debt and equity, i.e., both debt and external equity have important roles to play in the firm's capital structure. Non-voting, or minority, external equity ensures that, in the event of a takeover, the entrepreneur is compensated for his private benefits in good states of nature and allows the external investor to enjoy the efficiency improvements following the takeover by a rival in these states. Standard debt protects the external investor against dilution (asset stripping) in bad states of nature but extracts less from the rival in good states. Furthermore, we demonstrate the complementarity between the two transfer mechanisms associated with these contracts, bankruptcy and takeovers; bankruptcy optimizes contractual payoffs among the initial contracting parties, whereas takeovers optimizes these payoffs between the initial contracting parties and an external rival.

In Extension 1 to Chapter 3 we introduce the possibility of mistakes in the transfer process and discuss how this may affect the choice of capital structure. Extension 2 demonstrates that a convertible debt contract, with the properties of non-voting equity in good states of nature and those of standard debt in bad states, dominates any combination of the standard contracts. Contracting parties can improve on the standard

contract by making the transfer of control and the choice of the sharing rule optional. The third extension demonstrates that under our payoff assumptions joint ownership or unanimity rules have expected payoffs equivalent to those of all-debt external financing.

Chapter 4 applies the new property rights approach to international variations in capital structure. A comparison based on data for six capitalist economies classified into market-oriented and bank-oriented financial systems shows, among other things, higher debt-equity ratios and more concentrated ownership of debt and equity in countries with bank-oriented systems. Creditor reorganizations led by commercial banks are also more common in these systems, while takeovers are relatively rare. Furthermore, ownership patterns are remarkably stable over time. The analysis in Chapter 4 uses the new property rights literature to interpret these observations and how they are related to each other.

According to this approach, higher debt levels indicate that creditors, in particular commercial banks, have control over a wider range of states of nature. This allocation of control may be explained by the less strict regulation of commercial banks' involvement in corporate reorganization in these countries. Since these banks can exercise control more effectively, they are willing to extend credit beyond levels observed in market-oriented financial systems. In fact, commercial banks may actively utilize higher gearing ratios to initiate financial distress as a means of reorganizing problem firms. This claim is consistent with the relatively more common creditor reorganizations and less frequent hostile takeovers. In general, the data suggests that firms in the bank-oriented financial systems rely more on internal conflict resolution while market-oriented systems are more prone to solutions involving outsiders to the firm, such as courts and other companies. This again may explain why ownership structures are more stable in countries with bank-oriented systems. In the final sections, we suggest some implications for our understanding of the effects of financial deregulation.

While the analysis in Chapter 4 suggests the potential fruitfulness of the new property rights approach for understanding international variations in capital structure, Chapter 5 applies the same framework to a particular allocation of property rights, the Japanese corporate groupings, the so-called financial keiretsu. These groups are characterized by extensive reciprocal ownership of equity and debt, a strong domination of the group's main bank in corporate borrowing, and high levels of gearing in member firms. This pattern of property rights allocation is interpreted as a private collective mechanism enforcing contractual agreements between transacting firms. The crossholdings of equity are such that the combined voting power of group members is sufficient to ensure majority control to the group. When an individual manager does not exert effort in bilateral transaction between member firms, the group may remove the shirking manager. Similarly, when the firm does not meet its payment obligations, control is transferred to creditors through the use of debt in the form of trade credits and large bank loans. The allocation of control in low performing states of nature resembles that of good states, but the main bank has a more dominant role. Compliance with the decision reached by the main bank and member firms, now as creditors, is achieved through the crossholdings of equity. Thus, the mode of enforcement changes from mutual enforcement to a more hierarchical mode when the firm comes into financial distress.

The explanation suggested in Chapter 5 captures some of the central features of the financial keiretsu. It explains the particular pattern of financial contracting within the groups and the puzzling intermingling of property rights and trading relationships. Furthermore, our rationale is consistent with the remarkable stability of the financial keiretsu over time and the pattern of corporate reorganization observed within the groups. The formal model also predicts the approximate size and composition of the groupings as well as their dispersion across industries. In addition, an interpretation is given for the regular meetings of presidents in member firms. Finally, we analyse the implications of the arrangement.

2.1 Introduction

The essays in this thesis share a common theoretical and methodological base in the new property rights approach to capital structure. This chapter outlines this base and relates it to other approaches in the literature. The intention is not to extensively review the literature on capital structure and control but to define general contracting concepts and introduce formal tools believed to be helpful for the analysis (Sections 2.3-2.6). In addition, the most important contributions to the new property rights approach are presented and related to the rest of the literature on financial contracting, in particular to the agency literature (Sections 2.7-2.9).

The outline of the chapter is as follows. In Section 2.2, we infer from the literature a set of criteria for a property rights theory of capital structure. This approach takes its basic methodology from contract theory. Section 2.3 briefly presents this methodology. Within the contract theory literature, the new property rights literature belongs to a body of work which focuses on the incomplete nature of contracts. Incompleteness is explained by the inability of outside agencies to verify and enforce certain contractual provisions. The problems of verifiability and enforcement are discussed in Section 2.4. When contracts are incomplete, ex post conflicts are resolved through ex post bargaining. Section 2.5 discusses different ways of constraining such bargaining. We are particularly interested in the allocation of control rights as a means of reducing ex post bargaining costs. In Section 2.6, the concept of control is defined formally.

This thesis applies contract theory and the new property rights approach to a particular form of contract, financial instruments. Section 2.7 defines the two standard financial instruments, debt and equity, and discusses previous approaches to financial contracting in the context of a simple model with an entrepreneur seeking funds from an external investor. In Section 2.8, three central articles focusing on the control aspect of financial instruments are presented. Finally, in Section 2.9, the present state of the new property rights literature is evaluated using the criteria identified at the outset of the chapter.

2.2 An "Ideal" Property Rights Theory of Capital Structure

Like most research programs, the new property rights framework has formulated its own criteria, explicitly or implicitly, for how to evaluate research. In the following section, we attempt to identify, from some significant contributions, the ideals towards which this research program aspires. Taken together these criteria constitute an ambitious program for research. In the final section of this chapter we return to this "ideal" theory to evaluate the state of the art in the new property rights literature. Though obvious to most researchers, it should be emphasized that this approach does not claim present the only theory of capital structure. However, this literature may offer a useful framework within which a number of approaches can be developed and more specific hypotheses tested (Holmström & Tirole, 1989).

Much of the finance literature has analysed the firm's choice of capital structure as separate from the firm's real decisions, e.g., what to produce and how to organize production. The new property rights approach takes as one of its basic premises that a theory of capital structure should be subsumed under a more general theory of the firm (Hart, 1989). Indeed, if a firm is defined by its physical assets and how it allocates property rights to these assets, the choice of capital structure is intimately related to the choice of the firm's external organization; financial instruments confer property rights and the firm's capital structure defines how these rights are allocated among the firm's suppliers of capital. As with a theory of the firm, a theory of capital structure should be general in the sense that it does not apply only to a subset of firms, e.g., only to closely-held or only to small firms.

The new property rights approach views the corporate charter as providing the basis for the evolution of the firm as a contractual arrangement, and thus for the design of financial instruments. In writing the charter the initial contracting parties attempt to maximize the value of the firm by foreseeing potential future conflicts in the corporation. Such conflicts between parties may be caused by new information which becomes available after the time of contracting rendering existing arrangements obsolete. However, conflicts may also arise because the firm has to return to the

capital market for additional funds or because one party decides to sell his claims on the firm, possibly against the desire of other contracting parties. The corporate charter and the subsequent contracts are designed to mitigate such potential conflicts between the stakeholders of the firm. According to the proponents of the new property rights approach, a theory of capital structure and, more generally, a theory of the firm should be able to explain the role of different financial instruments and combinations of these instruments in conflict mitigation.

Much of the traditional finance literature as well as most agency approaches take existing financial instruments as given. An "ideal" theory of capital structure, in the eyes of the proponents of a new property rights perspective, must address the deeper question of security design, i.e., why financial instruments have certain cash flow characteristics and why they assign control rights in a particular way (Harris & Raviv, 1990). Such a theory should also improve our understanding of why financial instruments are used in particular combinations.

Furthermore, a theory of capital structure should explain why certain financial instruments and combinations of these instruments are used in some situations and not others, and why financial contracts appear in particular patterns across industries and across countries (Hart, 1988a). In the ideal of the new property rights school, such a theory should consider both control and return characteristics of financial instruments. This does not imply that both these aspects are always significant at the same time, but rather that a theoretical framework should be capable of considering both. This framework must also incorporate under the same paradigm the important financial instruments, at least both standard debt and equity, and explain why these instruments are used in certain combinations.

An even more ambitious goal which we impute to the new property rights approach is that the two basic dimensions of capital structure - the composition of instruments and their distribution across investors - should be addressed within the same theoretical framework. In particular, explanations should be provided as to why certain types of investors seem to hold certain types of instruments; for example, why commercial

banks in certain contexts hold both debt and equity in the same corporation. In addition, a new property rights theory of capital structure should also help explain why particular financial patterns cluster together in certain contexts and how these clusters relate to the larger context, i.e., to the financial and economic system. For example, why high corporate debt-equity levels are found in countries where ownership of debt and equity is highly concentrated.

An important feature of contracts, not the least financial contracts, is that they are sometimes renegotiated. Such renegotiations may be associated with considerable costs, directly through time-consuming bargaining but also indirectly through their effect on the willingness of contracting parties to invest *ex ante*. Rational contracting parties, of course, take the possibility of such renegotiation into account and design contracts in a way so as to reduce these costs. As a result, a wide variety of institutional arrangements economizing on renegotiation costs have evolved. From the viewpoint of the new property rights approach, an ideal theory of capital structure should allow for future renegotiation and explain how contractual design is affected by this possibility.

Ultimately, most economists would argue, a theory of capital structure should also have normative implications for decision-makers in individual firms and for government policy-makers concerned with institutional design. A theoretical framework should help financial managers in designing contracts with cash flow and control characteristics minimizing the cost of financing in a broad sense of the word, i.e., including agency costs associated with different contractual arrangements. Furthermore, a theory should provide assistance to those considering public policy issues such as how to tax financial instruments or how to regulate financial institutions and financial markets.

Before proceeding with a discussion of the literature on contracting and its formal tools, a few comments are made about contract theory and the design of models of long-term relationships.

2.3 Contract Theory

The general methodology for this thesis is that of contract theory (for a review of this literature, see Hart & Holmström (1987)). According to this theoretical tradition, every economic transaction is mediated by a contract, whether explicit or implicit. We are primarily concerned with explicit financial contracts. As defined by Hart & Holmström, a contract can be interpreted very broadly as any document regulating a quid pro quo, i.e., one thing in return for something else. A contract may, for example, stipulate certain actions to be undertaken in different states of nature, and rules for how to share the benefits generated from these actions. Contract theory sets forth to explain the design of contracts and the economic effects of their particular features.

Contracts are particularly important in long-term relationships, when time is allowed to elapse between initial contracting and actual performance, and between actions and payoffs. This thesis is concerned with such long-term relationships between the firm and its suppliers of capital. The goal of contractual design is to achieve credible commitment, i.e., to find arrangements which make contracting parties stick to the initially agreed terms when new information may become available.

The standard long-term contracting model assumes that parties meet at some initial date and negotiate a Pareto-optimal long-term contract. Optimality is interpreted in a second-best sense, i.e., the first-best cannot be achieved due to informational or other constraints; these constraints are at the heart of the contractual analysis. In more formal terms, a Pareto-optimal contract maximizes one party's utility subject to the other party (parties) receiving their minimum (reservation) expected utility. Typically, in the two-party setting, one party - e.g., the principal - suggests a contract to the other party - the agent - as a take-it-or-leave-it offer. This gives the principal all the bargaining power (i.e., the first-mover advantage in the bargaining game). The principal is assumed to know the agent's preferences and thus which action he will choose or which information he will report in a given contingency. Since the analysis is of a partial equilibrium nature, for the design of the optimal contract it typically does not

matter which party's utility is maximized¹. In fact, many contracting models assume that the agent suggests the contract, e.g., a manager proposes his financial compensation package to shareholders who vote on whether to accept it or not.

The individual rationality (IR) constraints ensuring all parties' participation are assumed to be determined in some market interaction, for example, an investor's IR constraint may be derived from the assumption of a competitive capital market. Prior to contracting the principal may choose among several agents, or the agent among several principals. This competition among agents (principals) explains why he (she²) may be forced back to his (her) reservation price. However, during the life of the contract the relative bargaining position may change because parties make investments specific to a particular relationship or as a result of new information which becomes available after the time of contracting. It is this transformation (what Williamson (1985) terms the "Fundamental Transformation") from a competitive market context to a bilateral, small-number situation that creates the basic problem of long-term contracting.

The IR constraints in the optimization problem are complemented by incentive compatibility (IC) constraints describing the agent's ex post incentives. The IC constraints ensure that the optimal action is chosen (or the correct information reported), i.e., given a certain state of nature, there is no other action (or report) which is more profitable for the party taking the action (or making the report). When the IC constraints are met, a contract is incentive compatible. Contracts which are incentive compatible and for which the individual rationality constraints are satisfied are said to be implementable. Among implementable contracts, the party with the

¹ Principals and agents are not always easy to distinguish. In the literature on agency problems under asymmetric information, the principal-agent relationship is typically defined in terms of the information structure with the agent having private information. However, when information is symmetrically distributed between the two contracting parties, this distinction is not applicable. Rather the agent is defined as the party implementing the strategic action or controlling cash flows. In the control literature, the principal-agent terminology could be misleading, since the relationship is reversed in certain states of nature when control rights are state-contingent.

² Following some other authors (e.g., Hart, 1988a), we generally use the feminine pronoun for principals and external investors.

bargaining power at the time of contracting chooses the contract which provides him (or her) with the highest utility.

When constraints are broken there are conflicts between the contracting parties. These conflicts stem from moral hazard, i.e., agents maximizing their own utility to the detriment of others in situations where they do not bear the full consequences (or enjoy the full benefits) of their actions (Kotowitz, 1987). Following the standard usage in game theory, moral hazard here denotes any form of ex post opportunism. These ex post problems affect contracting ex ante.

Moral hazard arises when uncertainty and incomplete contracts prevent the assignment of full damages (benefits) to the agent responsible. In fact, the moral hazard problem is caused by a special form of contractual incompleteness, resulting either from asymmetric information in conjunction with some conflict of interest between the principal and the agent (e.g., Gale & Hellwig, 1985) or from costs of writing and enforcing contracts (e.g., Williamson, 1985; and Grossman & Hart, 1986). The essays contained in the thesis are all concerned with moral hazard problems arising from the latter type of contracting costs.

Transactions are often complicated by requirements requiring that contracts cover a wide range of contingencies. Even a simple sale may necessitate that parties ex ante specify attributes such as quality, price and mode of delivery as well as various contingencies which may affect the value of the commodity or the costs of production. A complete (or comprehensive, in the terminology of Williamson (1985)) contract specifies each party's obligation in every conceivable eventuality, i.e., state of nature, actions and payoffs are stipulated in the contract³ (Hart & Holmström, 1987). This should be distinguished from a contract that is fully contingent in the Arrow-Debreu sense; such a contract only specifies states and payoffs. A contract may be complete

³ Tirole (1988) provides an alternative definition: a complete contract is a contract that has all the relevant decisions (transfer, trade, etc.) depend on all verifiable variables, including possible announcements by the parties. In his definition, an a priori incomplete contract may be complete if it yields the parties the same payoffs as the optimal complete contract.

with respect to one relevant variable, e.g., state of nature, and incomplete with respect to another, e.g., strategic action. In the usage of this thesis, for a contract to be complete it must be complete in all dimensions affecting the payoffs to the parties in the particular problem analysed.

Complete contracts are difficult to write and enforce. Some models have addressed this problem by assuming that enforcement is guaranteed by specifying sufficient explicit penalties delivered by the judicial system. Others have emphasized the role of implicit enforcement in complementing the often rudimentary contracts we observe in practice. A contract which is not enforceable by a third party may survive because it is self-enforceable; the contract may be a Nash equilibrium of a repeated game. These games rely on very long relationships and are sensitive to "unraveling from the end", i.e., parties may behave in an opportunistic manner in the last period which affects the behavior in the second to last period and so on. The mechanism in Chapter 5 of this thesis ultimately relies on the self-enforcement of a punishment scheme (in a sense this applies also to public courts, i.e., there is some mechanism with long horizon which makes judges sentence criminals and juries difficult to bribe).

A third approach, and the route followed in the three essays, is to explicitly model realistic penalties and indirect costs of contractual breach, e.g., in the form of losses of reputation or some other benefit. Furthermore, this latter approach discusses why certain variables are contracted upon while others are not, and the effects of such contractual incompleteness. Some contingencies will, quite rationally, be left out when contracts are signed, while other contingencies are simply not foreseen. This incompleteness is due to the existence of transactions costs, the major source of which is the cost of information. Hart & Holmström (1987) identify four types of transactions costs associated with specialized factors of production⁴: (1) the cost to each party of

⁴ The costs of specifying contingencies, and thus incompleteness, are primarily associated with long-term contracts, but by no means exclusively so. The costs mentioned above could well be associated with short-term transactions as well. However, they are believed to be lower for short-term contracts. Hart & Holmström (1987) argue that transaction costs of type 1 and, possibly, type 2 are lower for short-term contracts. Incompleteness thus provides an explanation as to why parties often sign short-term contracts and enter into costly renegotiation instead of signing a

anticipating the various eventualities that may occur during the life of the relationship; (2) the cost of deciding, and reaching an agreement about, how to deal with such eventualities; (3) the cost of writing the contract in a sufficiently clear and unambiguous way that terms of the contract can be enforced; and (4) the legal cost of enforcement⁵. Contracting costs are typically not modelled directly, i.e., by calculating the costs of including a particular variable. Instead, these costs are captured indirectly by assuming that certain variables are not verifiable by a third party, such as a public court⁶. Contracting costs are the costs arising from such incompleteness.

2.4 Verifiability and Enforcement

The information structure, i.e., the distribution of information about relevant variables among actors, is crucial for the analysis in the incomplete contracting literature. Contracts may be incomplete simply because information is asymmetrically distributed between the contracting parties, e.g., the principal does not observe the agent's actions or the state of nature. However, contractual incompleteness could be at hand, even if both parties to a contract observe everything and recognize its implications, i.e., if information is symmetric⁷. The problem is to convey this information to a third party, e.g., a public court. It is the asymmetry of information (and the associated enforcement problem) between the parties and the outsider, and not between the parties

contract covering a longer period of time. Perhaps less intuitively, the notion of incompleteness, as we will see later, may also help us explain why the same parties under certain circumstances would be better off signing long-term contracts preventing them from intermediate negotiations.

⁵ Holmström & Tirole (1989) provide a list of factors contributing to contracting costs: i) contingencies not foreseen; (ii) too many contingencies to write into a contract; (iii) monitoring; and (iv) legal costs.

⁶ Agreements may be non-enforceable also when a public court is unwilling to enforce them either because they are found to be in conflict with legal rules (e.g., anti-trust legislation) or simply of a nature that is not enforced by courts (e.g., agreements to collaborate in research and development).

⁷ This observation was first made by Williamson (1975). The assumption of ex post symmetric information is, of course, not always a realistic assumption. However, it greatly facilitates the analysis of the ex post bargaining game.

themselves, which is then the root of the problem. This is the crucial distinction between observability (between the contracting parties) and verifiability (by an outsider)⁸.

This distinction permeates much of contract law and its empirical significance is considerable. Any representative of the legal profession recognizes the difference between the two concepts when contracting parties meet in court to settle disputes. In many cases both parties know what took place. However, the particular circumstances may not have been anticipated *ex ante* or be verifiable *ex post* and thus may not be sufficiently well specified in the initial contract. Furthermore, the parties may have different interpretations of what the contract says about these circumstances; the problem is to convince the judge and/or the jury.

The problems of writing and enforcing complete contracts are perhaps best understood through a closer examination of the third enforcing party, e.g., a public court. The verifiability problem arises out of the informational requirements imposed by such a third party. Tirole (1986), analyzing information flows in hierarchical organizations, distinguishes between "hard" and "soft" information; hard information being information which can be credibly conveyed to, i.e., verified by, a third party. This party should be able to look at the evidence and convince himself or herself of what is in accordance with the contract and what is not. For example, a transfer of cash from one party to another could probably be verified by presenting a receipt, while the amount of effort put into a particular transaction is hard to measure in an unambiguous way.

Contractual design thus reflects the capabilities of this external agency. If the agency cannot observe, or verify, the resolution of uncertainty, i.e., the realizations of the states of nature, contracts contingent on states are not enforceable. Similarly, if actions are not observable and verifiable by the third party, contracts cannot be made contingent on actions. Finally, some benefits may be verifiable, while others are not;

⁸ Lack of verifiability by a third party is not sufficient to rule out contingent contracts (Maskin, 1985). This assumption must be supplemented by restrictions on complexity or by bounded rationality, i.e., by imposing limits on the individual actors' ability to process information (Simon, 1947).

in the perspective of the incomplete contracting literature, it is meaningless to include non-verifiable benefits in a contract. However, to be effective an enforcing institution must, in addition to verifying these variables, be capable of punishing deviations from contracts. In other words, a complete contract should specify not only actions, payoffs and contingencies but also mechanisms for enforcing such a contract.

Contracts exhibit various degrees of incompleteness. Some contracts, such as most employment contracts or publicly traded equity instruments, are typically quite rudimentary, while others, e.g., life insurance policies or corporate bonds, often are accompanied by long lists of contingencies specific to a particular relationship. The rudimentary nature of a particular contract may reflect either well-developed legal ground rules or established conventions making detailed specifications redundant, but it could also be a sign of incompleteness due to the problems of verifying certain variables, e.g., the exact tasks to be performed and the effort to be exerted by an employee or by the management of a firm.

In modelling incomplete contracts some authors have assumed extreme incompleteness where nothing but control rights are verifiable (e.g., Grossman & Hart, 1986). The parties may partially alleviate the problem of incompleteness by contracting on some restricted set of publicly observable variables. Aghion & Bolton (1988), for example, allow parties to utilize verifiable post-contracting information (profit realizations) as a proxy for the variable the parties would have contracted upon had a first-best contract been feasible (the state of nature). The extent of incompleteness varies across contractual situations and is ultimately an empirical issue.

2.5 Ex Post Bargaining

An agent cannot credibly commit to a contract which is contingent on non-verifiable variables or which is not incentive-compatible. However, even contracts contingent on verifiable variables may not allow credible commitment when contractual terms could be renegotiated ex post. While a court can enforce such contracts, it typically cannot prevent the contracting parties from tearing up old contracts. Many if not most

contractual disputes are settled through such unconstrained ex post bargaining. When bargaining is unconstrained, any ex post inefficiency will be renegotiated ex post. The possibility of renegotiation may be crucial if the initial contract prescribes ex post inefficient outcomes, e.g., some punishment scheme which is costly not only to the party subject to penalty but also to the punishing party. Naturally, ex post efficient contracts will not lead to renegotiation.

The possibility of renegotiation may curtail specific investments, since the marginal gain from such investments may be transferred to the other party; this is the general underinvestment result in the literature on incomplete contracts⁹ (for a survey, see Hart, 1988b). Specific investment weakens the ex post bargaining position by making the party undertaking the investment more vulnerable to a termination of the relationship¹⁰. In fact, in many cases it would be optimal for the parties to agree not to renegotiate (Hart & Holmström, 1987). However, to be credible, such an agreement must itself be renegotiation-proof; parties should not have incentives to renegotiate the initial contract ex post¹¹. Thus, the parties attempt to design the incentive compatibility constraints ex ante so as to avoid renegotiation (Dewatripont, 1988).

The contracting parties may thus ex ante agree to constrain this process through intermediate contracting (Tirole, 1988; cf. the concept of ex post governance in Williamson (1985)). Such constraints may involve, for example, imposing rules on the order and types of moves the parties can make in the ex post bargaining game. There are two dominating forms of intermediate contracts: arbitration¹², i.e., to let the third

⁹ The bargaining process as such may also be costly, e.g., because information is asymmetric (Fudenberg & Tirole, 1989) or because parties are liquidity-constrained (Aghion & Bolton, 1988).

¹⁰ Assets are said to be relation-specific when they have a higher value inside a particular relationship than when traded on the market. For simplicity, we assume that relation-specific investments are worthless outside the relationship.

¹¹ A contract is said to be renegotiation-proof if it is Pareto-efficient under the informational constraints existing at the time of renegotiation (Dewatripont, 1988).

¹² An arbitrator can be recruited either externally (a third party) or internally (one of the parties)(Hart & Holmström, 1987). The parties agree ex ante to arbitration and expect the arbitrator to make the decisions which most closely resemble those that a

party decide the outcome, or delegation of authority to one of the parties to decide on the outcome. The latter form of intermediate contract corresponds to our use of the concept of control; (residual) control rights represent the rights to make decisions in situations not covered by a specific contract (Grossman & Hart, 1986). Control can be delegated unconditionally or can be made conditional on some verifiable variable (Aghion & Bolton, 1988). In the following section, the concept of control rights is developed formally. We also discuss how the allocation of control rights affects ex post renegotiation. As will be shown, the delegation of control rights does not eliminate ex post bargaining but changes the status quo of the bargaining game by giving the first-mover advantage to the party in control.

2.6 The Concept of Control

In general, the allocation of control affects how the gains from trade are distributed. The division of ex post benefits, in turn, has repercussions for ex ante investments. To prove these contentions and provide some basic definitions, this section examines a simplified version of the Grossman & Hart (1986) model of control that has been widely used in subsequent work.

We consider two agents meeting in a competitive market. They possess one asset each. By coordinating the use of their assets, the parties may increase the marginal productivity of their investments. Assume for simplicity that this coordination opportunity lasts two periods. At date 0 (ex ante), the agents may sign a contract, or

complete contract would have specified. Arbitration can also be used to define the set of decisions which the parties can bargain over (Tirole, 1988). The choice between external and internal arbitration involves a trade-off between the costs of letting an outsider collect the information necessary to make the decision and the risk that an insider have conflicts of interests. In the case of arbitration by a third party, the reputation effect will work through external enforcement; the arbitrator might not be hired again. The internal arbitration mechanism relies on internal enforcement; the party acting as an internal intermediary risks losing a valuable commercial relationship. In both kinds of arbitration, it is incompleteness, not asymmetric information, which allows the reputation effect to enforce the outcome; if the parties never could see what the other party did, reputation could not be affected. The parties have the same information, i.e., the relevant variables are observable, but not verifiable.

leave the outcome to be decided by unconstrained ex post bargaining. Here it is assumed that the parties sign some contract; the problem is to find the optimal form. During the first period agents independently and non-cooperatively make the relation-specific investments d_1 and d_2 , respectively. At date 1 (ex post), some further actions a_1 and a_2 are taken and the following benefits realized:

$$B_j(d_j, T_j(a_1, a_2))$$

where B_j denotes benefits to agent j ($j = 1, 2$) and T_j the function describing how actions a_1 and a_2 affect these benefits. Benefits B_j are assumed to be increasing in T_j . Figure 1 shows the timing in the model.

Figure 2.1 Timing in the Model - With Ownership

cooperation opportunity occurs; contract signed; d_j chosen	party with ownership rights chose a_j	a becomes contractible; contract re- negotiated	project completed; benefits realized
0	1		2

If contracts could be made contingent on any of the variables d_j , a_j or B_j , the first-best solution, i.e., a complete contract, could be obtained. However, Grossman and Hart assume that, although all of these variables are observable to the parties, none of them are contractible ex ante. In fact, they assume an extreme form of incompleteness where no aspect of these variables are verifiable. A more realistic assumption would be that some benefits, such as dividends to shareholders, are contractible, while others, for example, managerial well-being, are not. Contractible benefits may be denoted security-related and non-contractible benefits private (Grossman & Hart, 1988). For contracts to be incomplete, it is essential that at least some benefits be private. Otherwise the first best could be achieved by transferring i 's benefits to j , removing all conflicts of interest.

Under the assumption of extreme incompleteness, the first best is not always obtainable; the distribution of ex post benefits does not reflect ex ante investments. However, a_1 and a_2 are assumed to be contractible ex post. Once the state of the world is revealed, the parties may renegotiate or write a new contract without costs. Thus, ex post investments are efficient; only the distribution of ex post benefits are affected by the allocation of control.

When states, actions and benefits are not verifiable, a contract consists simply of an allocation of control rights and a transfer payment between the agents. The optimal contract maximizes the combined ex ante net benefits of the two parties

$$B_1(d_1, T_1(a_1, a_2)) + B_2(d_2, T_2(a_1, a_2))$$

The allocation of control matters only when there is a conflict between the parties. Conflicts occur, for example, when B_j is increasing in a_j , but decreasing in a_2 . There are, according to Grossman and Hart, three interesting allocations of control: agent 1 controls asset 1 and agent 2 controls asset 2 (non-integration¹³); agent 1 controls the assets of both firms; and agent 2 controls both assets.

If only one party cares about non-contractibles, it is fairly straight-forward that this party should be in control. Furthermore, non-integration is clearly superior if T_j depends primarily on a_j . When both parties care about non-contractibles, each case leads to a distortion in ex ante investments. Under firm 1 control, firm 1 overinvests relative to the first-best, and firm 2 underinvests. The reverse is true when firm 2 is in control. Under non-integration the ex post surplus will be distributed more evenly, and both firms invest moderately and below first-best. Integration will be superior when one party's investment is particularly important relative to the other party, whereas non-integration is preferred when both parties' investments are approximately equally important.

¹³ Non-integration is formally defined as the allocation of control where the decision space is at least two-dimensional and each party has authority over at least one dimension (Tirole, 1988).

In their model, Grossman & Hart demonstrate that, in the absence of complete contracts, delegation of control is a second-best solution to the problem of protecting specific investment. Control rights do not eliminate ex post bargaining; they simply constrain the bargaining game by changing the status quo. In a game-theoretical sense, control rights are equivalent to the right to move first in the ex post bargaining game.

In the model of Grossman & Hart, actions a_1 and a_2 are ex post contractible; the parties can renegotiate or write a new contract without costs once the state of the world is determined. In this case, ex post investments are efficient; only the distribution of ex post benefits is affected by the allocation of control. However, this assumes efficient recontracting which, in turn, relies on symmetric information ex post and efficient bribing, i.e., transfers between parties are unconstrained. Under efficient bribing the non-controlling party must be able to pay the controlling party to take a mutually advantageous decision. When there is efficient recontracting, the allocation of control affects only the ex post division of benefits. The controlling party's investment cannot be expropriated, since he has the first-mover advantage in the ex post renegotiation.

When renegotiation is costly, either because efficient bribing is not possible or because information is asymmetrically distributed, the allocation of control influences both parties to invest ex post (Tirole, 1988). Efficient bribing is not possible, for example, when one of the parties is liquidity-constrained (see, for example, Aghion & Bolton, 1988; and Hart & Moore, 1989); the liquidity constraint prevents him from bribing the other party. Furthermore, if final benefits depend also on the initial investment d , the ex ante level of investment is influenced as well. When bargaining costs are not negligible, the allocation of residual control rights affects both the size and the distribution of ex post surplus (Grossman & Hart, 1986).

2.6.3 Property Rights Defined

Property rights can now be defined as the rights to return streams and the rights to make strategic decisions in contingencies not explicitly contracted upon (Grossman & Hart, 1986). We distinguish between specific rights which are specified in contracts and residual rights which cannot be directly contracted upon¹⁴; property rights refer to residual rights. Grossman & Hart (1986) refer to a legal definition of ownership (here equivalent to delegation of control) as all rights to use an asset "not voluntarily given away or that the government or some other party has taken by force". These rights may be independent of state or made contingent on future state realizations (Aghion & Bolton, 1988); when the weather is sunny, *i* is in control, whereas *j* holds the control rights when it is raining. State-contingent control rights are important in financial contracting; one party may have control when the firm is doing well, while another takes over in financial distress.

Control, as stated in our definition, refers to strategic decisions. By strategic decisions we mean decisions with major implications for the cash flows generated by a firm. The exact definition of a strategic decision, and therefore of the scope of control, differs across chapters. In Chapter 3, control refers to the decision of whether to liquidate, to continue or to sell the firm. Chapter 4 expands the concept of control to include important decisions such as reorganizations of companies and decisions to hire and fire top management. Finally, in Chapter 5, we distinguish between corporate and managerial control, where the former refers to the right to hire and fire and the latter to the right to make allocative decisions (cf. the distinction between decision control and decision management in Fama & Jensen (1983)).

The significance of property rights depends on other properties of the contracts and on the transaction subject to contracting, such as the verifiability of important variables and opportunities for renegotiation. By definition, *ceteris paribus*, a more complete contract confers less residual property rights. In Grossman & Hart (1986), property

¹⁴ This distinction is made by Grossman & Hart (1986). Wiggins (1988) distinguishes between property rights and contractual rights.

rights pertain to physical assets, but here, following Holmström & Tirole (1989), these rights also refer to residual returns, i.e., the right to spend the firm's money which has not been contracted for explicitly. Property rights do not directly confer control over human assets; slavery is not allowed. However, Hart (1989) argues that property rights to non-human assets also indirectly confer control over human assets; an employer can influence a worker by threatening to deprive him of the machine at which he works.

Throughout most of the analysis in this thesis control is assumed to be binary, i.e., either actors have all control or no control. Shared control in a particular state of nature implies unconstrained *ex post* bargaining between the parties in control (see Chapter 2). Obviously, this binary definition of control is a simplification of reality. Control rights are seldom unambiguously defined; court proceedings determining these rights would then be unnecessary. Neither are these rights, as interpreted by public courts, absolute; legal restrictions may, for example, prevent individual decisions from being implemented without prior consultations with the parties affected or other stakeholders may be entitled to a veto on certain strategic decisions. Furthermore, the transfer of control from one party to another is often gradual, for example, when creditors take over control from shareholders in bankruptcy (see Section 2.7.5 in this chapter and Chapter 3), creditors in many cases obtain influence prior to actual transfer and equityholders often maintain influence over certain strategic decisions for some time. Despite these external constraints and qualifications of control rights, the party in control can in most cases be distinguished from other stakeholders.

For delegation of control to be a viable alternative to unconstrained bargaining or other forms of intermediate contracts there must be some safeguards against abuse of authority by the controlling party. The legal definition referred to by Grossman & Hart suggests that there are definite limits to the scope of control. Laws impose such constraints, but the parties could also come to an agreement as to the scope. In fact, such an understanding of the limits of control, whether explicit or implicit, is necessary for the non-controlling party to accept the delegation of control in the initial contract (Kreps, 1984). As demonstrated by North (1981), such legal and moral constraints have been of major significance in the evolution of contractual arrangements throughout the

history of modern capitalism. Tirole (1988) argues that the limits of control could also be left to arbitration; an arbiter may be preferable to specifying in great detail the ex post decision itself.

Control is not only hard to define unambiguously, it is also hard to observe and measure in a precise manner. We suggest that the allocation of control may be indirectly observed through the firm's capital structure. However, this method introduces new measurement problems. Financial instruments may differ in how they are valued, and the control component cannot be easily isolated. Furthermore, comparisons across countries are distorted by international differences in accounting conventions and statistical procedures. These measurement problems are briefly discussed in Appendix 4.1.

2.7 Financial Contracting

Financial contracts confer property rights, i.e., rights to return streams and control as well as the right to sell these rights; financial contracts differ in terms of how they specify these rights. This thesis analyses the essential property rights features of the standard financial instruments, debt and equity, and how these contracts may be combined in a firm's capital structure to achieve specific allocations of property rights among investors. The optimal choice of capital structure is conceived of as a solution to a contracting problem where one party's payoffs are maximized, subject to a set of individual rationality and incentive compatibility constraints.

2.7.1 Standard Debt and Equity Defined

The traditional contracting problem in the capital structure literature is to choose an optimal combination of the two standard instruments - debt and equity. The standard equity instrument specifies a linear sharing rule and confers one or more votes in the general shareholders' meeting. Another important feature of the equity contract is the limited liability constraint which restricts the holder's liability to the amount originally

contributed¹⁵. The standard debt contract stipulates a fixed, but possibly contingent, payment. This payment is fixed in the sense that its size does not depend on the performance of the firm or a particular choice of strategic action. The fixed payment obligation could, however, be made contingent on the state of nature, e.g., \$100 when the weather is sunny but \$1,000 when it is raining. Control is conferred to the holder of debt when the fixed payment is not met; she may vote in the bankruptcy forum, typically according to some complex rules of priority¹⁶.

At first glance, the standard financial instruments seem radically incomplete. They specify only a very small number of contingencies and do not directly stipulate which action to undertake in a given contingency. In addition, equity appears more incomplete than debt which at least makes control contingent on the fulfillment of payment obligations. However, these instruments are complemented by legal ground rules and standards established by courts. For example, the law may stipulate criteria for when a firm's assets should be liquidated or a court may nullify actions undertaken when a firm is in financial distress. An evaluation of the extent of incompleteness in financial contracting and of the relative incompleteness of debt and equity must include these supporting legal structures.

2.7.2 Conflicts Between Investors

The early capital structure literature assumed that revenue streams were fixed, i.e., once the contract is signed the contracting parties cannot influence the action and

¹⁵ In fact, standard debt typically also carries a limited liability constraint. This is important in multicreditor situations since it ensures that no creditor can be asked to pay more than his original contribution.

¹⁶ Bankruptcy forum is the term used in the legal literature to denote the collective decision-making associated with default and the bankruptcy procedure (e.g., Jackson, 1988). The exact allocation of votes differ from country to country. In the Bankruptcy Code of the United States, for example, claimants vote in classes based on seniority. For a reorganization plan to be accepted it must be approved by a majority within each class. However, under certain conditions the Bankruptcy Court may force a plan through despite the dissent from one class of claimants; this is the so-called cram-down procedure.

thus not the size and riskiness of revenue streams. Under this and some other assumptions (e.g., no taxes and no bankruptcy costs), the choice between debt and equity is irrelevant (Modigliani & Miller, 1958 and 1969)¹⁷. In particular, capital structure does not affect incentives. The very strong general result in this literature is that real and financial decisions are essentially independent¹⁸.

The irrelevance claim and the separation of real and financial decisions may not hold when the contracting parties could influence revenue streams after the time of contracting, i.e., when there are agency problems or opportunities for moral hazard (Jensen & Meckling, 1976; and Myers, 1977). Agency costs arise because of conflicts between investors or between investors and managers. Conflicts may arise over which action to undertake or over the level of benefits to be distributed in a particular state of nature. For example, an action may require future expenditure of effort or give rise to benefits accruing to only one of the parties to the contract. Alternatively, the party managing the firm may select excessively costly or risky projects. The existence of

¹⁷ Any change in the firm's value could immediately be replicated in the portfolios of the individual investors. If the firm's value could be changed merely by altering the financial mix, this would imply a pure arbitrage opportunity. An outside investor could purchase the firm, repackage the return stream to capitalize on the higher value and yet maintain the same level of risk by forming an identically leveraged private portfolio. This holds when debt is riskless and there are no taxes. However, even with risky debt there is no clear explanation as to why the parties do not issue a wider set of financial instruments to complete the market. Alternatively, if benefits from completing the market were small, it would be sufficient to issue equity.

¹⁸ A vast literature has attempted to reconcile the Modigliani & Miller conclusion with the observation that firms seem to care about their capital structure and that capital structure varies systematically across industries and countries by introducing taxes and bankruptcy costs (for a textbook survey, see Brealey & Myers, 1989). The tax advantages of debt would make firms prefer this forms of finance. However, higher gearing ratios increases the probability of costly bankruptcy; capital structure is thus determined as a tradeoff between the tax benefits of debt and the costs of bankruptcy. While corporate taxes may affect the determination of a particular capital structure, they cannot provide a justification for why debt is used since this contract existed before such taxes (Hart, 1987). International comparisons of leverage ratios also do not bare out a correlation between corporate tax rates and debt-equity ratios (Rutterford, 1988; and Mayer, 1990). Furthermore, bankruptcy costs are poorly understood. Indeed, some empirical studies indicate that they are not large enough to explain existing capital structures (Warner, 1977).

conflicts in conjunction with contractual incompleteness render control valuable (Grossman & Hart, 1986).

Conflicts may stem from security benefits associated with a particular contract or from private benefits which one of the parties to a contract can enjoy, typically the party managing the firm, and which cannot be shared by other parties¹⁹ (Grossman & Hart, 1988). Some private benefits, such as expensive corporate jets, may be enjoyed at the expense of someone else (diluting private benefits), while others, e.g., a reputation which could be used in business situations not related to the particular firm or simply the utility an entrepreneur derives from realizing his ideas, do not affect the claims of other investors (non-diluting private benefits). Furthermore, some private benefits can relatively easily be transferred to a new manager (e.g., the corporate jet), whereas others are not directly transferable (e.g., a reputation). The degree of transferability may influence the willingness of a rival management team to bid for control over the firm.

Security-related conflicts arise from the return characteristics of the contracts used to finance a particular investment, e.g., the fixed payment associated with standard debt contracts may distort incentives. Jensen & Smith (1986) identify the following security-related conflicts associated with debt financing: (i) dividend payouts - the value of debt goes down when dividend increases are financed either by reductions in investments or by the sale of additional debt (e.g., Kalay, 1982); (ii) claim dilution - new debt is issued at the same or higher priority as existing debt or assets are transferred without fair consideration (e.g., Baird, 1988); (iii) asset substitution - high risk projects are substituted for low risk ones (e.g., Jensen & Meckling, 1976; and Green, 1984); and (iv) underinvestment - when a substantial portion of the value of the firm is composed of future investment opportunities, equityholders of a firm with outstanding risky debt

¹⁹ Private benefits are often equated with "control rents", but in our definition of control this is incorrect. A manager may enjoy private benefits without being in control. Correspondingly, an external investor may have the residual control rights without being able to derive utility from private benefits. To avoid this confusion, we use the term managerial rents or quasirents to denote private benefits accruing to a firm's management. As we demonstrate in Chapter 3, the allocation of control rights may be used to protect these rents.

may have incentives to reject positive net present value projects if the benefit from accepting the project accrues to the creditors (e.g., Myers, 1977).

The term dilution is in this thesis used in a broad sense to denote actions which are not Pareto-sanctioned as seen from the initial contracting parties' point of view (Shleifer & Summers, 1988). Thus, diluting actions may refer to security benefits to which the parties have entitlements (e.g., stripping of assets at prices below market value) or to private benefits enjoyed by the managing party (e.g., expropriation of managerial quasirents by firing incumbent management without compensation). Shleifer & Summers are primarily concerned with shareholders breaking commitments with other stakeholders, primarily labor and government. Our analysis focuses only on the firm's capital suppliers; labor and government are included in the analysis only to the extent that they have financial claims on the firm.

Conflicts may be independent of the state of nature (e.g., an entrepreneur may always want to dilute the claims of an external investor) or associated with a particular state (e.g., a conflict over the liquidation of a firm in bad states of nature). Since the opportunities for consumption of private benefits and dilution of security benefits in many cases depend on the performance of the firm, conflicts are often state-contingent. The existence of conflicts in general, and state-contingent private conflicts in particular, affects financial contracting.

Since external investors are assumed to perfectly foresee these moral hazard problems, agency costs are born by the issuing firm. Consequently, the firm has an interest in finding ways in which to reduce these costs. Contractual design is interpreted as a means for the firm to credibly commit not to undertake certain actions or to pay out a stipulated sum in the future. Agency costs arise when such credible commitment is not possible.

The rest of this chapter very selectively reviews the capital structure literature focusing on contributions emphasizing the control aspect of financial instruments. In particular, three major contributions to a control theory of capital structure are discussed at some

length. Aghion & Bolton (1988) analyse the choice between debt and equity in terms of how these contracts allocate control between an entrepreneur and an external investor²⁰. In a similar context, Hart & Moore (1989) determine the optimal payment structure of a debt instrument and discuss the choice between long-term and short-term debt. The third article, Grossman & Hart (1988), studies the allocation of votes among a firm's equityholders in the presence of an external market for corporate control. Finally, we discuss the state of the art within the new property rights literature.

2.7.3 Moral Hazard - A Simple Model

The moral hazard problem associated with external finance may be analysed formally in a model with a risk-neutral entrepreneur E seeking external finance from a risk-neutral investor I ²¹. This simple set-up allows us to address some of the basic financial contracting issues in a closely held firm. While many of the same issues would arise also in a firm where securities are widely held, new problems would be introduced as a result of diffused ownership.

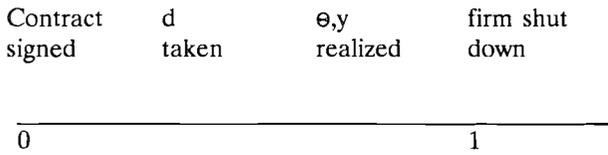
To highlight the problem of external finance and to simplify the analysis the entrepreneur is assumed to have no capital of his own, only his project. The same qualitative results would hold if the entrepreneur had some, but not sufficiently large, funds of his own. The project gives rise to future revenues y . Revenues are uncertain and may be represented by the density function $f(y;d,\theta)$ where d represents an initial

²⁰ Aghion & Bolton (1988) derive contracts with control properties resembling those of the standard financial instruments, debt and equity, as optimal contracts among a much wider set of financial contracts.

²¹ Risk neutrality is a general feature in this literature; contracting parties are assumed to have access to markets which allow risk diversification. Agency problems are easily generated when parties have different attitudes towards risk and contracts are incomplete (see Barnea, Haugen & Senbet (1985) for a textbook treatment of agency conclusions under risk aversion). The assumption of risk neutrality makes it possible that these effects from the agency problems stem from incomplete contracting alone.

action influencing revenues and θ is the state of nature²². For a given d and θ , both parties are assumed to know the resulting revenue distributions. The action d should be interpreted broadly as any decision, e.g., an effort investment, influencing revenues as well as private benefits. The state of nature represents any event, e.g., a change in a law or an exogenous price shock, which may affect how action d influences revenues and potential private benefits. For simplicity, states are either good (θ_g) or bad (θ_b).

Figure 2.2 Timing of Events



The timing of events is illustrated by Figure 2.2. A contract is signed at some initial date $t = 0$ and the entrepreneur undertakes d . At $t = 1$, the state of nature and revenues are realized and the firm is shut down; assets are liquidated and the proceeds distributed between the parties according to the initial contract. The entrepreneur enjoys private benefits (or incurs private costs) from managing the firm whereas the external investor only benefits from the verifiable revenues. Assume the following utility functions

$$U_E = M + z$$

$$U_I = M$$

where M is the verifiable monetary income which could be made part of a contract and z the non-verifiable, non-contractible private benefit. For simplicity, these benefits are also assumed to be non-diluting.

²² We follow the parameterized distribution formulation introduced by Mirrlees (1974) and further developed in Holmström (1979).

To bring down the costs of finance the entrepreneur would like to commit in a contract to a particular action d and a distribution of revenues. However, such commitment may not be possible; contractual design depends crucially on the assumptions about information structure. In this simple model, information is assumed to be symmetric between the contracting parties both *ex ante* and *ex post*; both parties observe whether a particular revenue realization is due to the state of nature or to a lack of effort investment. However, an outside agency (e.g., a public court) cannot make this distinction or at least not provide sufficient proof for one or the other; when contracts are incomplete, the entrepreneur cannot credibly commit.

If moral hazard were merely a result of asymmetric information between the entrepreneur and the external investor, e.g., because the entrepreneur privately observed θ or the action choice a , contractual incompleteness could be reduced, and perhaps eliminated, through monitoring²³ by the external investor or by some intermediary (Jensen & Meckling (1976) and Diamond (1984), respectively). For this information collection to be of any value, it must affect the behavior of the entrepreneur; monitoring must be associated with punishment schemes and mechanisms for enforcing such schemes. For example, deviations from promised behavior may result in the entrepreneur being fired without compensation. To be an effective punishment such a dismissal should have significant negative impact on the entrepreneur's expected future income.

When such punishment is possible, contracts can be made contingent on the firm's returns even though the entrepreneur has private information. Gale & Hellwig (1985) claim that such a contract would have the properties of a standard debt contract; a failure to meet a fixed repayment would result in inspection and the infliction of some penalty on the entrepreneur. However, when state verification or *ex post* punishment is costly, such a threat may not be credible *ex post*, i.e., the contract is not renegotiation-proof. In fact, the external investor may never inspect. Furthermore, the

²³ Monitoring could refer to information collection about a firm's investment prospects and its behavior *ex ante* and *ex post*. The term is here used in its more narrow sense of *ex post* information collection. When information is collected prior to contracting to reduce adverse selection problems, we use the term screening.

investor must be able to credibly commit not to punish the entrepreneur when he is exerting effort.

2.7.4 Capital Structure as an Incentive Scheme

Given that contracts are incomplete, behavior may be affected indirectly through incentives. Moral hazard can be viewed as an incentive problem which may be mitigated through the choice of capital structure (Jensen & Meckling, 1976). To minimize costs of private consumption (or lack of effort investment), the entrepreneur should be made residual claimant, i.e., only debt should be issued to the external investor so that the entrepreneur carries the full costs of any consumption of diluting private benefits. However, when the entrepreneur is only limitedly liable, an all-debt capital structure can make him choose excessively risky actions; the entrepreneur enjoys all the gains when returns are high, but for low returns limited liability restricts his losses. Consequently, he may choose excessively risky projects, i.e., the use of debt gives rise to a security-related conflict (asset substitution). The optimal combination of debt and equity is determined as a tradeoff between cost minimization and the provision of optimal risk incentives.

In an alternative incentive interpretation, capital structure is determined as a tradeoff between the tax benefits of debt²⁴ and the costs stemming from curtailed investments (Myers, 1977). According to this view, the value of the firm consists of both assets in place and future growth opportunities. High levels of debt may make the entrepreneur pass up profitable growth opportunities, since the benefits of these investments will largely accrue to creditors.

Even if capital structure can provide appropriate incentives for the choice of action plan, the external investor still has to ensure that she receives the benefits to which she is entitled; if revenues are not verifiable, the entrepreneur may simply refuse to pay claiming that there is no more cash in the firm. This possibility, in turn, will affect the external investor's willingness to supply capital in the first place. If the

²⁴ Tax laws in most countries treat debt more favorably than equity.

entrepreneur can credibly commit to paying back, capital structure may be used as a bonding device; by choosing a high level of debt, the entrepreneur commits to high profits since his costs of not meeting debt repayments, i.e., bankruptcy, are assumed to be large (Grossman & Hart, 1982); capital structure does not affect incentives directly but through the costs of bankruptcy to the entrepreneur. Through bonding the entrepreneur restricts the future states in which he is in control or the actions available to him.

In a similar interpretation, debt could be seen as a means of extracting excess funds, "free cash flow", which would otherwise be used for unprofitable investments (Jensen, 1986a). As the bonding theory, this explanation applies primarily to the widely held firm. In the context of our entrepreneurial firm, "free cash flow" allows the entrepreneur to invest in pet projects and empire building which presumably provides him with diluting private benefits. However, the managing party could also tie up resources, e.g., by delaying termination of some profitable projects until the external investor increases the entrepreneur's share of return. By raising the debt level the entrepreneur may improve his ability to credibly commit to pay out such funds; a failure to do so would result in, presumably costly, bankruptcy.

Both the bonding explanation and the "free cash flow" hypothesis rely on exogenous bankruptcy costs. This is unsatisfactory from a theoretical point of view, but empirical studies also indicate that the costs associated with bankruptcy may not be sufficiently large to offset the benefits of debt financing (Warner, 1977). In particular, it is not clear that, in a world of golden parachutes and other bounties following dismissal, bankruptcy is costly for either management or an entrepreneur. Furthermore, the "free cash flow" hypothesis only mentions the benefits of debt; presumably, high levels of gearing make the entrepreneur abstain from future profitable investment opportunities (cf. Myers, 1977). Table 2.1 summarizes the tradeoffs between the benefits and costs of debt when compared to equity financing as perceived by the models described above.

Table 2.1 Type of Conflicts in Previous Literature

	Benefits of Debt	Costs of Debt
Jensen & Meckling (1976)	Limit diluting private benefits (perks, leisure)	Asset substitution
Myers (1977)	Tax benefits	Underinvestment in growth opportunities
Jensen (1986a)	Limit diluting private benefits (overinvestment)	Not specified
Grossman & Hart (1982)	Limit diluting private benefits	Bankruptcy costs

The crucial restriction on the effectiveness of capital structure as a financial incentive scheme is the limited liability constraint inherent in financial contracts. This constraint restricts punishment schemes downwards; pecuniary penalties cannot be negative²⁵. Without limited liability the first-best could be achieved by making the entrepreneur residual claimant; if revenues were not sufficient to pay the external investor, remaining claims could be extracted from the entrepreneur personally.

Even with unlimited liability it is not clear what incentive role capital structure plays beyond that of a financial compensation scheme²⁶. When revenues are verifiable, such a scheme could achieve the desired incentive or bonding effects more directly and with less cost by requiring the entrepreneur to accept a paycut when revenues do not reach a certain level \hat{y} (Hart & Holmström, 1987). The firm would then be financed through

²⁵ The use of non-pecuniary penalties in contracts is typically rare and severely restricted by law.

²⁶ This review does not encompass signalling interpretations of capital structure (Leland & Pyle, 1979; Myers & Majluf, 1984; Ross, 1977). However, much of the criticism against the incentive approach applies to this literature. In particular, capital structure seems a rather costly and awkward way of conveying information.

a single, "omnibus" security which, among other things, would not involve a costly bankruptcy procedure (Hart, 1988a).

2.7.5 Capital Structure as a Control Device

2.7.5.1 The Choice Between Debt and Equity

When return streams are not fixed, it is important who has control over actions affecting return streams. The allocation of control may thus be used as an alternative to ex ante incentive alignment in mitigating moral hazard. Most of the incentive literature has assumed that control rests with the entrepreneur (see, e.g., Jensen & Meckling, 1976). By allowing for the possibility that control is transferred to another party, the entrepreneur may be able to also credibly commit when contracts are incomplete.

Control over the action decision may be transferred to the external investor through the use of debt; in bad states of nature, the external investor assumes control over the action. Following Aghion & Bolton (1988), we illustrate this role of debt by introducing a second period and a new action decision a at the beginning of this period. For simplicity, revenues in the first period are contingent on the state of nature but fixed, i.e., independent of first-period action d . At the beginning of the second period, the state of nature is realized and an action a undertaken, both affecting revenues in this period (see Figure 2.2). Revenues in the two periods are verifiable and may be represented by the density functions $f_1(y_1; \theta)$ and $f_2(y_2; (a, \theta))$.

Figure 2.3 Timing of Events

Contract signed	θ, y_1 realized	a_i taken	y_2 realized	firm shut down
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We assume, again for simplicity, that there are two states of nature, good and bad, and two actions, liquidate and continue operations. As before, the external investor is

constrained in her action choice; she is only capable of liquidating the firm. Actions differ in terms of private benefits, and since only the entrepreneur cares about private benefits, there could be a conflict as to the choice of action. For example, the entrepreneur may prefer action plan $\{a_2, a_2\}$, i.e., to always take a high private benefit action a_2 . The external investor, on the other hand, may prefer $\{a_1, a_1\}$. In this case the two parties have directly conflicting interests. The following security and private benefits would generate such a conflict.

$$(i) \quad E[y_2 | a_2; \theta_g] + z_2 > E[y_2 | a_1; \theta_g] + z_1$$

$$(ii) \quad E[y_2 | a_2; \theta_b] + z_2 < E[y_2 | a_1; \theta_b] + z_1$$

$$(iii) \quad E[y_2 | a_2; \theta_g] < E[y_2 | a_1; \theta_g]$$

$$(iv) \quad E[y_2 | a_2; \theta_b] < E[y_2 | a_1; \theta_b]$$

where $E[y_2 | a_i; \theta_g]$ and $E[y_2 | a_i; \theta_b]$ are the expected values of security benefits associated with action a_i in good and bad states, respectively. The term z_i represents the private benefits associated with action a_i . Condition (i) says that total benefits (the sum of security and private benefits) are higher for action a_2 than for a_1 in good states of nature, while the reverse is true in bad states of nature (condition (ii)). According to conditions (iii) and (iv), action a_2 always produces higher security benefits, whereas action a_2 always results in higher private benefits, i.e., $z_1 < z_2$ (conditions (i)-(iv)).

When there are no informational constraints, a complete contract could be signed stipulating actions and benefits associated with all conceivable contingencies. The entrepreneur could credibly commit ex ante to an action plan specifying which action to undertake or to a level of benefits in a particular state of nature. If payoffs were as stipulated above, such a contract would stipulate action plan $\{a_2, a_1\}$ which maximizes total benefits (i.e., both security and private benefits).

The external investor would be indifferent between the different contracts. Were there no private benefits, a contract could be made contingent on the verifiable security benefits. a complete contract would specify a_2 in good states and a_1 in bad states to maximize total benefits. However, neither actions nor payoffs are verifiable, whereas

revenues are, i.e., contracts are complete with respect to revenue realizations but incomplete with respect to action choice and benefits.

Aghion & Bolton study three generic allocations of control: non-voting (or minority) equity where the entrepreneur maintains control in both states of nature; voting equity where the external investor always holds the control rights; and standard debt where control is shifted from the entrepreneur to the external investor in bad states of nature (this debt contract is not so standard in terms of how it allocates revenues, since it has a linear sharing rule). Under non-voting equity, as in Jensen & Meckling (1976), the entrepreneur would attach too much weight to private benefits; in the extreme case where the firm is financed entirely through non-voting equity, the entrepreneur puts all the weight on private benefits (he is no longer a residual claimant). In this case, action plan $\{a_2; a_2\}$ would be implemented. Under voting equity, the external investor who only values security benefits would implement action plan $\{a_1; a_1\}$. We assume that liability is limited. Otherwise, the first-best could be achieved under non-voting equity; the entrepreneur would be made the residual claimant; any amount that he owed the external investor at the end of the second period would be extracted from him personally.

The alternative solution suggested by Aghion & Bolton is to make the allocation of control contingent on the state of nature or, since the state is not verifiable, on some approximation of the state of nature, e.g., first-period revenue realizations²⁷. In bad states, when y_1 is below a stipulated \hat{y}_1 , control rights are transferred to the external investor. Otherwise the entrepreneur makes the decision. Under this allocation of control, action plan $\{a_1; a_2\}$ is implemented. This contract would correspond to debt which is characterized by its state-contingent allocation of control. Debt allows the contracting parties to utilize information which becomes available after the contract has

²⁷. Control rights could be made contingent on a range of variables without using debt. For example, a fraudulent conveyance of an asset below its market value is illegal and may result in a control transfer even though revenue realizations are sufficiently high. Similarly, contractual covenants may specify that individual actions such as the issue of additional debt securities should lead to a transfer of control rights. The point is that not all dimensions of all possible decision which may affect revenues of a firm can be specified ex ante and included in a contract.

been signed. This possibility may mitigate the moral hazard problem associated with external finance. The described example provides an extreme case where debt financing generates the first-best action plan. Of course, this is not always the case; payoffs may be different and first-period revenues may be an imperfect signal of the state of nature.

It is important to make the distinction between binding contracts and incomplete contracts. In a technical sense, binding contracts allow contracting parties to specify all future actions and outcomes subject only to the incentive compatibility constraints imposed by the information structure (cf. Gale & Hellwig, 1985). However, under incomplete contracting the entrepreneur who makes the strategic decision cannot credibly commit to an action or a payoff which is not incentive compatible, i.e., at least one IC constraint is binding. As shown by Aghion & Bolton, the contracting parties can relax this constraint by making control over the action decision contingent on the state of nature; a transfer of control in bad states of nature implies shifting from the set of incentive compatibility constraints restricting the entrepreneur to those constraining the external investor.

The transfer of control over the action decision to the external investor raises some serious problems. If she cannot manage the firm herself, her right to make the action decision would be rather empty; the external investor is only capable of liquidating the firm. If for some reason control is transferred to the external investor when assets are worth more as part of a going concern, than when liquidated on the market, liquidation may not be credible. The external investor would have to rely on the entrepreneur managing the firm or sell the firm to a rival. We will return to this latter alternative in Chapter 3.

2.7.5.2 The Payment Structure of Debt

The optimal contracts generated by Aghion & Bolton are very general; in fact, to denote them debt and equity is rather arbitrary. In their model debt and equity are only distinguishable in terms of how they allocate control; both contracts have linear sharing rules. Furthermore, the analysis in Aghion & Bolton relies on the verifiability

of the firm's revenues. When revenues are not verifiable, the entrepreneur could presumably transfer to himself any amount not paid out. The problem of credibly committing to future payments may be mitigated through the use of standard debt as suggested by Hart & Moore (1989) (see also, for example, Townsend (1979); Gale & Hellwig (1985); and Bolton & Scharfstein (1990a)). Hart & Moore emphasize the fixed payment nature of standard debt, i.e., that this contract requires a fixed (but possibly contingent) payment. State-contingent control may then be given an alternative interpretation: when the fixed payment is not met, debt allows the external investor to seize all or part of the firm's assets. However, the creditor may also choose to reschedule debt repayments. Hart & Moore demonstrate that forcing the firm into financial distress may be an efficient way of forcing firms to pay out funds. A simplified version of their model is here briefly presented.

An entrepreneur seeks outside finance from an external investor (both risk-neutral). The project to be financed generates revenues in each period (y_1, y_2). For simplicity, these revenues are independent of any actions undertaken by management; Hart & Moore are only interested in financial contracts as means of extracting funds from the firm. Unlike Aghion & Bolton, here revenues are not verifiable; cash flows are assumed to be fairly easily manipulated by management and thus inherently difficult to contract upon. In the extreme case studied by Hart & Moore, a dollar of the firm's revenues can be turned into a dollar of entrepreneurial utility; the entire revenue stream can be diverted by the entrepreneur. Cash is not consumed by the entrepreneur but assumed to be saved to meet future repayments. However, these funds cannot be expropriated by the external investor and thus promises to make future repayments are not credible.

If physical assets are verifiable, commitment may still be possible. At $t = 1$, the firm's assets have a liquidation value (L); assets are assumed to be divisible and exhibit constant returns to scale so that a fraction of the assets can be liquidated without closing down the firm. However, these assets also represent potential future revenues which may be higher than the liquidation value. At the end of the project ($t = 2$), assets have no value to any of the parties.

more as a going concern ($L < R_2$). However, when the entrepreneur is liquidity-constrained, he cannot credibly commit to a future payment at $t = 2$. As a result, the firm will be inefficiently liquidated.

The entrepreneur suggests the contract which consists of the size of the transfer T and a payment D_1 . The optimal contracts are generated so as to minimize the deadweight loss, subject to the constraint that the external investor break even. Hart & Moore show that the optimal contract depends on the nature of uncertainty, i.e., whether R_1 , R_2 or L is stochastic. In the simple two-period case a debt contract is either all transfer or no transfer. When a third period is added the entrepreneur may credibly commit also to a second debt repayment D_2 . In this more interesting general case, there are two tradeoffs: that between a low debt level and a high transfer T ; and that between low debt repayments early in the relationship and lower repayments later on. Low levels of debt reduce the likelihood of default and the degree of liquidation in default (unless debt levels are so high that the external investor will forgive some of debt). Transfers have the same effects. However, when debt is forgiven, such initial lump-sum payments also facilitate for the entrepreneur to repurchase assets in the ex post renegotiation. While transfers improve social efficiency by reducing dead weight losses, they are costly for the creditor. In general, optimal contracts contain both transfers and debt repayments.

The very general result from the Hart & Moore analysis is that, since the entrepreneur is liquidity-constrained and cannot bribe the investor, he should be in control in as many states as possible given that the external investor recoups her investment. Furthermore, debt "frees cash flow" from the firm (cf. Jensen, 1986a); the possibility of a future seizure of assets provides the entrepreneur with a device to credibly commit to pay out cash flows. In a different setting, this threat could be used to also influence the entrepreneur's choice of action plan.

2.7.5.3 The Allocation of Votes Among Equityholders

Aghion & Bolton (1988) and Hart & Moore (1989) analyse different problems, but they generate debt as the optimal contract. However, initial contracting parties may wish to issue voting equity since this instrument allows for efficiency-enhancing takeovers. In this sense, a takeover is an indirect means of renegotiating the contract utilizing information which becomes available after the time of contracting (Grossman & Hart, 1980)²⁹. The allocation of votes among equityholders, the firm's voting structure, influences the probability that a rival management team indeed will increase efficiency rather than enjoy private benefits (Grossman & Hart, 1988). In fact, it is the existence of an external control market with rival management teams that gives voting structure a role; in the absence of such a market the allocation of votes among equityholders would be irrelevant. This section summarizes Grossman & Hart (1988).

As seen from the incumbent equityholders, the voting structure has two roles: it ensures that the most efficient party is in control (the allocative role) and extracts as much surplus as possible from a rival management team (the surplus extraction role). Through the allocative role the assignment of voting rights affects both whether a high-private-benefit party or a high-security-benefit party is in control and the value of income claims under the controlling management. By making control costly, the parties increase the likelihood that a rival is more efficient; takeovers motivated by private benefits become more expensive. However, the voting structure also determines the price an acquirer must pay voteholders for the private benefit of control; this is the surplus extraction role. The two roles may be in conflict.

Grossman & Hart study the optimality of one-share-one-vote, as compared to some other principle of vote allocation, for various assumptions about the relative importance

²⁹ When there is asymmetric information between contracting parties, the possibility of an informed rival taking over the firm may also induce the incumbent manager to provide truthful reports; this is the disciplinary role of a takeover beyond that of financial incentive schemes (Scharfstein, 1988). When firm value is low because of bad states of nature, takeovers are less likely. However, when value is low because of managerial slack, the probability of an informed rival appearing increases.

of security benefits and private benefits. The authors identify four cases illustrated in Table 2.2. Case 1 considers the situation where the private benefits of the rival are insignificant. In Case 2, the incumbent's private benefits are not significant relative to those of the rival. Cases 3 and 4, respectively, deal with the situations where the rival's and the incumbent's private benefits are either both insignificant or both significant.

Table 2.2 The Relative Significance of Private Benefits and Effects on the Choice of Contract

		I n c u m b e n t	
		Negligible	Significant
R i v a l	Negli- gible	Case 3 one-share-one-vote	Case 1 one-share-one-vote
	Signi- ficant	Case 2 one-share-one-vote	Case 4 deviation from one-share-one-vote may be motivated

Under certain assumptions about the bids allowed, Grossman & Hart find that a one-share-one-vote voting structure dominates any other allocation of votes as long as both the rival and the incumbent do not have large private benefits (Situation 3). In this case, some other allocation of votes may allow the incumbent to extract some of the value of the bidder's private benefits; the surplus extraction role of the voting structure dominates its allocative role.

Grossman & Hart show how the voting structure allocates property rights so as to protect the claims of incumbent equityholders. In their analysis the compensation to management is treated as separate from the allocation of votes. However, in

entrepreneurial firms private, non-contractible benefits may be an important part of the entrepreneur's reward scheme. In this case, the entrepreneur may desire property rights to protect his claims in the event of a rival management team appearing. Chapter 3 in this thesis analyses how such protection may be achieved through the allocation of votes not only among equityholders but also across states of nature, i.e., through the issue of debt instruments with state-contingent control.

Harris & Raviv (1989) analyse a similar problem. In fact, they generate an optimal capital structure endogenously. In their model either incumbent management or the external rival (but not both) enjoys private benefits. The incumbent commits ex ante by maximizing his costs of opposing the rival. When the rival is less (more) efficient, the incumbent should be able (not be able) to resist a takeover. The cost to the inferior candidate of acquiring control is the capital loss he suffers as a result of being less efficient. The optimal capital structure according to Harris & Raviv contains a single class of voting security and only one risky security; there should be no "cheap votes". Consequently, riskless debt should be non-voting and there should be no risky debt. Furthermore, the incumbent should not hold voting rights when he goes public, and any security he retains should be risky. If risky nonvoting claims are issued to external investors, voting claims are made less sensitive to firm value. However, as in Grossman & Hart, when the incumbent maintains control he may extract more of the rival's surplus than could non-colluding shareholders.

2.8 The Property Rights Approach to Capital Structure - An Evaluation

The three contributions to a theory of capital structure form part of the new property rights school. This research program is still in its infancy and an evaluation of the ultimate usefulness of its theoretical apparatus is premature. Furthermore, as any young literature, the new property rights approach has yet to formulate precise hypotheses for empirical testing. Despite the relative recency of this body of work this section attempts a preliminary evaluation of its contributions to our understanding of corporate capital structure. In addition, we relate the chapters of this thesis to previous contributions.

The criteria for an "ideal" theory of capital structure identified in the introduction to this chapter are used as a point of reference (in addition to standard theoretical criteria). According to the new property rights approach, such a theory should

- * be subsumed under a more general theory of the firm applicable to both closely held and widely held firms
- * explain the role of financial instruments in mitigating conflicts
- * explain why financial instruments are designed in a particular way and why they appear in certain combinations in the firm
- * incorporate the important financial instruments, at least both standard debt and equity
- * consider both return and control characteristics of financial instruments
- * explain why financial instruments and combinations of financial instruments are used in certain situations
- * explain why certain investors hold certain instruments
- * explain why financial instruments appear in particular patterns across industries and across countries
- * explain why particular financial patterns seem to cluster together and how these clusters relate to the larger context
- * allow for future renegotiation of contracts
- * have normative implications for financial policies of individual corporations and for public policy

The previous discussion has shown that while the new property rights approach has gone some way towards meeting these criteria, it suffers from important deficiencies. Some of these problems concern the general theory of the firm provided in this literature. The theory of incomplete contracting still lacks a standardized framework for analysis. From a theoretical point of view, this theory does not provide an explicit model of contracting costs; it relies on, but does not model, bounded rationality. In addition, the new property rights theory of the firm typically equates ownership with control and ownership of the firm with ownership of non-human assets (Hart, 1989).

While equating ownership and control may be reasonable for the entrepreneurial firm, it misses important issues in the widely held firm. As discussed in Chapter 1 and earlier in this chapter, the concept of control used in the new property rights literature is also rather simplistic. Whereas this approach has improved our understanding for the role of control in the firm's external legal structure, it has had little to say about how control is exercised within organizations. The application of the framework to the firm's internal organization promises to yield interesting insights. However, such analysis is also likely to reveal the weaknesses of the rudimentary control concept used in the new property rights literature.

Like the previous agency literature, the new property rights approach is concerned with agency costs arising from conflicts between investors. However, the new property rights framework is distinct in that it provides a rationale for the standard financial instruments and for capital structure beyond that of incentives. The incentive effect cannot be the only justification for why capital structure matters; appropriate incentives could be achieved more inexpensively through a financial compensation scheme. Instead, the new property rights literature regards financial instruments as commitment devices and focuses on the control aspect of these instruments. These instruments are viewed as defining both the allocation of rights to return streams and residual control rights. Capital structure is determined by agency costs stemming partly from conflicts between investors and partly from the separation of ownership from control (Tirole, 1988). Through the allocation of control across investors and across states of nature, conflicts associated with moral hazard may be mitigated. In essence, agency costs are reduced by shifting the principal-agent relationship around in certain states. In this way, the incentive compatibility constraints imposed by the information structure are relaxed.

The three contributions reviewed here have explained particular features of capital structure and the standard financial instruments. In Aghion & Bolton (1988), as in Jensen & Meckling (1976), the role of the firm's capital structure is to ensure that the optimal action plan is implemented. They demonstrate that the state-contingent control allocation associated with debt may dominate voting and non-voting equity contracts when there are state-contingent private conflicts. Hart & Moore (1989) take

up Jensen's (1986a) view of debt as a device to extract non-verifiable cash flows from the firm. This explains the fixed nature of debt repayments: when payments are not met, all or part of the firm's assets may be seized. Finally, Grossman & Hart (1988) seek to determine how the optimal allocation of votes among equityholders in a widely held firm affects the market for corporate control. The optimal structure extracts as much as possible from a potential rival and ensures that the party with the highest security-related benefits assumes control. They find a one-share-one-vote rule to be optimal, unless both the incumbent manager and the rival management team enjoy large private benefits.

These three contributions to a property rights theory of capital structure thus focus on different aspects of the property rights associated with the firm. Aghion & Bolton discuss the optimal allocation of control rights and Hart & Moore analyse how the return and control rights associated with debt are interrelated. Grossman & Hart, finally, are concerned with how the right to transfer property rights to an outsider affects the allocation return and control rights among the firm's equityholders. The model analysed in Chapter 3 incorporates all the basic features of the standard financial instruments; control is allocated contingent on meeting a fixed debt repayment, and the optimal combination of debt and equity is determined so as to ensure the initial contracting parties the highest possible compensation in the event of a takeover. The model extends the Grossman & Hart analysis to incorporate also the effect of the right to sell on the entire capital structure. The allocation of this right is shown to affect the compensation to the initial contracting parties in the event of a rival appearing.

Furthermore, the new property rights approach views capital structure as a mechanism for the transfer of control from incumbent management; each instrument is associated with a particular mechanism (Grossman & Hart, 1988; and Hart, 1989a). Equity makes possible a control transfer to a party outside the initial contract through a takeover. Debt ensures that control is transferred to external investors in low performance states (bankruptcy). Capital structure influences when and how control is transferred and the terms at which a transfer occurs. Chapter 3 in this thesis demonstrates how the two

basic transfer mechanisms have different properties partly complementing each other. Chapter 4 discusses international variations in the use of the two mechanisms of control transfer and the implications of these differences for the functioning of the financial system.

The new property rights approach allows for the two instruments to be analysed within the same general framework. Unlike the early property rights literature which almost exclusively focused on equity, these more recent contributions have been primarily concerned with debt. While we have a better understanding of the optimality properties of debt in bilateral contracting situations, the new property rights approach is still rather incomplete as a theory of capital structure, i.e., as a theory explaining why certain financial instruments are used and why they appear in particular combinations.

The three contributions reviewed here all generate capital structures where external finance comes from only one financial instrument, either all-debt or all-equity³⁰. In Aghion & Bolton (1988), standard debt, or more generally, a contract which makes control contingent on the state of nature, dominates equity unless the first-best is implementable under an all-equity structure where the entrepreneur maintains control. Grossman & Hart (1988) exclude debt from the analysis altogether; they are only concerned with the allocation of votes among equityholders. Finally, in Hart & Moore (1989) there is no role for equity. While our understanding of the individual instruments has improved, neither of these contributions provides a theory of capital structure. In particular, whereas we understand better the one-share-one-vote rule, the use of outside equity remains insufficiently explained. Furthermore, these previous contributions provide no clear understanding of the use of convertible securities. Chapter 3 in this thesis analyses a particular example where there is a fundamental complementarity between the two standard instrument debt and equity and where convertible debt dominates any combination of debt and equity³¹.

³⁰ Harris & Raviv (1989) allow also for riskless debt, but the debt contract in their model has no control rights.

³¹ In a recent working paper, Aghion, Dewatripont & Rey (1990) develop a model where debt and equity have complementary roles. The latter contract allows for efficiency-enhancing takeovers, while the former reduces managerial compensation in

Whereas traditional capital structure literature, as well as much of the agency literature on incentives, has been primarily concerned with the allocation of return streams, the new property rights literature makes possible the simultaneous analysis of rights to returns and control rights. However, these recent contributions in the new property rights literature, with the exception of Hart & Moore (1989), have almost exclusively focused on the control aspect of financial instruments. In Aghion & Bolton, as in Modigliani & Miller (1958), the design of sharing rule is irrelevant; only the allocation of control matters. Grossman & Hart assume linear sharing rules for equity³². A more general theory of capital structure should explain both return and control features of financial instruments and how these complement each other. In the particular example modelled in Chapter 2, both cash flow characteristics and the assignment of control rights influence the determination of capital structure.

An "ideal" theory of capital structure, as perceived by the new property rights research program, should be general enough to include widely held as well as closely held firms. Both Aghion & Bolton and Hart & Moore model the financing problem of the closely held entrepreneurial firm with only one external investor. Even though several problems of external finance can be studied in such a context, the widely held firm introduces a great number of additional complications. In particular, models have to be developed which allow for the formal analysis of collective choice problems. In addition, the focus on the entrepreneurial firm leads us to think of capital structure as consisting solely of bilateral contracts without taking into account the interconnectedness between the parties to the firm's different contracts.

Diffused ownership and the interconnections between contracts are particularly important for our understanding of debt finance and the control aspect of this instrument. Needless to say, if one includes tax and trade creditors, one-creditor firms

bad states of nature by requiring a fixed payment. Furthermore, standard debt limits management's possibilities to invest in various forms of takeover defenses.

³² In fact, they demonstrate in a previous version of the same article that linear sharing rules dominate non-linear sharing rules.

are rare in reality, to the extent that they exist at all. Multicreditor situations give rise to new ex post bargaining problems. The debtor may collude with one of the creditors at the expense of the other creditors (Bulow & Shoven, 1978); in general, the existence of more than one creditor tends to enhance the bargaining power of the debtor (Bolton & Scharfstein, 1990b). Hellwig (1990) suggests that the multiplicity of investors may also be a commitment device; the inefficiencies associated with multilateral bargaining may weaken the incentives to renegotiate ex post. A complete control theory of capital structure must also encompass the multi-creditor case as well as the case where both debt and equity are widely held³³.

Most of the models in this literature, again with Hart & Moore as an exception, generate no renegotiation in equilibrium. This result is unsatisfactory since one of the most conspicuous features of debt contracts is that they are frequently renegotiated. Another characteristic of these contracts yet to be satisfactorily modelled is the use of priority (for some early attempts to model priority, see Hart & Moore, 1990; and Bolton & Scharfstein, 1990b). To understand why financial instruments appear in particular combinations, we must address both the issue of security design and that of seniority structure in the presence of multiple investors.

The financing models of the new property rights approach have been primarily concerned with end game situations, i.e., situations where the relationship between the contracting parties ends after the last period of the game. To analyse this type of game may be appropriate when horizons are finite (most debt contracts are finite); unraveling from the end leads to the end game being played today. However, end game behavior is not a good characterization of many financing situations. In particular, the power of the threat not to refinance is likely to be underestimated in this context; when a particular relationship is about to terminate, this threat carries little clout.

³³ In preliminary work, Bolton & Scharfstein (1990b) model the common pool problem and generate the creditor structure endogenously. Furthermore, they establish conditions for when secured debt is optimal.

Whereas the new property rights literature may claim some success in explaining the design of individual securities, its record is less impressive in predicting observed capital structures. Unfortunately, comparative statics are still few. Indeed, the hypotheses generated by this approach have so far not been sufficiently precise to allow for discriminating empirical testing. Furthermore, like much of the contracting literature, research in the new property rights research program has proceeded by rationalization of observed stylized facts rather than independent empirical testing. In the absence of such tests the empirical significance of the approach has yet to be proved. However, we may still be able to evaluate in which areas the new property rights literature is likely to provide valuable insights and empirically testable implications.

At a general level, the new property rights approach suggests that capital structure is related to the nature of firm assets, e.g., their liquidation value and how easily diluted they are. Furthermore, more profitable firms and those with larger fraction of cash flows that are contractible should have lower debt levels; the need to free cash flow is less important. As shown in Chapter 3 of this thesis, this approach may be able to predict patterns of contracting in venture capital financing. We demonstrate how the choice of contract is influenced by the nature of underlying assets; when assets are easily diluted in bad states of nature, debt financing is more attractive than if such dilution were not possible. The theory may also be successful in explaining changes in capital structure over the life cycle of the firm, e.g., changes in debt-equity ratios as firms go from closely held to widely held or vice versa. However, the new property rights theory of capital structure is unlikely to predict the exact proportions of debt and equity in a particular firm. For this purpose, the concept of control rights is not precise enough; more structure must be added for models to generate testable implications.

We suggest that the new property rights approach at this stage should be viewed primarily as an interpretive tool and as a theoretical framework within which alternative explanations can be analysed and tested. Chapter 4 should be regarded as a first test of the fruitfulness of the framework in the context of cross country comparisons. In fact, studies of such international variations in capital structure may

improve our understanding of why financial instruments are used in combination; why certain investors hold certain instruments; why particular financial patterns cluster together and how these clusters relate to the rest of the financial system in which investors operate. Furthermore, the international comparison makes possible the analysis of how external constraints on investor behavior influence financial contracting. More specifically, the chapter studies the effects of regulation of commercial banks. Finally, as exemplified in Chapter 5, the control approach may provide rationales for observed institutional arrangements.

The normative implications generated by the analysis within the new property rights research program have yet to evolve. The superiority of a one-share-one-vote allocation of control and returns among holders of equity is strongly suggested. However, this begs the question of why, where this is allowed, multiple classes of voting securities are frequently observed. In general, it is doubtful whether these prescriptions will be of value for financial policies of individual corporations. Again, the imprecision of the concept of control may render such advice vague. However, the analysis in Chapters 4 and 5 of this thesis suggests that the approach could be a helpful tool for makers of public policy.

3.1 Introduction

An entrepreneur seeking to raise outside capital has to share revenues and control over investment decisions with an external investor. The two parties must also agree on how to allocate the right to sell control over the firm when a rival management team appears; the right to sell control is a fundamental property right influencing compensation to the initial contracting parties in the event the firm is sold (Alchian & Demsetz, 1972). A rival manager could improve efficiency, but he might also dilute the claims of the party who does not have the right to sell¹. There is a trade-off between, on the one hand, the wish of the initial contracting parties to benefit from potential efficiency improvements by a rival and, on the other hand, their desire to protect themselves against dilution.

This chapter focuses on how standard debt and equity allocate the right to sell control over the firm. The fundamental point is that this right should optimally be allocated to the party most vulnerable to dilution. In this way the initial contracting parties extract the most from the rival and increase the likelihood that he is more efficient in running the firm. We analyse a world where the entrepreneur is able to manage the firm but has no funds of his own. The external investor has capital but cannot manage the firm. To highlight two basic conflicts, the entrepreneur is assumed to care primarily about his private reputational benefits² and the external investor only about revenues. After a contract has been signed, a rival appears who both possesses capital and can make investment decisions; the rival is more efficient, but he may also fire management without compensation and dilute firm value by transferring assets to himself in connection with liquidation.

¹ For surveys of the dilution and efficiency effects of takeovers, see Jensen (1986b) and Roll (1985).

² An entrepreneur typically enjoys substantial quasirents, from running the firm such as a reputation or simply the utility of realizing his ideas. These benefits are often private in the sense that they cannot be contracted upon, as distinct from security-related benefits which can be made part of a contract (Grossman & Hart, 1988). Even though these benefits may be hard to specify contractually, they are in many cases an essential part of the entrepreneur's incentive scheme.

We demonstrate that external finance tends to come from both standard debt and equity, i.e., there is a complementarity between the two standard instruments. Equity ensures the entrepreneur compensation for his private benefits by giving him the right to sell control when the firm is performing well. Furthermore, equity allows the external investor to benefit from efficiency improvements brought about by a rival management team. Debt protects the external investor in bad states of nature by transferring the right to sell control to her when debt repayments are not met. In addition, the analysis illustrates how also the basic mechanisms for control transfer associated with equity and debt, takeovers and bankruptcy, complement each other; a takeover optimizes between outsiders and insiders, and bankruptcy among insiders.

The real world firm which most closely resembles that of our formal analysis is a venture capital firm where the entrepreneur is strongly dependent on one external investor and where private benefits form an important, often dominating, part of the entrepreneur's compensation scheme. The choice of financial instruments predicted by our model corresponds well to the patterns observed in this type of firm in the United States. The venture capitalist typically holds either debt and minority equity, or convertible debt (or convertible preferred stock). The entrepreneur maintains majority control over the firm in good states of nature, but the venture capitalist takes over when payment obligations are not met. Minority equity and the option to convert allow the venture capitalist to share in value-increasing activities when the firm is doing well.

The two conflicts discussed here - expropriation of managerial quasirents and asset stripping - are just examples of potential conflicts caused by the possibility of a sale of the firm; in discussing our results we allow for a wider set of conflicts. However, our example captures two generic state-contingent conflicts in entrepreneurial finance. One relates to private benefits in good states of nature, and the other involves the value of the firm in bad states; reputational benefits are assumed to be small when the firm is performing poorly, and asset stripping is more likely when the firm's assets are better used elsewhere, i.e., when the firm should be liquidated. Conflicts between the

initial contracting parties in the absence of a rival are ignored here³. Our point is that the mere possibility of a future sale of the firm may give rise to conflicts.

The situation discussed here belongs to a more general class of trilateral bargaining problems, where one party arrives after the others. If trading with the third party can improve the situation for both initial contracting parties, there is no conflict. Similarly, if both original parties are made worse off by trading with the latecomer, no conflicts arise; the initial contracting parties will not trade. However, if the third party can improve the situation for one party while worsening it for the other, there are potential conflicts; the latecomer may collude with one of the initial contracting parties to extract surplus from the other. Our analysis demonstrates that these potential conflicts may be mitigated by allocating the decision to trade to the most vulnerable party.

Our findings are related to those of Aghion & Bolton (1988). In a setting similar to Jensen & Meckling (1976) with an entrepreneur seeking outside funds to finance a project, they demonstrate that, when project selection is repeated, the allocation of control over these future decisions may be crucial. In particular, when there are private costs to liquidation, the entrepreneur may increase the value of the firm by agreeing to give up control when the firm is doing poorly, i.e., to make the allocation of control contingent on the state of nature. While Aghion & Bolton treat the sharing rule as irrelevant, Hart & Moore (1989) emphasize the connection between control and return characteristics. Their analysis of debt renegotiation focuses on the fixed nature of debt repayments, and on the right to foreclose on the debtor's assets following a failure to meet payments. Grossman & Hart (1988) analyse how the allocation of votes among equityholders of a widely held firm affects the compensation to the initial contracting parties when a rival takes over the firm. However, in their analysis the allocation of control and incentives are separated; when private benefits are an important part of

³ The focus in this chapter is on how the possibility that the firm may be sold will influence the choice of financial contracts. Of course, a sale of the firm is not the only potential source of conflicts between an entrepreneur and an external investor. The appearance of a rival could be thought of more generally as representing a technological shift allowing the entrepreneur to implement actions that previously were beyond his capability. However, this problem would have to be analysed in a different way and is considered beyond the scope of the chapter.

managerial compensation schemes, state-contingent conflicts may arise and this separation may not hold.

All these models generate capital structures with only one type of financial instrument: either all-equity or all-debt. In the Hart & Moore model there is no clear role for equity at all. We show here that the standard instruments may be combined to reduce the costs of external finance⁴. The fundamental question is who gets the right to sell control over the firm: the entrepreneur, the investor or both but in different states. If a sale is beneficial to both the entrepreneur and the investor, the only thing that matters is how much can be extracted from the rival's surplus under different contracts (cf. Grossman & Hart, 1988). However, when a sale may also be detrimental to one party, but beneficial to the other party, the allocation of control, or the right to sell control over the firm, becomes important. Furthermore, given a particular allocation of control, the design of sharing rules can be used to extract more from the rival.

3.2 The Model

A risk-neutral entrepreneur (E) needs outside capital C from a risk-neutral external investor (I) to pursue a project. To capture a typical entrepreneurial finance situation, we think of capital requirements as large compared to the entrepreneur's own funds. For simplicity, the entrepreneur is assumed to have no funds of his own. Our analysis would also hold, if, for example, he contributes capital which is then tied up in physical assets or in an account without withdrawal rights. In addition, we assume that the capital requirements are large relative to the expected value of verifiable revenues from the project so that the bulk of these revenues should be paid out to the external investor. These assumptions about the size of capital requirements are made because we want to study a firm where private benefits are an important or dominating part

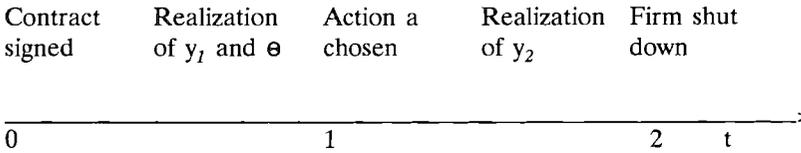
⁴ Aghion, Dewatripont & Rey (1990) also generate a capital structure where debt and equity have complementary roles. Equity allows for efficiency-enhancing takeovers, while debt reduces managerial compensation in bad states of nature by requiring a fixed payment. Furthermore, standard debt limits management's possibilities to invest in various forms of takeover defenses.

of the entrepreneur's compensation scheme (the case where private benefits are not important is discussed later).

The entrepreneur suggests the contract. He may choose between two standard contracts, equity and standard debt, alone or in combination; the return and control rights associated with these contracts will be specified in detail later. The external investor I who operates in a competitive capital market is willing to invest if she breaks even, i.e., if she receives at least the market rate of return which is equivalent to the discount rate and assumed to be zero. Once a contract is signed, the entrepreneur cannot receive additional capital in the market, at least not when the firm is doing poorly. In such bad states of nature, outside investors know that, by assumption, the optimal decision is to liquidate the firm and they will not provide new funds, at least not without getting control.

The entrepreneur's idea is economically viable for two periods at the most. We think of a short period before the parties receive a signal about the state of nature and then a long period representing the entire life of the project. At the beginning of period 1, a contract is signed and production starts. The project may be abandoned at the end of period 1 or, at the latest, at the end of period 2. Upon shut-down, the firm's assets are liquidated and the proceeds distributed.

The operation yields revenues (net operating income), y_1 and y_2 in periods 1 and 2, respectively, where y_1 is small compared to y_2 and to inputs C . Both y_1 and y_2 are random variables with observable positive realizations. Furthermore, revenues net of first-period payments to the external investor are kept as cash and become verifiable, together with second-period revenues, only when the firm is liquidated. Their respective densities are given by $f_1(y_1, \theta)$ and $f_2(y_2; (\theta; a))$ where θ denotes the state of nature and a some action to be taken by the firm in period 1. The distributions have support in the interval $[\underline{y}, \bar{y}]$. Once first-period revenues and the state of nature are revealed, the parties know also the probability distributions of second-period revenues for the various actions. The timing of events is depicted in Figure 3.1.

Figure 3.1 Timing of Events

The state of nature θ should be interpreted as a change in any of a broad set of circumstances relevant to the project's outcome. For simplicity, there are only two states of nature: good and bad, $\{\theta_g, \theta_b\}$. The probabilities of good and bad states are q and $1 - q$, respectively. The realizations of these states have a significant impact on the feasibility of different strategic decisions.

There are three possible actions: $A = \{a_1, a_2, a_3\}$ where a_1 represents continuation, a_2 a sale of the firm to a rival management team, and a_3 liquidation. These actions differ in terms of verifiable second-period revenues (y_2) and private, non-verifiable benefits (z) associated with managing the firm; liquidation a_3 confers no private benefits. In addition, depending on who has the right to sell the firm (a_2), the entrepreneur may or may not be compensated for his private benefits z_E in a takeover. We think of private benefits as a reputation which the entrepreneur may use in other business situations. To highlight our conflicts, we assume that private benefits accrue only in good states of nature; there is no positive reputational value for an entrepreneur in running a poorly performing company.

The utility function of the entrepreneur has two components, z and M , with M representing verifiable money income. The external investor never enjoys any private benefits z . She cannot manage the firm herself, only sell or liquidate it; she has to rely on the entrepreneur to implement action a_1 :

$$U_E = M + z_E$$

$$z_E(\theta_b) = 0$$

$$U_I = M$$

3.2.1 Introduction of a Rival

A sale of the firm (action a_2) corresponds to the event of a rival appearing and p is the exogenous probability of this event. For simplicity, we study only the cases where p is zero and one, i.e., when a rival never occurs and when a rival occurs with certainty. As we discuss later, the results in the latter case would hold for any positive probability of a rival appearing. The rival's utility function is given by

$$U_R = M + z_R + \Phi \qquad z_R(\theta_b) = 0$$

$$\qquad \qquad \qquad \Phi(\theta_g) = 0$$

where z_R denotes private benefits (a reputation) and Φ the value of a non-verifiable asset which the rival can transfer to himself in connection with liquidation (asset stripping). The incentives to strip assets are assumed to be stronger in bad states of nature when the firm's assets are more likely to be better used elsewhere or scrapped (for simplicity, $\Phi(\theta_g) = 0$). The rival always gives rise to higher verifiable second-period revenues (in good states of nature, through improved management, and in bad states, through superior liquidation). To ensure that the rival always values the firm higher than the entrepreneur, the rival is also assumed to enjoy larger private benefits than the entrepreneur in good states ($z_R > z_E$). Since the rival's private benefits z_R do not confer utility to the initial contracting parties, these benefits will not enter into the optimization problem. To simplify notations, throughout the analysis we drop the subscript and let z denote the entrepreneur's private benefits in good states of nature. The rival fires him without compensation for these private benefits (expropriation of managerial quasirents). We now have two potential conflicts arising from the appearance of a rival: expropriation of private benefits in good states of nature, and dilution of verifiable revenues in bad states.

The rival R appears after the state of nature and first-period revenues have been realized but before the action decision (see Figure 3.1). He makes a take-it-or-leave-it offer to the party with the right to sell control. This assumption provides the rival with all the bargaining power (first-mover advantage); since everything is observable,

he knows the other party's reservation price and offers him this plus a small amount, thus absorbing the entire surplus of the bargain. This may seem unrealistic in a competitive market for corporate control; in most cases the seller is likely to enjoy some of the surplus. However, for the rival to make a bid he must receive some surplus.

If a perfectly contingent contract could be written, a first-best solution would be possible. Such a contract would state which action to implement (or stipulate the payoffs) in each state contingent on the event of a sale. To capture the difficulties involved in writing such comprehensive contracts, we assume that even though the state of nature θ is perfectly observable, it is not verifiable by a public court (for a discussion of verifiability, see Chapter 2). When actions and payoffs cannot be made contingent directly on the state of nature, contracting parties can avoid costly ex post bargaining by allocating control over strategic decisions to one of the parties (Grossman & Hart, 1986). The parties may further improve by making this allocation contingent on some verifiable variable correlated with the state of nature (Aghion & Bolton, 1988). We evaluate the different control allocations which the parties can achieve through the use of standard financial contracts.

3.2.2 Standard Contracts

A contract is exhaustively described by the allocation of control rights (the right to decide on action a) and the sharing rules (the rights to return streams in periods 1 and 2, respectively). To facilitate our analysis and highlight some important points, the contracting parties are restricted to standard debt and equity contracts or any combination of these instruments.

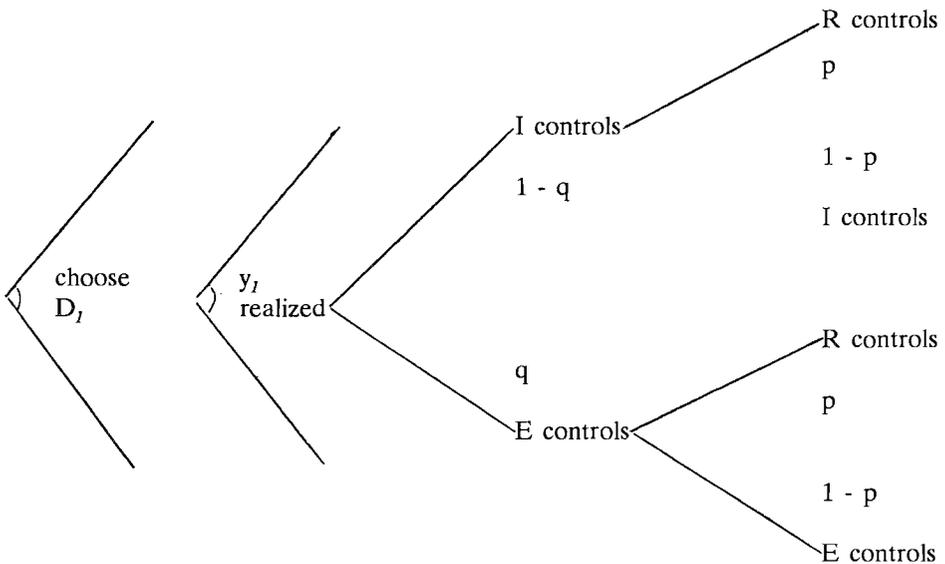
3.2.2.1 Allocation of Control

The entrepreneur manages the firm in the first period. We are concerned with control over the second-period action decision. Equity provides one of the parties with control and the right to sell control. Debt transfers this right to the external investor in bad

states of nature following default on first period repayments. Given these standard contracts, there are three plausible allocations of control and revenues: i. issue non-voting (or minority) equity in which case E retains control in all states; ii. issue voting equity to I who then has full control in all states; and iii. issue standard debt or a combination of standard debt and non-voting equity (mixed financing) which gives control to the entrepreneur in good states of nature and delegates this right to the external investor in bad states (see Table 3.1). (To combine voting equity with standard debt is redundant in this context with two parties; voting equity already allocates control to the external investor and thus there is no use for transferring control.) All-debt external financing does not exclude internal equity in the capital structure; the important thing is that only debt is issued to the external investor.

In Aghion & Bolton (1988), debt allocates control contingent on first-period revenues. Since these revenues here are not verifiable without liquidating the firm and since the entrepreneur is liquidity-constrained, debt repayments in the first period are used as a (perfect) signal of the state of nature (Extension 1 examines the case where debt repayments are an imperfect signal). Figure 3.2 illustrates the control allocation associated with debt financing. In the initial contract, the parties agree on a level of fixed first-period debt repayments D_1 . The level of D_1 determines when control is transferred from the entrepreneur to the investor. It is set so that, at $t = 1$, first-period revenues y_1 are above and below D_1 with probabilities q and $1 - q$, respectively. Since the entrepreneur is liquidity-constrained, he cannot meet his payment obligations when first-period revenues are below D_1 . Furthermore, the entrepreneur will always pay when he can; otherwise he loses control which is valuable to him. Subsequent to the control transfer, an outside rival appears with probability p , in which case the party in control always sells.

Figure 3.2 The Control Allocation Associated with Standard Debt



We also allow the contracting parties to combine the two standard contracts debt and equity. More specifically, they have access to a particular contract, a mixed contract, which specifies a share α of non-voting, or minority, equity and a share $(1 - \alpha)$ of debt; α is exogenously given in the interval $0 < \alpha < 1$. The mixed contract has the same allocation of control as all-debt financing, i.e., it specifies the same first-period debt repayment D_1 .

An alternative to allocating control and the right to sell control is joint ownership and to leave the second period selling decision to unconstrained bargaining at the beginning of the second period. This is equivalent to stipulating that this decision must be unanimous, or that the firm can only be sold in its entirety. We investigate this allocation of control in Extension 3.

We allow parties to renegotiate the allocation of control if a rival appears. To prevent a takeover the party vulnerable to dilution may attempt to prevent a sale by offering a small amount t_0 to the party with control rights who is indifferent between selling and

not selling. Since the entrepreneur is liquidity-constrained, only the external investor can make such an offer, i.e., renegotiation is only feasible in bad states of nature when non-voting equity has been issued. The entrepreneur knows how much the external investor is willing to pay and accepts a t_0 which gives the external investor a payoff just above her reservation price; the option to renegotiate therefore has no value in our model⁵.

3.2.2.2 Allocation of Return Streams

The two all-equity capital structures, non-voting and voting equity, have linear sharing rules s_{NVE} and s_{VE} , respectively, representing the share of verifiable revenues to which the entrepreneur is entitled after liquidation the firm. Since revenues in the first period are not verifiable, a separate linear sharing rule in this period is not meaningful; dividends may or may not be paid out, but they are not specified in the initial contract. When capital requirements are large relative to the expected value of the project, the entrepreneur's share is small. This sharing rule may be interpreted as a wage related to verifiable revenues or a share in the equity capital of the firm. We think of the case where the share of the entrepreneur's income from verifiable revenues is small relative to his private benefits.

Equity also has a limited liability clause (the entrepreneur's share s is assumed to be non-negative); the entrepreneur cannot be forced to pay more than his initial contribution to the firm (we have assumed that he contributes no funds of his own). If liability were unlimited, the first-best could be achieved by making the risk-neutral entrepreneur residual claimant; when revenues were not sufficient to meet payment obligations to the external investor, the investor could extract any amount from the entrepreneur personally.

⁵ In fact, if the entrepreneur can influence the probability of a rival appearing, the external investor may prefer a commitment not to renegotiate. The option to renegotiate may provide incentives to the entrepreneur to attract rivals. This would allow him to induce transfers from the external investor or to use the option not to sell to extract some of the rival's surplus. In other words, allowing renegotiation may make the protection offered by control rights, and the rights to sell these rights, excessively strong.

Standard debt specifies fixed repayments D_1 and D_2 in periods one and two, respectively. The first-period debt repayment D_1 is assumed to be negligible in relationship to second-period revenues; it only serves as a signal of the state of nature. If the fixed payment D_2 in the second period is not met, the external investor receives all of the verifiable second-period revenues ($\min(D_2, y_2)$).

The particular mixed contract we examine entitles the external investor to a share $\alpha(1 - s_{DE})$ of verifiable revenues from her equity holdings and $(1 - \alpha)\bar{D}_2$ from her holdings of debt in good states of nature; s_{DE} is the linear part of the sharing rule and \bar{D}_2 is the exogenously determined fixed payment under mixed financing. The level of second-period debt repayments is set so that in bad states, as in the case of all-debt external financing, the external investor receives all verifiable revenues. Table 3.1 summarizes the control and return characteristics of the different forms of external financing. Note that whereas all-debt financing, and mixed debt and equity financing are identical in terms of control allocation, they have different sharing rules.

Table 3.1 Allocation of Control and Revenues for Different Forms of Financing

		θ_g		θ_b
	Party in control	External investor's payoff	Party in control	External investor's payoff
Non-voting equity (NVE)	E	$(1 - s_{NVE})y_2$	E	$(1 - s_{NVE})y_2$
Voting equity (VE)	I	$(1 - s_{VE})y_2$	I	$(1 - s_{VE})y_2$
All-debt (SD)	E	D_2	I	y_2
Mixed (DE) [α NVE + $(1 - \alpha)$ SD]	E	$\alpha(1 - s_{DE})y_2 + (1 - \alpha)\bar{D}_2$	I	y_2

3.2.3 The Choice of Contract

The contracting decision can be characterized as a programming problem determining the parties' optimal choice of financial contract; each capital structure corresponds to a particular program. This program maximizes the entrepreneur's payoffs (he proposes the contract to the external investor who accepts or rejects) subject to the investor's individual rationality constraint. The payoffs for each contract are then compared and three propositions describing the ranking of capital structures are established.

The assumption that first-period revenues and debt repayments are negligible allows us to focus on the second-period outcome. To simplify notations we denote the revenue integrals for the second period by π so that

$$\pi_{g_i} = \int_{y_j}^{\bar{y}} y_2 f_2(y_2; a_i, \Theta_g) dy_2 \quad \text{and} \quad \pi_{b_j} = \int_{y_j}^{\bar{y}} y_2 f_2(y_2; a_j, \Theta_b) dy_2$$

where π_{g_i} denotes second period revenues in the good state given that action i is undertaken and π_{b_j} these revenues in bad states when action j is implemented. We now specify an example of second-period revenues and the entrepreneur's private benefits generating the previously described state-contingent conflicts.

- (i) $\pi_{g1} + z > \pi_{g2} > \pi_{g1} > \pi_{g3}$
- (ii) $\pi_{b2} > \pi_{b3} > \pi_{b1} > \pi_{b2} - \Phi$

When there is no outside rival ($p = 0$), and a sale of the firm (a_2) is not an option, conditions (i) and (ii) stipulate that entrepreneur and the external investor both prefer action plan $\{a_1, a_3\}$, i.e., to continue in good states and to liquidate in bad states; there are no conflicts between the two contracting parties. This action plan can also be characterized as a constrained first-best, the first-best plan when the initial contract prevents the firm from being sold. In this case, the choice of capital structure is

irrelevant. The entrepreneur's expected payoffs Ω are independent of the sharing rule (due to risk-neutrality) and control allocation chosen, i.e.,

$$\Omega_{NVE} = \Omega_{VE} = \Omega_{SD} = q(\pi_{gl} + z) + (1 - q)\pi_{b3} - C$$

where C denotes the external investor's reservation utility (her initial capital contribution). Since the entrepreneur suggests the contractual arrangement, all the bargaining power is vested in him, and he may force the external investor back to her reservation utility. The above irrelevance result would also hold if a complete contract could be written specifying that action a_1 and a_3 are to be implemented in good and bad states of nature, respectively.

When a rival occurs with certainty ($p = 1$), the parties' ranking over actions depends on the choice of capital structure. In general, under our assumption that the rival has all the bargaining power, the party in control is indifferent between selling and not selling; by stipulation, action plan $\{a_2; a_2\}$ is implemented, i.e., he or she always sells. Since the controlling party always receives her reservation utility, i.e., what he (she) would get in the absence of a takeover, he (she) has protection against potential dilution by the rival ($\pi_{b3} > \pi_{b2} - \Phi$). However, he (she) does not enjoy the benefits of efficiency improvements brought about by the rival ($\pi_{g2} > \pi_{gl}$). The non-controlling party, on the other hand, is potentially subject to expropriation of private benefits or asset stripping. The allocation of control and the right to sell control, and the design of sharing rules, influence the compensation to the initial contracting parties and how much they can extract from a potential rival.

3.2.3.1 Non-Voting Equity

The firm may issue non-voting equity, in which case the parties delegate control and the right to sell control to the entrepreneur in the second period. When a rival appears, the entrepreneur can only tender his control rights as long as he is fully compensated, also for his private benefits; the entrepreneur is indifferent to a takeover, i.e., he is compensated as if action plan $\{a_1, a_3\}$ were implemented. The external

investor enjoys the benefits of efficiency improvements in good states of nature, but she is subject to asset stripping in the bad state of nature.

To calculate the entrepreneur's expected payoffs under non-voting equity Ω_{NVE} we set his share of revenues s_{NVE} so as to maximize his expected payoffs (i.e., his reservation price when he sells control)

$$\Omega_{NVE} \equiv \text{Max}_{s_{NVE}} q(s_{NVE}\pi_{g1} + z) + (1 - q)s_{NVE}\pi_{b3}$$

subject to the external investor's individual rationality constraint when the entrepreneur has control over the second-period investment decision

$$q(1 - s_{NVE})\pi_{g2} + (1 - q)(1 - s_{NVE})(\pi_{b2} - \Phi) \geq C$$

Since the entrepreneur is assumed to have all the bargaining power, the individual rationality constraint is binding. This implies that we can solve for the entrepreneur's optimal share of verifiable revenues s_{NVE} in terms of exogenous parameters

$$s_{NVE}^* = 1 - \frac{C}{q\pi_{g2} + (1 - q)(\pi_{b2} - \Phi)}$$

Of course, the entrepreneur's share decreases with the capital contribution of the external investor. Furthermore, financing costs $(1 - s_{NVE})$ decrease, as the probability of the good state of nature increases and as the size of potential dilution decreases.

The entrepreneur's expected payoffs under non-voting equity are

$$\Omega_{NVE} = q\left[1 - \frac{C}{q\pi_{g2} + (1 - q)(\pi_{b2} - \Phi)}\right]\pi_{g1} + z + (1 - q)\left[1 - \frac{C}{q\pi_{g2} + (1 - q)(\pi_{b2} - \Phi)}\right]\pi_{b3}$$

The entrepreneur is protected against potential dilution from a takeover, but he does not benefit ex post from potential improvements in efficiency brought about by the outside rival. The latter holds only under the assumption that the rival has all the bargaining power. If some bargaining power is vested with the entrepreneur, he may also benefit from increased efficiency. The external investor, on the other hand, sees her claims as a minority shareholder being diluted in bad states of nature, while enjoying the benefits of efficiency improvements in good states. Accordingly, she will ask for a share in verifiable revenues ensuring that she recoups her initial capital contribution.

3.2.3.2 Voting Equity

Under voting equity the external investor always has control over the second-period decision, including whether or not to sell the firm. Consequently, the rival has to make his take-it-or-leave-it offer to her. Since the investor knows that no more offers will be made, she accepts as long as the price exceeds what she would get in the absence of a rival. The entrepreneur retains his security-related benefits and shares in potential value-increasing actions. However, he worries about his managerial quasirents being expropriated in good states of nature and, in addition, assets being syphoned off in bad states.

The entrepreneur maximizes his expected payoffs under voting equity Ω_{VE} by offering the sharing rule s_{VE} that solves the following problem

$$\Omega_{VE} \equiv \text{Max}_{s_{VE}} \quad qs_{VE}\pi_{g2} + (1 - q)s_{VE}(\pi_{b2} - \Phi)$$

subject to the following individual rationality constraint for the external investor

$$q(1 - s_{VE})\pi_{g1} + (1 - q)(1 - s_{VE})\pi_{b3} \geq C$$

Again this constraint is assumed to be binding, and we solve for s_{VE} in terms of exogenous parameters

$$s_{VE}^{\circ} = 1 - \frac{C}{q\pi_{g1} + (1 - q)\pi_{b3}}$$

Voting equity then yields the following expected payoffs for the entrepreneur:

$$\Omega_{VE} = q\left(1 - \frac{C}{q\pi_{g1} + (1 - q)\pi_{b3}}\right)\pi_{g2} + (1 - q)\left(1 - \frac{C}{q\pi_{g1} + (1 - q)\pi_{b3}}\right)(\pi_{b2} - \Phi)$$

Under non-voting equity Pareto-inferior actions occur only in the bad state of nature; assets are stripped from the firm in conjunction with liquidation ($\pi_{b3} > \pi_{b2} - \Phi$). Voting equity results in Pareto-inferior actions in both good and bad states of nature; the managerial quasirents are expropriated and the entrepreneur's claims to the firm's assets diluted, respectively ($\pi_{g1} + z > \pi_{g2}$; and $\pi_{b3} > \pi_{b2} - \Phi$). The ranking over these two allocations of control depends on the relative size of these two forms of dilution and on the size of initial capital requirements. The following proposition evaluates the relative ranking of the two capital structures for a particular case.

Proposition 1: When expected private benefits are non-negligible and the net effect on expected verifiable revenues of a rival appearing is zero, an all-equity capital structure allocating the right to sell control to the entrepreneur in all states of nature (non-voting equity) Pareto-dominates an all-equity capital structure which always gives control over the selling decision to the external investor (voting equity). In general, there always exists a z° above which non-voting equity dominates voting equity.

Proof: We compare the entrepreneur's expected payoffs for the two contracts. Setting $\Omega_{NVE} - \Omega_{VE} > 0$ yields the following inequality:

$$(a - b)\left[1 - \frac{C(a + b)}{ab}\right] < qz$$

where

$$a = q\pi_{g2} + (1 - q)(\pi_{b2} - \Phi); \text{ and } b = q\pi_{g1} + (1 - q)\pi_{b3}$$

i.e., the expected value of verifiable revenues under the rival and in the absence of a rival, respectively. The left-hand side of the inequality compares the effect on expected verifiable second-period revenues of the two contracts, and the right-hand side is the expected value of private benefits. Domination may go both ways, but when the net effect on expected verifiable revenues $(a - b)$ is zero, and expected private benefits are positive, a specific case which we use later, non-voting equity dominates voting equity. However, the inequality also proves our general result that there will always exist a level of benefits above which non-voting equity dominates voting equity. Note that this may happen already for negative private benefits, the left-hand side can take on negative values.

Q.E.D.

The economics underlying the result in Proposition 1 is more complicated than it may appear at first. What matters to the initial contracting parties is how much they can extract from the rival given that the external investor receives her capital contribution in expectation; we have assumed that all the surplus goes to the entrepreneur. When the entrepreneur has control, i.e., when non-voting equity has been issued, the value of the private benefits and $(1 - s_{NVE})$ of efficiency improvements are extracted from the rival in good states of nature; the larger the external investor's share, the more is extracted. However, in bad states the extracted value decreases in the external investor's share. Correspondingly, under voting equity only the entrepreneur's share s_{VE} of efficiency improvements are extracted in good states, but by the same token only a share s_{VE} is diluted from verifiable revenues in bad states.

We illustrate this for the extreme case where capital requirements are so large that the external investor takes all the expected verifiable revenues to cover her initial

contribution (and the entrepreneur only enjoys private benefits; his share $s = 0$). Under non-voting equity, the value of the private benefits and all the efficiency improvements brought about by the rival are extracted in good states of nature. In bad states, the external investor has no protection against dilution and carries the full cost of net dilution. When voting equity is issued in this extreme case, no part of efficiency improvements is extracted in good states, and the claims of the initial contracting parties are not diluted in bad states; the entrepreneur, however, is unlikely to enter into a voting equity contract in this situation, since he has no protection of his private benefits and expected payoffs of zero (assuming that a rival appears with probability one). We see that the relative attractiveness of non-voting equity and voting equity depends on the relative size of expected efficiency improvements and expected net dilution and on expected private benefits. This case also illustrates how the dilution problem in bad states stems from expropriation of minority, non-controlling interests; when these interests are small, the rival would carry most of the cost of dilution himself.

If capital requirements are smaller than the expected value of verifiable revenues and the external investor's share of verifiable revenues under non-voting equity consequently lower, less is extracted from the rival in good and more in bad states. If instead voting equity had been issued, more would be extracted in good states and less in bad states as the share of the external investor falls. The relative attractiveness of the two contracts depends on the relative size of expected efficiency improvements in good states and expected net dilution in bad states and the size of initial capital requirements. The size of these opportunities for improvements or dilution and of capital needs feed back into the share of the external investor; as expected net dilution increases she must receive a higher share of verifiable revenues.

To ensure that the entrepreneur is properly compensated for his private benefits, voting equity could be combined with a payout triggered by a takeover (a golden parachute); such a clause would extract more from the rival. However, he should not be compensated in bad states of nature where he enjoys no private benefits; a

compensation would have to be contingent on the state of nature which is assumed not to be verifiable.

3.2.3.3 All-Debt Financing

When there are potential state-contingent conflicts associated with takeovers, the analysis of voting and non-voting equity contracts shows that delegating control, and the right to sell control, entirely to one of the parties may be inefficient. Since the two conflicts discussed here occur in different states of nature and between different parties, the parties may be able to extract more from a rival by making the allocation of control contingent on the state of nature. When a takeover occurs in the good state, the entrepreneur who is vulnerable to expropriation of his private benefits holds the control rights and thus the right to tender these rights. If the rival appears following the realization of the bad state of nature and assets can be stripped, control is allocated to the external investor who cares most about firm value. Such an allocation of control could be achieved through debt financing. We want to show when an all-debt external financing would dominate non-voting equity.

All-debt external financing has the following payoffs when a rival always appears in the second period ($p = 1$).

$$\begin{array}{cc}
 \theta_g & \theta_b \\
 \text{E: Max } (\pi_{g1} + z - D_2, z) & \text{Max } (\pi_{b2} - \Phi - D_2, 0) \\
 \text{I: Min } (D_2, \pi_{g2}) & \text{Min } (D_2, \pi_{b3})
 \end{array}$$

In good states of nature, the entrepreneur receives either first-period revenues plus private benefits minus a fixed debt repayment D_2 or, if these are larger, only the private benefits z ; these are his reservation utilities in good states of nature, i.e., what he would get in the absence of a rival. In bad states of nature, he gets the maximum of asset value after dilution minus the fixed payment D_2 and zero. The external investor receives the minimum of D_2 and revenues π_{g2} in good states, and of D_2 and π_{b3} in bad states. Note that the transfer of control does not affect sharing rules per se; claims remain intact, but there may not be enough verifiable revenues to meet these claims.

To derive the entrepreneur's expected payoffs under an all-debt external financing we make two additional assumptions about payoffs and the size of the second-period debt repayment D_2 . First, for the entrepreneur to enter into the agreement, D_2 must be smaller than second-period revenues in good states of nature under the entrepreneur π_{gl} . Second, debt is risky; the stipulated second period repayments are smaller than the liquidation value of assets π_{b3} .

The entrepreneur who gets zero in bad states maximizes his expected payoffs by suggesting a fixed second-period repayment D_2 which solves

$$\Omega_{SD} \equiv \text{Max}_{D_2} q(\pi_{gl} + z - D_2)$$

subject to the external investor's individual rationality constraint

$$(IR) qD_2 + (1 - q)\pi_{b3} \geq C$$

Solving when this constraint is binding gives us the optimal level of second-period fixed repayment

$$D_2^* = \frac{C - (1 - q)\pi_{b3}}{q}$$

The entrepreneur's expected payoffs under an all-debt external financing is

$$\Omega_{SD} = q(\pi_{gl} + z) + (1 - q)\pi_{b3} - C$$

We derive the following proposition:

Proposition 2: All-debt external financing only dominates an all-equity capital structure which allocates control to the entrepreneur (non-voting equity) when the expected net dilution resulting from the appearance of a rival in bad states of nature is larger than the expected efficiency improvements brought by the rival in good states.

Proof: We want to show when $\Omega_{SD} > \Omega_{NVE}$. Setting $\Omega_{SD} - \Omega_{NVE} > 0$ gives us the following expression

$$(1 - q)[\pi_{b3} - (\pi_{b2} - \Phi)] > q(\pi_{g2} - \pi_{g1})$$

Q.E.D.

The left-hand side of this inequality represents the benefits of debt financing, i.e., the expected value of avoiding dilution in bad states of nature. The right-hand side corresponds to the costs of debt financing which are the gains foregone from efficiency improvements brought about by the rival in good states. For the case investigated in Proposition 1, i.e., when the net effect of a rival appearing is zero, the contracting parties are indifferent between the two contracts. All-debt external financing prevents dilution in bad states, but this contract does not allow the initial contracting parties to enjoy the efficiency improvements brought about by the rival. When the expected net effect on verifiable revenues of a future sale is negative, it may seem that parties should agree not to sell the firm under any condition. However, the entrepreneur may still wish to convert his private benefits into cash.

3.2.3.4 Combined Debt and Equity Financing

The problem with all-debt external financing was that while control was optimally allocated, the allocation of rights to revenues was such that the initial contracting parties did not benefit from efficiency improvements brought about by a rival in good states of nature. If they could combine the protection against asset stripping offered by debt with the possibility to enjoy the benefits of a rival through issuing equity, the contracting parties may be able to extract more from the rival than under capital structures with all-equity or all-debt financing.

We study here a specific mixed financing contract which contains a share α of non-voting equity and a share $(1 - \alpha)$ of standard debt, and has a linear sharing rule s_{DE} , a fixed repayments D_1 and \bar{D}_2 in the first and the second period, respectively. The

share of debt as well as the size of the two repayments are exogenously determined by the allocation of control. It is important to note that this contract is not a linear combination of standard debt and non-voting equity, since these two contracts represent different allocations of control and thus different optimization problems. When $\alpha = 0$, this contract is equivalent to a standard debt contract. However, $\alpha = 1$ does not correspond to pure non-voting equity financing since this contract represents a different allocation of control. In Extension 2, we show that the case where $\alpha = 1$ may be interpreted as a convertible debt contract.

Under a mixed contract the entrepreneur suggests a share s_{DE} which maximizes the following objective function

$$\Omega_{DE} \equiv \text{Max}_{s_{DE}} \quad q[\alpha s_{DE} \pi_{g1} + (1 - \alpha)(\pi_{g1} - \bar{D}_2) + z]$$

subject to the following individual rationality constraint

$$q[\alpha(1 - s_{DE})\pi_{g2} + (1 - \alpha)\bar{D}_2] + (1 - q)\pi_{b3} \geq C$$

Again, assuming this constraint to be binding yields

$$s_{DE} = 1 - \frac{C - q(1 - \alpha)\bar{D}_2 - (1 - q)\pi_{b3}}{q\alpha\pi_{g2}}$$

Substituting this into the objective function gives us the entrepreneur's expected payoffs from a mixed contract

$$\Omega_{DE} = q[\pi_{g1} + z - (1 - \alpha)\bar{D}_2] + \pi_{g1}/\pi_{g2}[q(1 - \alpha)\bar{D}_2 + (1 - q)\pi_{b3} - C]$$

This contract is clearly not an optimal contract. Expected payoffs could be increased by allowing α to go to one or set \bar{D}_2 to zero while maintaining the same allocation of control. The fact that this contract is suboptimal makes it even more interesting if we

can show that it may dominate both pure non-voting equity and pure debt financing. To compare these contracts we suggest the following proposition.

Proposition 3: A combination of debt and equity financing where the entrepreneur has control in good states and the external investor in bad states always dominates pure debt financing and may also dominate pure equity financing where the entrepreneur has control (non-voting equity).

Proof: We start by comparing the entrepreneurs expected payoffs from pure debt financing and from a mixed contract. Setting $\Omega_{DE} - \Omega_{SD} > 0$ gives us the following

$$(\pi_{g1}/\pi_{g2} - 1)[q(1 - \alpha)\bar{D}_2 + (1 - q)\pi_{b3} - C] > 0$$

We immediately see that the payoffs from the two contracts are equivalent when $\pi_{g1} = \pi_{g2}$. Furthermore, we see from the individual rationality constraint under the mixed contract that $[C > q(1 - \alpha)\bar{D}_2 + (1 - q)\pi_{b3}]$ so that the term within brackets on the left-hand side is always negative. Consequently, when $\pi_{g1} < \pi_{g2}$, as we have assumed, a mixed contract always dominates pure debt external financing. Next, we investigate when a mixed contract dominates non-voting equity. Setting $\Omega_{DE} - \Omega_{NVE} > 0$ yields the following expression

$$C\left[\frac{q\pi_{g1} + (1 - q)\pi_{b3}}{q\pi_{g2} + (1 - q)(\pi_{b2} - \Phi)} - \frac{\pi_{g1}}{\pi_{g2}}\right] + \left[\frac{\pi_{g1}}{\pi_{g2}} - 1\right][q(1 - \alpha)\bar{D}_2 + (1 - q)\pi_{b3}] > 0$$

Domination may go both ways. Under our payoff assumptions ($\pi_{g1} < \pi_{g2}$; and $\pi_{b3} > \pi_{b2} - \Phi$), the second product term on the left-hand side of the inequality is always negative, but the first product term depends on the relative size of the expected efficiency improvements in good states and expected net dilution in bad states. When the net effect on expected verifiable revenues of a rival appearing is zero, the same case for which we showed in Proposition 1 that non-voting equity dominated voting equity, the mixed contract dominates non-voting equity (as in our comparison of a

mixed contract and standard debt, we utilize the individual rationality constraint and get $[C > q(1 - \alpha)\bar{D}_2 + (1 - q)\pi_{b3}]$. The smaller the share of debt $(1 - \alpha)$, the more attractive is the mixed contract. Furthermore, the attractiveness of the mixed contract increases in expected net dilution in bad states but decreases in efficiency improvements in good states. By combining these results with those of Proposition 2, we can also demonstrate that when the expected net dilution in bad states of nature is larger than expected efficiency improvements in good states our mixed contract dominates non-voting equity.

Q.E.D.

Mixed financing dominates standard debt because it allows contracting parties to extract some, or most, of the benefits of efficiency improvements brought about by a rival in good states of nature. When the net effect on verifiable revenues of a rival appearing is zero, a mixed contract dominates also non-voting equity; it extracts more from the rival by transferring control in bad states of nature and allows the contracting parties to benefit from efficiency improvements brought about by him.

3.3 Analysis of Results

Our model discusses how the possibility of a future sale of control over the firm affects the initial choice of contract. Internal finance is implicitly free and thus preferred; all financing costs stem from conflicts between investors, and all forms of external finance are costly. When there are no conflicts, either because the possibility of a future takeover p is zero or because there is no dilution or when efficiency improvements dominate dilution in both states, the choice of capital structure is irrelevant and the constrained first-best action plan is implemented.

We have focused on the case where a rival always appears and always dilutes. The ordering of contracts depends on the significance of private benefits, the net expected net effect on verifiable revenues of a rival appearing, and the size of the initial capital requirement. The only thing we could say in general was that there always exists a level of private benefits above which non-voting equity dominates voting equity (Proposition

1). We then compared non-voting equity financing with all-debt external financing. Both these contracts compensates the entrepreneur for his private benefits in good states of nature. The two contracts differ because standard debt provides protection to the external investor against asset stripping by the rival whereas non-voting equity allows her to benefit from efficiency improvements brought about by him. We could show that when the expected gains from potential efficiency improvements brought about by a rival exceeds the expected costs from potential dilution, non-voting equity dominates all-debt external financing (Proposition 2).

We also examined a mixed contract which was designed so as to provide protection in bad states of nature and allow the external rival to enjoy some of the benefits from efficiency improvements in good states of nature. Even though this contract is not an optimal contract, we demonstrated that under our assumption that a rival is more efficient in good states of nature, the mixed contract always dominates all-debt external financing (Proposition 3). When the expected net dilution in bad states of nature are larger than expected efficiency improvements in good states, the mixed contract dominates non-voting equity (Propositions 2 and 3). Furthermore, we showed that for the particular case where the expected net effect on verifiable revenues of a rival appearing is zero that the mixed contract dominates non-voting equity which, in turn, generates expected payoffs equivalent to those under all-debt external financing and larger than those under voting equity (Propositions 1-3).

If asset stripping is not state-contingent, i.e., a rival reduces firm value in both good and bad states of nature, all-debt financing dominates. When the entrepreneur enjoys private benefits in both good and bad states, non-voting equity will become relatively more attractive⁶. The net effect when conflicts are not state-contingent depends on the relative size of asset stripping and managerial quasirents, and on initial capital requirements, but in general all-equity structures become more attractive; as the firm

⁶ However, as demonstrated by Aghion & Bolton (1988), such benefits may give rise to conflicts in bad states of nature (when the firm should be liquidated) between the entrepreneur and the external investor also when the firm cannot be sold.

grows larger, conflicts relating to firm value are likely to gain in significance relative to conflicts arising from non-diluting private benefits.

Caution is warranted in interpreting these results. A number of restrictions have been imposed on the contracting problem. Most important, the probability of a takeover (p) has been assumed to be exogenous; the choice of capital structure has no effect on the likelihood of a rival appearing. This is clearly unsatisfactory since the allocation of control affects the price a rival has to pay for the firm; the parties may ex ante use this allocation to discriminate between diluting takeovers and takeovers which enhance efficiency. However, making the probability of takeovers contingent on the choice of contract would only reinforce the complementarity of debt and equity financing; debt financing reduces the likelihood of diluting takeovers in bad states of nature.

To limit the analysis to standard debt and equity contracts may seem restrictive. However, Aghion & Bolton (1988) generate contracts from a much wider class of contracts that resemble our standard financial instruments. Furthermore, the predominance of these instruments in corporate finance suggests that there are considerable gains to standardization. Our task has not been to explain why these standards evolved but to determine how such contracts may be used. We are certain that our results would hold also for a more general class of contracts. In particular, as we demonstrate in Extensions 2 and 3, they hold for a more general debt contract with a linear second-period sharing rule (convertible debt) and for equity contracts with unanimity rules or unconstrained ex post bargaining.

Our debt contract, where control transfer is triggered by a failure to meet a payment, corresponds fairly well to observed default mechanisms⁷. This specification avoids the somewhat troubling assumption that revenues are verifiable before liquidation. A skilled management may relatively easily manipulate accounting figures; this is one reason why

⁷ However, in the United States, the federal Bankruptcy Code does not apply to a firm with only one creditor (if we include wage and tax claims, such cases are very rare). Furthermore, a failure to meet one payment is typically not sufficient to declare a firm bankrupt.

debt contracts typically are not contingent on revenues. In addition, from a modelling point of view, we wanted to rely as little as possible on assumptions of verifiability.

To isolate the effects of the market for corporate control on the choice of capital structure, we have assumed that there are no conflicts between the initial contracting parties. Needless to say, many conflicts could occur also between the entrepreneur and the initial investor. However, initial contracting parties may be able to reduce the probability of future opportunism through investigations (e.g., credit ratings) prior to committing capital or sharing entrepreneurial ideas; an outside acquirer has not been subject to such screening. At the expense of transparency, our model could be extended to incorporate conflicts between the initial contracting parties.

If the control transfer associated with debt is costly, e.g., because a failure to meet debt repayments is an imperfect signal of the bad state of nature, the parties may prefer pure non-voting equity to mixed financing when asset stripping is insignificant but managerial quasirents are substantial. Similarly, when asset stripping is significant but managerial quasirents are negligible, voting equity may be preferred to debt. The possibility of mistakes is studied in the following Extension 1.

3.4 Extensions of the Basic Model

3.4.1 Extension 1: Costs of Transfer

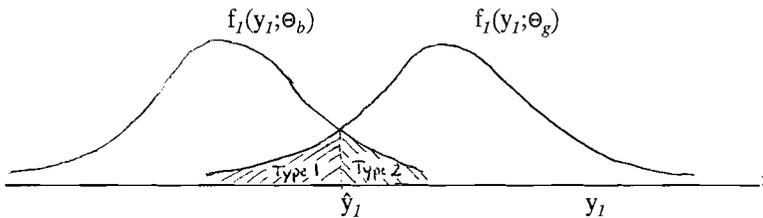
An important feature of debt financing in the basic model was the signaling function provided by the first-period debt repayment D_1^8 . This payment was set so that first-period revenues would be insufficient in bad states of nature. We assumed throughout the analysis that first-period revenue realizations below some \hat{y}_1 , and thus a failure to meet D_1 , were a perfect signal of the state of nature. This extension considers the case

⁸ This role of debt is even more important when the state of nature is not observable, i.e., when information is asymmetrically distributed among the contracting parties. A failure to meet the first-period repayment then triggers a control transfer and inspection which (presumably at low costs) allows the external investor to determine the state of nature.

when first-period revenues and the state of nature are not perfectly correlated. In this case the mechanism for control transfer associated with debt may be costly. We demonstrate that these costs may differ across states and that the relative significance of costs in good and bad states may influence the choice of level of first-period debt repayments, i.e., when control is transferred.

When the first-period debt repayment is an imperfect signal of the state of nature, two types of errors may be committed; control could be transferred when it should not be (Type 1-error) or not be transferred when it should be (Type 2-error). Figure 3.3 provides an illustration of the possible mistakes. The distribution function $F(\hat{y}_1 | \Theta_g)$ represents the probability of Type 1-error and the function $1 - F(\hat{y}_1 | \Theta_b)$ the probability of Type 2-error.

Figure 3.3 First-period revenue realizations and the state of nature



Were errors to be committed, the initial contracting parties would have the following payoffs. As before, we assume that $\pi_{g1} > D_2 > \pi_{b3}$.

Type 1 - error in Θ_g	Type 2 - error in Θ_b
E: $\pi_{g2} - D_2$	0
I: D_2	$\pi_{b2} - \Phi$

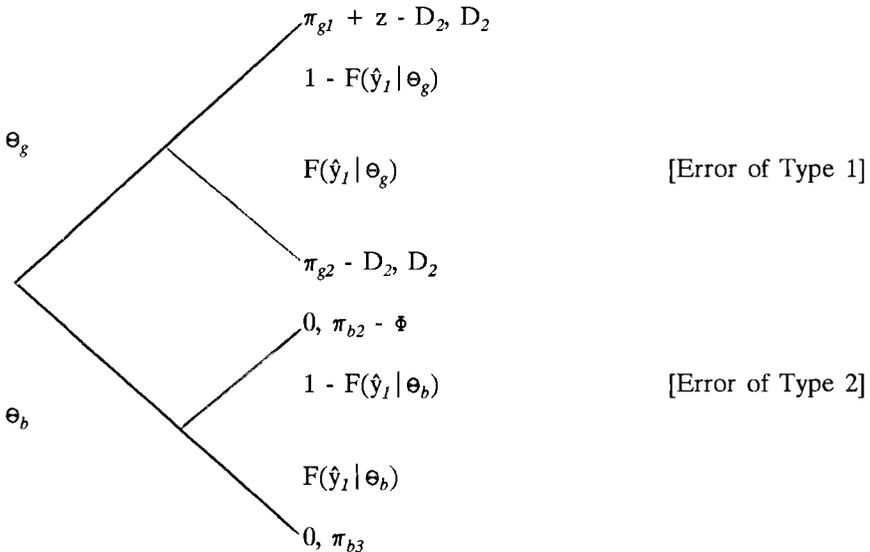
When the rival appears in good states of nature and control has been transferred by mistake, the entrepreneur has no protection of his private benefits and the external investor sells for D_2 , i.e., what she would get in the absence of a rival (see Figure 3.4 with payoffs for the entrepreneur and the external investor, respectively). After a

takeover, the entrepreneur maintains his residual claims on the firm and thus receives all the verifiable revenues once the fixed claim has been paid off ($\pi_{g2} - D_2$). The rival takes over the firm because he enjoys higher private benefits. When a mistake of Type 2 occurs in bad states of nature, the entrepreneur sells for some negligible amount; he would get nothing if he did not sell, and the rival has all the bargaining power. The external investor receives the remaining verifiable revenues $\pi_{b2} - \Phi$ and the rival the stripped assets Φ . We see that the costs of errors of Type 1 are borne by the entrepreneur, and those stemming from Type 2-errors by the external investor. The expected costs of these two types of errors (when $p = 1$) are then given by

Type 1-error: $qF(\hat{y}_1 | \Theta_g)[\pi_{g1} + z - \pi_{g2}]$

Type 2-error: $(1 - q)(1 - F(\hat{y}_1 | \Theta_b))[\pi_{b3} - (\pi_{b2} - \Phi)]$

Figure 3.4 Ex Post Payoffs from a Debt Contract with a Fixed Second-Period Repayment



When first-period debt repayment D_1 is an imperfect signal of the state of nature, the entrepreneur maximizes his expected payoffs by suggesting a second-period debt repayment D_2 which solves

$$\Omega_{DE} \equiv \text{Max}_{D_2} q\{(1 - F(\hat{y}_1 | \Theta_g))(\pi_{g1} + z - D_2) + F(\hat{y}_1 | \Theta_g)(\pi_{g2} - D_2)\}$$

subject to the external investor's individual rationality constraint

$$(IR) qD_2 + (1 - q)\{(1 - F(\hat{y}_1 | \Theta_b))(\pi_{b2} - \Phi) + F(\hat{y}_1 | \Theta_b)\pi_{b3}\} \geq C$$

Solving when this constraint is binding gives us the optimal level of second-period fixed repayment

$$D_2^* = \frac{C - (1 - q)\{(1 - F(\hat{y}_1 | \Theta_b))(\pi_{b2} - \Phi) + F(\hat{y}_1 | \Theta_b)\pi_{b3}\}}{q}$$

The entrepreneur's expected payoffs under standard debt simplifies to

$$\Omega_{SD} = q\{(1 - F(\hat{y}_1 | \Theta_g))(\pi_{g1} + z) + F(\hat{y}_1 | \Theta_g)\pi_{g2}\} + (1 - q)\{(1 - F(\hat{y}_1 | \Theta_b))(\pi_{b2} - \Phi) + F(\hat{y}_1 | \Theta_b)\pi_{b3}\} - C$$

which can be checked in Figure 3.4; the first line corresponds to the upper half of the payoff tree and the second line is the lower half minus initial capital requirements.

We derive the following proposition:

Proposition 2': When first-period revenues are an imperfect signal of the state of nature, a non-voting equity capital structure may dominate all-debt financing also when

expected efficiency improvements in good states are smaller than expected net dilution in bad states.

Proof: Setting $\Omega_{SD} - \Omega_{NVE} > 0$ yields the following expression

$$(1 - q)[\pi_{b3} - (1 + A)(\pi_{b2} - \Phi)] > q[(1 + A)\pi_{g2} - \pi_{g1}]$$

where

$$A = (1/C)[qF(\hat{y}_1 | \Theta_g)(\pi_{g1} + z - \pi_{g2}) + (1 - q)(1 - F(\hat{y}_1 | \Theta_b))(\pi_{b3} - \pi_{b2} + \Phi)]$$

which is the (the net dilution as a result of errors divided by capital requirements). This term is positive but tends to zero as the correlation between first-period revenues and the state of nature approaches one in which case we have the original expression in the proof to Proposition 2. The costs of transfer thus decrease the left-hand side and increase the right-hand side as compared to this expression. As expected, the attractiveness of non-voting equity increases in the costs of mistaken transfers.

Q.E.D.

The optimal transfer point D_1^* should be determined by the relative size of the two types of costs. For example, when asset stripping is likely to be large in bad states of nature relative to the expropriation of private benefits in good states, the parties worry more about the Type 2-error and would thus set a higher first-period debt repayment. Similarly, when private benefits are very large or efficiency improvements small, the parties would be more concerned with Type 1-errors.

3.4.2 Extension 2: Convertible Debt

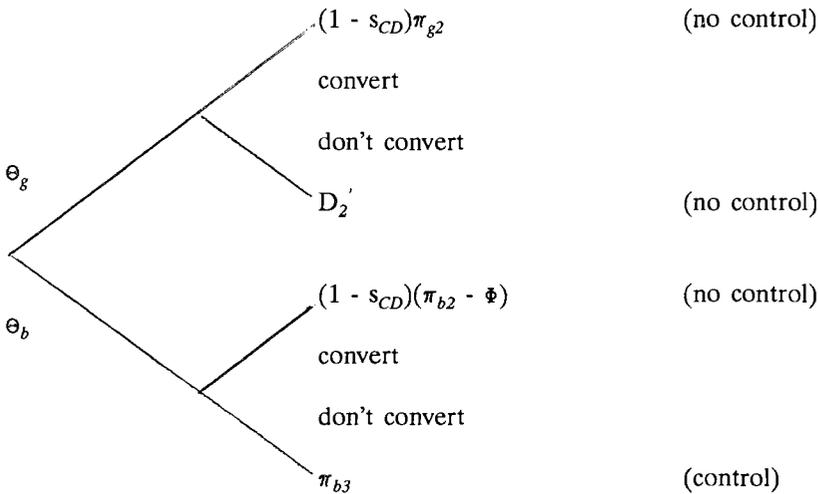
Mixed financing allows the contracting parties to benefit from a more efficient rival. However, the mixed contract was not an optimal contract; if the exogenously determined share of debt $(1 - \alpha)$ or the second-period debt repayment \bar{D}_2 were set to zero higher expected payoffs could be achieved. Such a contract corresponds to a

convertible debt instrument which provides the external investor with protection in bad states and the minimum of second-period verifiable revenues and a fixed repayment D_2' , and which is converted into a linear sharing rule $(1 - s_{CD})$ in good states (non-voting equity). Figure 3.5 illustrates the payoffs to the external investor associated with this convertible debt contract. For now we assume that the optimal strategy is to utilize the conversion option in good but not in bad states of nature. We later discuss the optimality of this conversion strategy (while we see from Figure 3.5 that it is never optimal to convert in bad states, we can not be sure that conversion is in good states).

Under our payoff assumptions the entrepreneur maximizes his expected payoffs Ω_{CD} by suggesting a sharing rule s_{CD} which solves (when the assumed conversion strategy is followed, the second-period debt repayment D_2' will never enter into the problem)

$$\Omega_{CD} \equiv \text{Max}_{s_{CD}} = qs_{CD}\pi_{g1} + z$$

Figure 3.5 The External Investor's Payoffs of a Convertible Debt Contract



subject to the external investor's individual rationality constraint

$$(IR) \quad q(1 - s_{CD})\pi_{g2} + (1 - q)\pi_{b3} \geq C$$

Solving when this constraint is binding gives us the optimal level of second-period fixed repayment

$$s_{CD}^* = 1 - \frac{C - (1 - q)\pi_{b3}}{q\pi_{g2}}$$

The entrepreneur's expected payoffs under a convertible debt contract are

$$\Omega_{CD} = q(\pi_{g1} + z) + \frac{\pi_{g1}}{\pi_{g2}} [(1 - q)\pi_{b3} - C]$$

We have the following proposition.

Proposition 5: A debt contract which provides the external investor with an option to convert it into non-voting equity dominates any combination of debt and equity financing.

Proof: We want to show both that the suggested convertible contract is optimal ex ante, i.e., it dominates any combination of debt and equity, and that the assumed conversion strategy is optimal in the sense that the option to convert will always be utilized in good states and only in these states. The ex ante optimality of the convertible debt contract is obvious; by issuing convertible debt the contracting parties can always do at least as well as with all-debt financing, non-voting equity, or mixed financing; a convertible debt contract which is always converted corresponds to setting the share of non-voting equity α in the mixed contract equal to one or the second-period debt repayment \bar{D}_2 equal to zero.) Next we investigate the optimality of the conversion strategy. We see from Figure 3.5 that under our payoff assumption the external investor never converts in bad states of nature. If the conversion option is

never utilized, i.e., it is not converted in good states either, we have pure debt financing which yields lower expected payoffs than a mixed contract and consequently than the convertible contract. Thus we know that the assumed conversion strategy is ex ante optimal. However, ex post the external investor will be indifferent between converting and not converting (when individual rationality constraints are assumed to be binding, we know that $(1 - s_{CD})\pi_{g2} = D_2'$). We must therefore assume that the external investor can credibly commit to converting in good states of nature (e.g., by ex ante agreeing on a second-period debt repayment below the optimal D_2').

Q.E.D.

This contract mitigates the moral hazard problem by using observable but non-verifiable information. Under our assumption of symmetric information about the state of nature a non-voting equity contract convertible into standard debt would be equivalent; the external investor always converts in bad states of nature. However, if the entrepreneur had private information about the state, the signal provided by a fixed debt payment in the first period would be valuable.

3.4.3 Extension 3: Joint Ownership and Unanimity Rules

In analyzing our basic contracts we assumed that it was preferable to allocate control and the right to sell control to one of the parties, and that control rights and the right to sell these rights should always be combined. A number of alternative allocations are plausible, or at least possible. For example, the parties could share control over the firm and leave the decision to sell to unconstrained bargaining. Equivalently, they may require that a decision to sell must be unanimous, or that the firm can only be sold in its entirety. This extension examines the expected payoffs from joint ownership.

When the parties share control and the right to sell control, the external investor, who has a lower reservation utility, can extract some of the value of the private benefits from the entrepreneur before she gives her consent to a sale (since he is liquidity-constrained this transfer comes from the proceeds of the sale). For simplicity, we assume that the parties split the value of private benefits equally (this is the Nash

bargaining solution; an alternative specification would not affect our results). However, since we have assumed that the entrepreneur suggests the contract, the possibility of extracting private benefits will merely be reflected in a lower share of verifiable revenues $(1 - s_{EE})$ for the external investor (s_{EE} is the entrepreneur's share of verifiable revenues under joint ownership). The rival knows the reservation utilities of the parties and offers $\pi_{gI} + z$ in good states of nature and π_{b3} in bad states.

We now have the following optimization problem. The entrepreneur proposes a sharing rule s_{EE} maximizing his expected payoffs

$$\Omega_{EE} \equiv \underset{s_{EE}}{\text{Max}} \quad q(s_{EE}\pi_{gI} + z/2) + (1 - q)s_{EE}\pi_{b3}$$

subject to the external investor's individual rationality constraint

$$q[(1 - s_{EE})\pi_{gI} + z/2] + (1 - q)(1 - s_{EE})\pi_{b3} \geq C$$

solving for the optimal s_{EE} yields

$$s_{EE}^* = 1 - \frac{C - qz/2}{q\pi_{gI} + (1 - q)\pi_{b3}}$$

We now generate the entrepreneur's expected payoffs for a joint ownership contract

$$\Omega_{EE} = q(\pi_{gI} + z) + (1 - q)\pi_{b3} - C$$

which is equivalent to the expected payoffs from standard debt external financing (this equivalence is not general but stems from the particular state-contingent conflicts we have studied). We have the following proposition.

Proposition 6: Joint ownership, or a rule requiring contracting parties to be unanimous when selling the firm, dominates an all-equity contract which allocates control to the entrepreneur (non-voting equity) when the expected net dilution resulting from the appearance of a rival in bad states of nature is larger than expected efficiency improvements brought about by the rival in good states.

Proof: See proof of Proposition 2.

Under our assumption that the rival has all the bargaining power, a joint ownership contract or a unanimity rule ensures the initial contracting parties a compensation equivalent to what they would get in the absence of a rival. This contract protects them against dilution by a rival, but does not allow them to benefit from potential efficiency improvements.

3.5 Concluding Remarks

Standard debt and equity have been shown to have complementary roles in mitigating potential conflicts associated with a sale of the firm and in extracting surplus from a rival management team. Whereas both standard debt and non-voting equity contracts compensate the entrepreneur for his private benefits in good states of nature, they have different effects on the expected payoffs to the contracting parties. A standard debt contract provides protection against value-decreasing actions in bad states of nature by shifting control, and the right to sell control, among the initial contracting parties. Non-voting, or minority, equity financing allows the contracting parties to enjoy some of the benefits of efficiency improvements in good states by shifting control to a third party, an outside rival. Thus, the two mechanisms for control transfer associated with debt and equity contracts - bankruptcy and takeover - also serve as complements. Bankruptcy optimizes among the insiders to the firm, while a takeover by a rival optimizes between insiders and outsiders.

The discussion has been primarily concerned with closely-held firms where the allocation of control may be difficult to separate from managerial compensation

schemes; managerial quasirents being an important part of such schemes. A full understanding of the capital structure decision must also consider the collective choice problems when holdings of debt and equity are dispersed. Furthermore, in closely held firms the disciplinary role of the market for corporate control is likely to be less important. However, as the firm grows and incentives for dilution increase, private benefits could become a costly way of rewarding managers and making the disciplinary role more important. The possibility that the firm could become widely held in the future could affect the design of financial instruments in the closely held entrepreneurial firm. All the capital structures considered here can potentially be used to constrain managerial consumption. In fact, their disciplinary effects complement or reinforce each other. Voting equity allows the external investor to sell to a rival without compensating the entrepreneur for his private benefits. Non-voting equity in the form of a minority holding of shares with voting power could potentially turn into majority equity if the firm has to return to the capital market in the future. In addition, in certain situations the threat of liquidation inherent in standard debt may be used to affect the behavior of the entrepreneur or the rival. This model should be extended to also consider the disciplinary role of capital structure and how it affects preferences over the basic contracts considered here.

CHAPTER 4: CAPITAL STRUCTURE AS A MECHANISM OF CONTROL - A COMPARISON OF FINANCIAL SYSTEMS¹

4.1 Introduction

The new property rights literature views a corporation's capital structure as defining the allocation of returns and control among investors. Casual observation indicates substantial international variation in corporate capital structure, also within the capitalist world. This chapter applies the new property rights approach to the description and analysis of these differences across countries. In particular, we are interested in how, in a comparative context, external constraints on individual investors influence the allocation of returns and control. The focus is on restrictions imposed on commercial banks through financial regulation. We claim that these restrictions are related to observed differences in capital structure, both in terms of the relative importance of different financial instruments and of the distribution of these instruments among investors.

The chapter identifies some stylized facts about international variations in corporate capital structure based on data derived primarily from national accounts and surveys of the corporate sector in six capitalist economies (the Federal Republic of Germany, France, Japan, the United Kingdom, the United States and Sweden). The choice of countries was natural considering their size and importance to the world economy. Sweden was included because its financial system has undergone a considerable transformation during the period studied, 1975-1985, and because data for that country was easily accessible. These countries broadly classified into market- and bank-oriented financial systems based on the relative significance of commercial banks in the provision of funds to corporations. We find that the capital structure in the corporate sector differs significantly between the two types of systems, with bank-oriented financial systems having higher debt-equity ratios and more concentrated ownership of debt and equity. In addition, the relative importance of the basic mechanisms for transfer of

¹ This chapter is a revised version of an article published in Aoki, Masahiko, Bo Gustafsson and Oliver Williamson (eds.), 1990, The Firm as a Nexus of Treaties, London: European Sage.

corporate control, takeovers and bankruptcy, also differs across the two groups of countries.

The claim here is that the observed variations across countries are related, at least to some extent, to differences in three sets of banking regulation: i. restrictions on the portfolio choices of banks; ii. restrictions on their ability to exercise control; and iii. restrictions on the size of individual institutions. Commercial banks in countries with market-oriented financial systems are much more regulated in these respects. The strict regulation has prevented banks from effectively exercising control in non-financial corporations, affecting their willingness to extend credit. In addition, market-oriented countries, most prominently the United Kingdom, have a number of restrictions on the market for corporate control that affect the use of the takeover mechanism. We suggest that market-oriented arrangements in these systems, in fact, have been supported by wide-ranging regulations.

Unfortunately, international comparisons of capital structure are hampered by the poor quality and lack of comparability of available data. These problems are discussed in Appendix 4.1. While data quality can be enhanced and comparability improved (see e.g., Mayer (1990)), it is doubtful whether satisfactory statistics will ever be available. In light of these problems, this chapter spends less time on computations of comparable statistics and detailed analysis of data; existing studies are taken as given. In order to mitigate the comparability problem we group countries and compare across groups to derive stylized facts, i.e., patterns shared by all or most of the countries in a group. In this manner, distortions due to idiosyncracies in individual countries' accounting conventions and other institutional differences may be reduced.

This chapter compiles data for a broader range of aspects of capital structure than previous studies. However, each aspect is treated rather superficially. The purpose is to test the general fruitfulness of the new property rights approach when applied to international variations in capital structure and to indicate interesting correlations for closer scrutiny. Of course, the conclusions generated by such a rudimentary framework must be treated with considerable caution. As discussed in previous chapters, the

concept of control used here is rudimentary and may, at best, provide a first approximation of actual control. Furthermore, the new property rights literature has primarily analysed small venture capital firms; generalizations to large widely held corporations must be made with considerable caution. While we have a better understanding of conflicts between classes of investors, the analysis of conflicts within classes of investors is still underdeveloped. In addition, the increasing internationalization of industrial and financial activities may render the analysis of national financial systems less valuable (see Grou (1985) for a discussion of ownership patterns in multinational corporations). However, we maintain that the governance structures in the home country are still important for most companies with global operations.

The outline of the chapter is as follows: Section 4.2 briefly discusses the application of the new property rights approach to international variations in capital structure. A number of new interpretations of empirical observations on capital structure emerge from this literature. In Section 4.3 the financial systems of the six countries are described and classified as either bank-oriented or market-oriented. A number of stylized facts about the features distinguishing the two types of systems are identified. Section 4.4 discusses the regulatory constraints on financial institutions, in particular commercial banks, in market-oriented systems, based on the example of the United States. The stylized facts and their connection to the constraints imposed by regulation are given a property rights interpretation in Section 4.5. Particular emphasis is given to procedures for handling conflicts between investors when firms are in financial distress. Section 4.6 discusses the implications of this new property rights interpretation for the functioning of the two systems. In Section 4.7, we derive some hypotheses for further testing. The concluding Section 4.8 speculates about the implications of the new property rights analysis for our understanding of the ongoing deregulation of financial markets and financial institutions particularly within the European Community.

4.2 A Property Rights Framework for International Comparisons

Differences across financial systems have been extensively discussed in the literature loosely defined as comparative finance (see, for example, Goldsmith (1959 and 1985); and Zysman (1983)). These contributions are rich in descriptive material, but their theoretical base is typically weak. While firmly rooted in theory, financial economics in the tradition of Modigliani & Miller (1958) has not provided satisfactory explanations to international variations in capital structure as defined here. The focus in this literature has been on the return aspect of financial instruments and on the debt/equity dimension of capital structure. In fact, this approach has not been particularly successful in explaining differences across countries even in debt/equity ratios. To the extent that such variations are acknowledged, they are seen as merely accidental or as explained by different corporate tax schemes. However, most studies indicate that international variations remain after adjustments for statistical differences, and taxation does not explain the observed patterns (see, for example, King and Fullerton, 1985; Rutterford, 1988; and Mayer, 1990).

The traditional property rights literature emphasizes control rights and has largely ignored the debt/equity dimension; the focus is on how equity is held. International comparisons covering only equity ownership miss many of the most interesting differences between financial systems in terms of how control over strategic decisions is allocated. We suggest that the new property rights approach offers a rich theoretical framework for interpreting international variations in capital structure. Unlike previous approaches, this literature considers both debt and equity, and return as well as control characteristics of financial instruments. The new property rights approach also allows us to simultaneously analyse the choice between financial instruments and their allocation among investors, the two basic dimensions of capital structure. For example, when commercial banks hold both debt and equity in a particular firm, this may affect how bank act when the firm is in, or approaching, financial distress. Furthermore, this framework can be used to study interrelationships between these dimensions. For example, the concentration of debt holdings in a particular firm may affect the willingness to extend additional finance and thus the debt/equity ratio. The rest of this

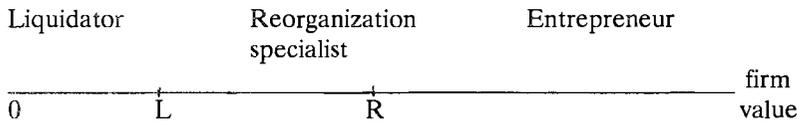
section discusses some important insights from the new property rights approach relevant to the analysis of international variations of capital structure.

Previous chapters demonstrated the importance of financial instruments as devices for commitment in long-term relationships between investors, and between investors and managers. Through improved ability to commit, contracting parties may mitigate potential conflicts and thus reduce agency costs. Conflicts could arise directly between an entrepreneur managing the firm and an external investor, as in Aghion & Bolton (1988), or, among external investors in the widely held firm, as in Bolton & Scharfstein (1990b). Furthermore, as in Chapter 3, conflicts could occur as a result of the appearance of an external rival. The new property rights approach submits that the nature of these conflicts affects the design of financial instruments and how these instruments are combined in the firm's capital structure. In particular, there is an interaction between the external market for corporate control and the determination of capital structure (Grossman & Hart, 1988). For example, Chapter 3 suggested that an external investor may wish to hold debt to protect herself against potential dilution by an external rival in bad states of nature. This chapter explores this relationship further.

Most of the formal analysis in the new property rights literature has been undertaken in the context of a small closely held firm with an entrepreneur and an external investor. Contracting parties are assumed to ex ante agree on how to allocate control over strategic decisions among themselves and across states of nature. The principal-agent relationship may shift around following the arrival of new information; control may be transferred from the entrepreneur to the external investor. The ex ante decision of optimal transfer point is influenced by real considerations such as managerial capability and the nature of underlying assets. For example, in the entrepreneurial finance model analysed by Aghion & Bolton, the underlying assumption is that while the entrepreneur is better at managing the firm when it is doing well, he is less suited to making strategic decisions when the firm should be liquidated (when firm value is

below L in Figure 4.1)²; he incurs a private cost, or equivalently loses private benefits, in case of liquidation. Consequently, control should be transferred to the external investor (here called the liquidator) when liquidation is the value-maximizing decision.

Figure 4.1 Allocation of Control Across Investors and States



Financial distress is thus determined endogenously; distressed states are merely those bad states in which the parties ex ante agreed to transfer control from shareholders to creditors. As a result, contracting parties ex ante influence the choice between the transfer mechanisms of bankruptcy and takeover. Control is allocated contingent on meeting a fixed debt repayment, the exact transfer point is determined by the structure of debt repayments and the level of debt; a higher level of debt indicates that control is transferred at an "earlier" point in time.

This conflict arises from the fact that the entrepreneur obtains private benefits from continued operation of the firm whereas the external investor does not³. However, once the parties have agreed ex ante to use debt financing, a security-related ex post conflict may emerge. When firm value slides and the likelihood of financial distress rises, the incentives of equity holders become increasingly distorted (cf. Jensen & Meckling, 1976). The owner-entrepreneur wants to pursue more risky strategies, i.e., to gamble with external investors' money (asset substitution). The existence of such

² The figure is simplistic; firm value is a function of the strategic decision. The horizontal axis describes firm value given that the firm continues to operate and that the value-maximizing decision is chosen; the value of the firm as a going concern may fall below liquidation value in which case the value-maximizing decision is to liquidate the firm.

³ Alternatively, the owner/entrepreneur suffers private costs, such as loss of reputation, if the firm is shut down.

security-related conflicts suggests that control should be transferred at a firm value above the point of limited liability, i.e., the point at which the value of the firm is zero. The external investor could then take over the firm and hire a new management or threaten to liquidate assets if the entrepreneur engages in excessively risky behavior. However, this threat is only credible if the costs of excessive risk-taking exceed those of liquidating the firm, i.e., the difference between the liquidation value and the value of the firm as a going concern.

Due to limitations in modelling technology, the analysis has typically considered only two parties, an entrepreneur and an external investor, and only two states of nature, good and bad; in bad states the firm should be liquidated. However, we could think of a third party, a "reorganization specialist", and an intermediate range of states between L and R in Figure 4.1, where the firm should be thoroughly reorganized. Such reorganization may require managerial skills different from those associated with running the firm in good states of nature, or with liquidation. A reorganization specialist could hold debt, i.e., a creditor specializing in reorganizing problem firms. Alternatively, the initial contracting parties could rely on the appearance of an external rival management team with the necessary skills. Since such a reorganization specialist may have stakes in the firm as a going concern and thus suffer private costs from liquidation, he should also be relieved of control if firm value slides below L. If the reorganization specialist does not incur such costs, he could also be identical with the liquidator.

A firm may credibly commit by agreeing to transfer control away from incumbent management in certain contingencies. Standard debt ensures control transfer in low performance states (bankruptcy) and equity allows for control transfer in good states (takeovers). In other words, capital structure may be viewed as a mechanism of control (Hart, 1988a) or rather as containing two fundamental mechanisms of control transfer. Chapter 3 suggested that these two mechanisms have different properties, partly complementing each other. Whereas, at least in theory, bankruptcy is more or less automatic following a failure to meet a debt repayment, takeovers rely on a well-functioning market for corporate control. Furthermore, bankruptcy optimizes among

insiders to the firm, while takeovers optimize between insiders and outsiders; following a bankruptcy, the group of initial contracting parties is intact, but a takeover often brings in a new controlling investor with additional capabilities.

When debt and equity are widely held, the two fundamental mechanisms of control transfer represent two collective choice problems - one among creditors and one among shareholders. We have already suggested that the reliance on a fixed payment for triggering a control transfer may give rise to ex post conflicts among creditors. Furthermore, the variation across creditors in terms of, for example, payment structure, interest rates and priority in bankruptcy suggests that incentives are more heterogeneous within the creditor collective than among shareholders⁴. In general, the costs of collective choice are expected to increase with the heterogeneity of the collective making the decision (Hansmann, 1990). This greater heterogeneity of the creditor structure strengthens the bargaining power of debtor firms, which in turn reduces their ability to commit through the use of debt. It is not clear, however, why creditors do not ex ante syndicate loans to mitigate this ex post problem. Bolton & Scharfstein (1990b) suggest that, given certain assumptions about the complementarity of underlying assets, multiple creditors may in fact be optimal. We argue here also that constraints imposed on individual investors, more specifically on commercial banks in market-oriented systems, may prevent such syndication and thus reduce commitment possibilities.

Furthermore, the two mechanisms may err. As analysed in Chapter 3, a failure to meet debt repayments is an imperfect signal of the bad state of nature; control could be transferred by mistake or not transferred when it should be. Similarly, takeovers do not always or only occur when they are optimal. Mistaken transfers of control are likely to be costly, e.g., because of disruptions and loss of reputation. In addition, a rival has not been subject to prior screening by the contracting parties and could thus be more likely to dilute assets or simply be less efficient (see Chapter 3).

⁴ However, shareholders may also vary significantly in terms of low or high voting shares and their degree of attachment to the firm (e.g., an owner-entrepreneur vs. a portfolio-oriented insurance company).

Another claim is that since control is valuable, an incumbent cannot be trusted to hand control over voluntarily. If a rival management team appears, he may engage in costly managerial defences. Similarly, incumbent management may manipulate revenue figures or, as suggested above, when there are multiple creditors, settle with one creditor at the expense of the creditors as a collective. Consequently, the two mechanisms for control transfer, bankruptcy and takeovers, have different properties and give rise to different costs. International variations in the relative importance of these two mechanisms should have important ramifications for our understanding of how the different economic systems function.

External constraints on individual investors' ability to hold and exercise control affect commitment possibilities and thus the conditions at which investors are willing to provide funds. For example, when a creditor is effectively prevented from holding equity or from exercising control in bad states of nature, her willingness to extend credit is lower. Since the level of debt affects the choice of mechanism for control transfer, the regulation of financial institutions may also have implications for the functioning of the market for corporate control.

Most previous approaches treat holdings in individual firms as independent and anonymous. The new property rights framework can be used to analyse control patterns which span several firms (cf. Hilferding's (1910) concept of *Finanzkapital*; see also Chapter 5 in this thesis for an application to corporate groupings). This approach also recognizes that financial contracts are embedded in a wider context. Contracts typically rely on some form of external enforcement, and differences in the effectiveness of such arrangements may affect how control is allocated among investors. These enforcement mechanisms themselves become important objects of study (see Chapter 5).

To hold a controlling block in a widely held firm is costly in the sense that the investor holding this block is abstaining from opportunities to diversify her assets. An investor who incurs high costs of control are here called control-oriented and one for whom

control costs are low is said to be portfolio-oriented⁵. These control costs are a function of the value of the holding in a particular firm and the value of the investor's portfolio. Furthermore, they are influenced by the diversification opportunities open to a particular investor. The relative costs of holding control may differ across countries depending on the diversification opportunities available in financial markets, and on restrictions on investor portfolios.

4.3 Six Financial Systems - a Statistical Overview

This section discusses capital structure in two types of financial systems and identifies a number of distinguishing features based on official statistics and secondary material for the six countries in our study. Financial system refers here to the industrial finance system, i.e., the institutional arrangements transforming savings into investments and allocating funds among alternative uses within the industrial sector (Tobin, 1984). This allocation is handled by a set of financial markets and a set of financial institutions providing various intermediation services. Before discussing corporate capital structure we briefly describe the two types of systems.

4.3.1 Bank-oriented and Market-oriented Systems

The financial systems of the capitalist countries can be crudely classified into two groups - bank-oriented and market-oriented financial systems. The two concepts are frequently used in the literature (see, e.g., Rybczinski, 1985), but they are rarely clearly defined. Here we take existing classifications as given, but we interpret them as based on the relative significance of commercial banks in the provision of funds to corporations. We do not intend to show that the two models are the only existing ones, nor do we claim that the countries covered by our study perfectly match our

⁵ The terms control-oriented and portfolio-oriented are ambiguous. An investor could be portfolio-oriented in one firm and control-oriented in another. Furthermore, a very large investor may also be able to diversify away large control blocks.

models.⁶ However, as Zysman (1983) points out, there do seem to be a limited number of feasible arrangements, certainly empirically and perhaps theoretically.

Countries with bank-oriented systems are normally characterized as having less developed financial markets, in particular for risk capital. Consequently, the opportunities for diversification and hedging are more limited than in market-oriented financial systems. Savings in bank-oriented systems are primarily transferred in the form of short-term and long-term credits through banks and other savings institutions. Typically, government supports bank lending and actively influences the costs of various forms of finance, often through the intervention by the central bank.

In market-oriented systems the range of financial instruments and capital markets is wider. Households invest a larger share of their savings directly into production. Banks primarily meet short-term financing needs of the corporate sector and are less important in the provision of long-term funds. They also receive a larger share of their funds from sources other than households, primarily through borrowing in intermediate markets. Government regulates the banking sector but normally refrains from active intervention. The central bank is concerned primarily with the control of monetary aggregates, i.e., money supply or interest rates.

Following this classification scheme, the United States and the United Kingdom are normally referred to as market-oriented, while France, Japan and West Germany are characterized as bank-oriented⁷. Sweden, the sixth country in our study, is much smaller

⁶ Zysman (1983) uses the term credit-based instead of bank-oriented. For these financial systems, he also distinguishes between those with administered prices and those where price formation is dominated by banks. This distinction is particularly important for Zysman's analysis of the role of government intervention in the economy.

⁷ This classification follows Rybczinski (1985), but it is also identical to that used by, for example, Mayer (1990) even though he does not use the terms bank-oriented and market-oriented. The most questionable characterization probably concerns the British financial systems. After the Second World War the financial systems of the United States and the United Kingdom were relatively intact and well developed. However, during the postwar period the two systems developed quite differently, in particular during the 1970s. While bond markets have grown in importance in the United States, the British corporations have increasingly been seeking other forms of

than the others, making direct comparisons more difficult. Most observers would probably characterize the Swedish financial system as bank-oriented, at least as it appeared in the early 1980s (for a discussion of the classification of the Swedish system, see Berglöf (1988)). As is obvious from this crude classification, there are substantial variations within the two categories. Indeed some of the more interesting international differences, from an institutional point of view, are found within the group of bank-oriented systems. Furthermore, due to recent developments in the financial markets, in particular increasing marketization of financial instruments and internationalization, financial systems have converged along some dimensions. However, we believe the distinction to be of significant interest for the subsequent analysis; it may, in fact, help us understand the implications of the ongoing changes in the financial systems (see Section 4.8).

To find measurements which capture these differences between the two types of financial systems turns out to be more difficult than one might have expected. Goldsmith (1985) compares the development of financial systems in market economies and centrally planned economies, and in developed and developing countries based on national accounts for 20 countries. Despite considerable adjustments, underlying data are very poor and comparability limited. Nevertheless, his statistical material may allow a first comparison of the six countries covered by our study.

Judging from Goldsmith's standard measures, the six countries are remarkably similar when it comes to the size of the financial sector and the degree of intermediation (see Table 4.1). However, the crudeness of these measures may make them less informative about differences within the group of developed capitalist economies. In particular, these measures provide little information about the type of intermediation undertaken by financial institutions. Systematic differences between the two types of systems are difficult to identify even when the relative size and activity levels of primary and

debt finance. The recent liberalization of the financial markets has again strengthened the market orientation of the financial system in the United Kingdom. As stated earlier, Zysman (1983) distinguishes between two types of bank-oriented (or in his terminology credit-based) systems: those with administered prices (Japan and France) and those where price formation is dominated by banks (West Germany).

secondary markets for corporate securities are compared (Berglöf, 1988). At the beginning of the 1980s, the United States had by far the largest (in absolute terms) and most developed secondary markets for stocks and corporate bonds. The security markets in West Germany and France trailed far behind in most respects. The ranking for the United Kingdom and Japan at this time depended on whether the comparison referred to equity or bond markets, to primary or secondary markets, or to size or activity levels.

Table 4.1 Some Measurements Comparing Financial Systems (1978)

	Financial assets/Gross National Product	Financial Inter- relations Ratio (Financial assets/ Real assets + net balances)	Financial Inter- mediation ratio (Assets of financial institutions/Total financial assets)
F R Germany	3.83	0.89	38.5
France	3.29	0.83	32.7
Japan	4.68	1.02	29.9
Sweden	4.44	1.27	26.1
United Kingdom	6.64	1.11	40.8
United States	3.90	0.99	26.8

Source: Goldsmith, Raymond, 1985, National Balance Sheets for 20 countries, National Bureau of Economic Research, New Haven: Yale University Press

The differences between the two types of financial systems stand out clearly first when the relative importance of various financial institutions is compared. As expected, banks hold a higher share of total domestic financial assets in the bank-oriented systems covered by our study (Table 4.2). Furthermore, the lending activity of the banking sector is more directed towards corporate financing. For example, during the 1970s on average 80-90 per cent of commercial bank lending in Japan went to the corporate sector. The corresponding figure for the United States was approximately 40 per cent (Goldsmith, 1983).

Table 4.2 Bank Credits Relative to Domestic Financial Assets (1978)

(per cent)

F R Germany	24.3
France	16.7
Japan	20.8
Sweden	15.4
United Kingdom	9.4
United States	13.3

Source: Goldsmith, Raymond, 1985, National Balance Sheets for 20 countries, National Bureau of Economic Research, New Haven: Yale University Press

Another characteristic of the banking sector in the bank-oriented financial systems is heavy concentration and substantial government ownership. In France, for example, seven of the ten largest banks were government controlled in 1982 (Hägg & Hörnell, 1987). The three largest banks accounted for close to 50 per cent of total bank lending in 1986. The Japanese government does not have a major ownership interest in any of the major commercial banks, but it exercises control over the influential Industrial Bank of Japan and several banks specializing in long-term lending to industry (Goldsmith, 1983). In addition, the government-owned postal savings system plays a major role in channelling funds from households to the corporate sector. The postal system alone accounted for 20 per cent of the total assets of the financial sector in 1986. In West Germany, the publicly owned special giro institutions and the savings and loans associations handled slightly more than half of commercial banking activities. Westdeutsche Landesbank with public ownership belonged to the three largest commercial banks in 1984 in terms of both total assets and total lending (Monopolkommission, 1986). The degree of concentration is substantially lower and government ownership virtually non-existent in the commercial banking sector in the United States and the United Kingdom.

4.3.2 Capital Structure

The focus is here on identifying differences between the two types of systems in terms of capital structure, i.e., the relative importance of different instruments in the financing of corporations and how these instruments are distributed among the firm's investors. It is important to emphasize that our classification into bank-oriented and market-oriented financial systems does not rest on these differences in capital structure, but on the relative significance of commercial banks in the financial system (e.g., as measured by the ratio of bank credits to domestic financial assets as in Table 4.2). The studies presented here and our own computations are primarily based on the flow-of-funds statistics and surveys of financial statements available in OECD Financial Statistics, Parts I-III. Data cover the period up to 1983, and in some cases 1984 and 1985. The major changes in the financial markets during the second half of the 1980s are not covered by the study. The calculations undertaken by Mayer (1990) have been used as the main basis for assessing the relative importance of debt and equity finance. In determining the ownership of debt and equity a number of independent studies have been compiled.

4.3.2.1 Relative Importance of Debt and Equity

Mayer (1990) presents data on differences in financing patterns for eight countries, including five of the countries covered here, but excluding Sweden, during the period 1970-1985 (see Table 4.3). A first important observation is that retentions dominate external sources of finance in all the countries covered by the study. The highest degree of self-financing is observed in the market-oriented systems of United States and United Kingdom. While bank financing dominates external finance in all the countries, the use of this source is most pronounced in France and Japan (and Italy). Contrary to a commonly held view, banks seem less important as a provider of finance to nonfinancial corporations in Germany during the period studied. In no country has a substantial amount of external finance been raised through securities markets. These observations concerning the relative importance of debt and net equity finance are broadly consistent with measurements of the ratio of debt to equity (see Table 4.4).

Debt/equity ratios are high in France and Japan but relatively low in United States and United Kingdom. However, these statistics must be read with particular caution due to differences in accounting conventions and problems associated with the use of stock data (see Appendix 4.1).

**Table 4.3 Unweighted Average Net Financing of Nonfinancial Corporations¹
(1970-1985)**

	F R <u>Germany²</u>	<u>France</u>	<u>Japan³</u>	United <u>Kingdom⁴</u>	United <u>States⁵</u>
Retention	70.9	61.4	57.9	100.2	85.9
Capital transfers	8.6	2.0	0.0	4.1	0.0
Short-term securities	-0.1	-0.1	N.A.	1.7	0.4
Loans	12.1	37.3	50.4	7.6	24.4
Trade credits	-2.1	-0.6	-11.2	- 1.1	- 1.4
Bonds	-1.0	1.6	2.1	- 1.1	11.6
Shares	0.6	6.3	4.6	- 3.3	1.1
Others	10.9	-1.4	- 3.8	3.2	-16.9
Statistical adjustments	<u>0.0</u>	<u>- 6.4</u>	<u>N.A.</u>	<u>-13.4</u>	<u>- 5.1</u>
Total	99.9	100.1	100.0	100.1	100.0

1. Net financing is shown as a proportion of capital expenditures and stock building.
2. There is no statistical adjustment in German accounts. Funds placed with insurance companies, and building and loan associations are included in loans.
3. Japanese flow-of-funds do not report retentions. The ratio of external to internal financing of Japanese enterprises has been obtained by applying proportions recorded in aggregate company accounts for the period 1972-84. The Japanese figures, therefore, should be treated with particular caution. Short-term securities are included in bonds.
4. United Kingdom statistics refer to private enterprises only.
5. Capital transfers are included under retentions in US accounts. Acquisitions of central government short-term securities are not shown separately from bonds.

Source: Mayer, Colin, 1990, "Financial Systems, Corporate Finance, and Economic Development," in Glenn Hubbard, Asymmetric Information, Corporate Finance, and Investment, NBER, Chicago: University of Chicago Press

Table 4.4 Debt/equity Ratios in Six Countries

	Net debt/equity equity ratio ¹ 1983	Gross debt/equity ratio ² 1983
F.R. Germany	N/A	0.59
France	0.67	0.73
Japan	0.68	0.77
Sweden	0.50	0.65
United Kingdom	0.40	0.55
United States	0.23	0.41

1. Book value of net liabilities in relation to equity excluding holdings of shares in other corporations.

2. Book value of short-term and long-term liabilities relative to total assets.

Source: OECD (1985) Financial statistics

4.3.2.2 Ownership of Debt and Equity

The patterns of ownership of debt and equity also differ significantly across financial systems. Unfortunately, statistics are poor and comparability limited. In particular, data on the concentration of debt holdings are generally not available. We have to rely on observations of the relative importance of various forms of debt finance. For example, high shares of bank finance are interpreted as suggesting that ownership of debt is concentrated. The quality of statistics on ownership of equity varies considerably across countries (see Appendix 4.1).

The dominance of commercial banks in the bank-oriented financial systems (with the exception of Germany) is reflected in significantly higher shares of bank credits (see Table 4.5). Furthermore, the creditor structure in large companies in these systems is heavily concentrated and dominated by main banks. Creditors are considerably more dispersed in the market-oriented systems. This is particularly true for the United States, the only country where bond financing is of any major importance to the corporate

sector (see Table 4.3). Bank lenders in these systems are also less coordinated, lacking the dominance of the main banks. Furthermore, lender-borrower relationships seem less stable over time than in bank-oriented financial systems⁸.

Table 4.5 Bank Credits as a Percentage of Total Liabilities

F.R. Germany	N/A
France	0.247
Japan	0.393
Sweden	0.242
United Kingdom	0.103
United States	0.089

Source: OECD (1985) Financial Statistics, Part 3.

As in the case of debt, ownership of equity in individual firms under bank-oriented systems is, in general, more concentrated (see Table 4.6). The incidence of control-oriented investors, i.e., investors abstaining from diversification opportunities in order to control companies, is higher. This is true for individual as well as institutional investors. While institutional holdings in many US and UK companies are large, they are much less likely to be control-oriented (for data on the distribution of shareholdings in the corporate sector, see Table 4.7); whereas some institutional owners, such as pension funds, hold substantial blocks in individual firms, they typically do not exercise control. In particular, bank shareholdings are more important in bank-oriented countries, both as a share of bank portfolios and from the perspective of the company⁹.

⁸ Stability does not refer to maturity, i.e., whether debt is short-term or long-term, but to the relationship between lender and borrower. A long-term relationship may consist of a sequence of contracts with short maturity.

⁹ In the United States and Sweden, where commercial banks, in principle, are not allowed to hold shares, bank shareholdings were negligible according to OECD Financial Statistics, (Parts 1 and 2, 1986). For British banks the importance of shareholdings in their portfolios has decreased markedly during the last decade. If viewed from the perspective of ownership structure in industry, banks held about 4 per cent of outstanding stock value on the Paris Exchange in 1979. In Germany, the corresponding figure was 8 per cent (1983) and in Japan as high as 20 per cent (1982).

The shares of interfirm shareholdings are also higher in countries with bank-oriented financial systems. The fact that firms in these systems are generally more closely held can be partly attributed to the smaller average firm size¹⁰.

In the United Kingdom bank ownership was of little significance as measured by its share of total listed stocks.

¹⁰ The available data do not allow for satisfactory corrections for differences in firm size. The average size in the US sample is larger than in the other samples, at least when measured by market value. However, exchange rate fluctuations make the exact differences difficult to determine. The average size of the largest shareholder only increases from 10 per cent to 15 per cent when we consider the 500 largest instead of the 200 largest firms (Securities and Exchange Commission, 1980). Furthermore, the average size of the firms in the two German samples is larger than that for the United Kingdom. In general, we are confident that the observed variations are sufficiently large to be robust to such corrections. Finally, it is not clear that we want to adjust for firm size. We are interested in determining the degree of concentration of ownership in a particular country. Firm size is, at least partly, endogenous; if companies in bank-oriented countries are smaller, this observation is interesting in itself.

Table 4.6 Ownership concentration in individual firms (the largest owner's share of capital)

Largest owners' share	France US			Japan		UK	Sweden	F.R.G	
	1	2	3	4	5	6	7	8	9
> 50	55		9	17	5	5	42	66	59
30-50		5		11			31	23	
25-30			29			29	12		
20-25	42			31	70				41
15-20		1				27			
10-15		6	10				11	12	
5-10		15	29	16		30			
> 5	2	73	23	25	25	9	4		

1. Morin (1982). Covers the 500 largest non-financial firms (parent companies) by turnover in 1976. The large public utilities are not included.
2. Herman (1981). Shows distribution according to size of all holdings over 2% in the 200 largest manufacturing corporations by turnover at the end of 1974.
3. Corporate Data Exchange (1980). Based on data from the Securities and Exchange Commission covering the 500 largest firms by employment 1980 according to Fortune magazine.
4. Miyazaki (1972). Covers the 466 largest firms by turnover in 1966. Groupholdings merged.
5. Mito (1983). Referred to in Gerlach (1986). Includes the 200 largest firms by turnover in 1976. Groupholdings merged.
6. Leech and Leahy (1990). Refers to a sample 470 UK-listed firms including 325 firms from "The Times 1000". Observations of ownership structure were made some time during 1983-1985.
7. Isaksson and Skog (1987). Includes 107 public companies in 1985. Based on voting power.
8. Iber (1985). Includes all firms listed on the German stock exchanges in 1983.
9. Monopolkommission (1986). The 100 non-financial largest firms by turnover in 1984.

Source: Berglöf, Erik (1988) *Ägarerna och kontrollen över företaget - en jämförande studie av finansiella system*. Stockholm: Statens Offentliga Utredningar.

Table 4.7 Ownership of Listed Stocks According to Sectors (1980 unless indicated otherwise)

	House- holds	Non-fin. corp.	Governm. inst.	Finan- cial inst.	Foreign owners
F.R. Germany (a)	17	51	10	15	8
France (b)	38	22	0	24	16
Japan (c)	27	25	0	42	5
Sweden (d)	33 (e)	7	0	56	4
United Kingdom (f)	28	5	3	60	4
United States (g)	51	15	0	28	6

- (a) 1983. Includes all public companies with capital over DEM 4.75. The share of non-financial corporations is exaggerated due to double counting in statistics.
- (b) All listed stocks.
- (c) Stocks listed on the Tokyo Stock Exchange 1979.
- (d) Stocks listed on the Stockholm Stock Exchange 1981.
- (e) Includes mutual funds (aktiesparfonder).
- (f) Stocks listed on the London Stock Exchange.
- (g) All stocks listed on the New York Stock Exchange.

Sources: F.R. Germany: Iber (1985)

France: Société d'Etudes pour le Développement Economique et Social (SEDES) and Banque de France, Commission des Operations de Bourse

Japan: Aoki (1984)

Sweden: Industri och industripolitik 1983-84, Industridepartementet 1985

United Kingdom: The Stock Exchange Survey of Share Ownership (1981)

United States: Securities and Exchange Commission, Monthly Bulletin (1981)

The statistics on ownership concentration conceal important differences in shareholding patterns within the group of bank-oriented financial systems. In France and West Germany, family control is still important even in large firms (Berglöf, 1988). The role

of family ownership in large Japanese companies was effectively eliminated after the Second World War, when the family-controlled holding companies were dismantled under the supervision of the occupation forces. In present-day Japan, controlling shareholders are mainly industrial corporations and financial institutions. Furthermore, the aggregation of shareholdings in Japan according to the corporate groupings (financial keiretsu) may give a misleading picture. The degree to which these groups coordinate their activities is disputed among observers and there exists considerable variation between groups (see Sheard, 1986, and Aoki, 1988, for a discussion of these groupings and the role of commercial banks; Chapter 5 models this coordination). Nevertheless, since one of our primary concerns is with the effects of ownership concentration on the likelihood of takeovers and since most studies suggest that coordination at least encompasses takeover protection, we have chosen to combine holdings.

Another feature distinguishing the bank-oriented systems in our study from their market-oriented counterparts is their longer-term shareholdings (see Berglöf, 1988). Controlling blocs of shares are seldomly transacted. Furthermore, takeovers as a mechanism of transfer of control from one set of shareholders to another have been much less common (for a comparison of the United Kingdom, France and Germany, see Franks & Mayer, 1990). This is particularly true for hostile takeovers; whereas such control transfers have been common in the United States and the United Kingdom, only a handful of hostile takeovers had taken place in Germany and Japan until the mid 1980s (Mayer & Alexander, 1990; and Aoki, 1988). As a result of the higher incidence of control posts and the long-term holdings, owners are generally well known and at least easily identified.

The results of our statistical comparison of the six financial systems are summarized in Table 4.6. The measures (small-large, high-low etc) should be regarded as characterizations relative to the other type of system. We emphasize again that the systems are classified based on the relative significance of commercial banks in the financial system, and are not based on capital structure.

Table 4.6 Financial Systems and Capital Structure

General characteristics of financial markets and financial institutions	Type of financial system	
	Bank-oriented	Market-oriented
Depth and width of financial markets (i.e. the opportunities for diversification)	Low	High
Ratio of financial assets held by banks to total assets held by financial institutions	High	Low
<u>Overall capital structure</u>		
Degree of internal finance	Low	High
Debt/equity ratios	High	Low
<u>Creditor structure</u>		
Ratio of bank credits to total liabilities	High	Low
Importance of bond financing	Low	High (not in the UK)
Degree of concentration	High	Low
Turnover	Low	High
<u>Shareholder structure</u>		
Degree of concentration	High	Low
Commercial bank shareholdings	Significant	Insignificant
Interfirm shareholdings	Widespread	Less common
Turnover of controlling blocs	Slow	Faster

4.4 Regulation of Financial Institutions

The regulatory framework of the United States will here provide an example of how legislators can prevent the emergence of large control-oriented financial institutions (see Roe, 1990, for a discussion of these restrictions and their origin). Federal regulation effectively prohibits commercial banks and bank holding companies from owning stocks and exercising control. The National Bank Act of 1863 and a clarifying Supreme Court ruling forbid national banks from holding stocks. The Glass-Steagall Act of 1933 prevents commercial banks from owning and dealing in securities through affiliates. Banks can only hold corporate stock through their trust departments (a maximum of 10 per cent in a single corporation).

Insurance companies have also been constrained in their shareholdings. State legislation in New York, where most of these institutions are incorporated, prevented insurance companies from holding corporate shares for the first half of this century. After several revisions, life insurers can now hold as much as 20 per cent of the company's assets, or one half of its surplus in stocks. However, a life insurance company cannot put more than 2 per cent of its assets into a single corporation. Furthermore, property and casualty insurers cannot control non-insurance companies.

Mutual funds acting as investment companies are severely penalized by tax laws. According to the Investment Company Act of 1940, a fund cannot own more than 10 per cent of a single corporation to be classified as diversified; only diversified funds can pass through profits to shareholders without payment of taxes (Subchapter M in the Internal Revenue Code). The Investment Company Act also imposes restrictions on the part of holdings which are concentrated; if holdings are larger than 5 per cent in a particular firm, the investment bank sponsoring the fund cannot sell securities to this firm.

Pension funds are relatively unregulated but still severely inhibited in exercising control. Since each company typically sets up its own fund, there is a strong fragmentation. Furthermore, funds are required to be diversified and a prudent person standard is

imposed. This legislation discourages a pension manager from taking board positions in a company where the manager's fund holds stock. Furthermore, since funds are company-based and subordinated to top management in their respective companies, it may be difficult for managers to monitor top management in other companies.

Besides these direct restrictions, a number of indirect rules discourage control-orientation among financial institutions. The Securities Exchange Act (Sections 13 and 14), which requires the institution aspiring to control to follow the complicated proxy machinery and file schedules with Securities and Exchange Commission, serves as a strong disincentive; the procedures often force the disclosure of confidential information. Insider legislation (SEA, Section 16b) effectively locks in financial institutions holding large blocks of shares.

In many countries, financial institutions, in particular commercial banks, often exert control when firms are in financial distress. The regulatory framework in the United States also provides a serious obstacle for this form of corporate control. A creditor with a substantial shareholding or other close affiliation with a debtor firm, may have its loans subordinated to other claims, i.e., it will be paid last and often not at all. In fact, such a creditor may be liable for the entire debt of the ailing firm. Roe (1990) argues that financial institutions also would face public protests and new legislation if they were to exert more control.

The restrictions in the United Kingdom bear many similarities to those of the United States, but many rules are not spelled out in laws but, rather, are enforced through "gentlemen's agreements". However, there was never a Glass-Steagall Act in the United Kingdom. Furthermore, unlike the U.S., insurance companies in the U.K. were never prohibited from owning shares; as a result they developed into important controlling owners.

The bank-oriented countries in our study exhibit much less restrictive laws on the exercise of corporate control by financial institutions. In Japan, the US occupation forces attempted to implant an American legal framework with limited success. While

commercial banks are limited to 10 per cent each of equity (5 per cent after 1987) in individual corporations, they still own about 20 per cent of the shares issued by firms listed on the Tokyo stock exchange. In addition, they have found other means of exerting their influence through the extensive cross-holdings and concentrated lending within the so-called financial keiretsu (see Chapter 5).

4.5 Variations in Capital Structure - A Property Rights Interpretation

A first conclusion from this overview of statistics is that capital structure seems to matter, in the narrow sense of debt-equity ratio as well as in the wider definition used here. The conspicuous similarities among countries within each type of financial system cannot be dismissed as merely accidental. These financial patterns also appear to have implications for real decisions, for example, for whether firms are reorganized through takeovers or creditor intervention. Furthermore, both dimensions of capital structure, i.e., both the relative importance of different financial instruments and the distribution of these instruments among investors, are relevant and related to each other.

The empirical observations also suggest the potential dangers of studying only the return aspect of financial instruments in attempting to understand capital structure or only equity when analysing the allocation of control. A focus on the allocation of returns misses many of the interesting characteristics and makes remaining observations difficult to interpret. When only equity is considered, our understanding of the allocation of control is at best partial; the international comparison suggested that the most conspicuous differences concerned the role and distribution of debt contracts. In fact, ignoring debt may also be directly misleading. For example, the role of Japanese commercial banks in non-financial corporations would be grossly understated if only the banks' rather modest equity shares were taken into account. The new property rights approach considers the control and return aspects of both debt and equity, and allows these two instruments to be analysed simultaneously; the behavior of a bank as a shareholder may be affected by the fact that it holds a substantial share of the firm's debt.

If capital structure does indeed provide us with a first approximation of the allocation of returns and control, the observations of international differences can be given a number of interesting interpretations. In particular, this section interprets six stylized facts which stand out when bank-oriented financial systems are compared to their market-oriented counterparts: (1) debt/equity ratios are higher; (2) ownership of debt is more concentrated and more homogeneous; (3) shareholdings are also less dispersed; (4) commercial banks often have large shareholdings in individual firms; (5) ownership of debt and equity is relatively more stable over time; and (6) corporate take-overs are less common.

While recognizing that the stylized facts outlined here can only be fully understood in a much broader historical context, this section concentrates on the effects of government regulation of institutional investors, in particular of commercial banks. More specifically, it focuses on the combined effects of the rules constraining commercial banks in market-oriented financial systems. These restrictions help explain the most significant difference between the two types of financial systems, and the difference used to classify the systems: the role of commercial banks in the corporate sector. In practice, the countries with market-oriented systems through regulation have eliminated one type of investor, i.e., a creditor capable of holding considerable shares of both debt and equity in the same firm. The regulations of commercial banks directly affect concentration of the creditor structure. The limits on the size of individual institutions increase the costs of holding large control blocks. Furthermore, the regulatory restrictions on bank shareholdings constrain commercial banks' opportunities to diversify their portfolios.

Differences in the regulation of large commercial banks are important in explaining the higher gearing in the corporate sector in the bank-oriented financial systems. The higher debt/equity ratios imply that creditors are carrying larger shares of firm-specific risk in bank-oriented financial systems. Data suggest that this increased risk exposure is to a large extent absorbed by commercial banks. However, the higher debt/equity ratios in the bank-oriented financial systems also indicate that control is

shifted from shareholders 'earlier', i.e., creditors have control over a wider set of states of nature.

Because of its higher risk content, bank debt in these countries is sometimes referred to as "crypto equity" (Hart, 1988a). The new property rights approach allows us to characterize the nature of bank control and risk bearing more precisely: commercial banks carry risk and have full control in a wider set of bad states. To the extent that a bank has large shareholdings in the same firm, it also shares risk and control in good states. Equityholdings by banks may reduce conflicts between shareholders and creditors when firms are in financial distress (see, for example, Hoshi et al. (1989a)). However, the fact that banks hold control blocks suggests that these holdings have a wider role in ensuring that control is transferred and in enforcing reorganizations. In Chapter 5 large control-oriented equityholdings by main banks in the financial keiretsu reduce the collective choice costs of debt by ensuring that member firms with trade-related claims cooperate in reorganizing a troubled member firm.

The heavier reliance on debt in bank-oriented financial systems has made it possible for firms to grow without diffusing control in good states to the same extent as in countries with market-oriented systems. The new property rights literature suggests that firms in bank-oriented systems have given up control in a wider range of states to maintain a more concentrated ownership of equity. Again the stylized facts seem to be strongly interconnected, i.e., the ratio of debt to equity is related to the structure of equity ownership.

The claim here is that the less regulated commercial bank of the bank-oriented type, as marginal lender and main risk-bearer when the firm is in financial distress, has been willing to accept these higher debt levels because it can exercise control much more freely than its counterpart in the market-oriented systems. In Williamson's (1988) terms, the less restrictive regulations in bank-oriented financial systems reduce the costs of debt as an *ex post* governance mechanism or, equivalently, make debt a more attractive device for commitment. The new property rights literature views commitment as the crucial link between the real and financial sectors in the economy. The analysis

indicates that the ability to commit is particularly important in low performance states, i.e., when firms should be thoroughly reorganized or liquidated. We suggest here that restrictions on financial contracting may limit the possibilities for commitment. In fact, the optimal way to credibly commit may differ across financial systems. When control markets are active and institutional investors are heavily regulated, commitment may best be achieved by issuing voting equity. However, when regulations on the exercise of control by institutions are less stringent and activity in control markets is lower, debt may provide superior commitment opportunities.

The higher debt/equity ratios imply that financial distress is a much more common phenomenon in these countries; distress is actively used by the contracting parties to reorganize problem firms. The initial contract implies that parties agree *ex ante* to let creditors, more specifically main banks, act as reorganization specialists. In market-oriented systems, this role is normally played by a group of shareholders through the market for corporate control. Thus, the higher debt/equity ratios in bank-oriented financial systems could be related to the observation that takeovers are not as common as in countries with market-oriented financial systems. The greater reliance on the internal solution of creditor-led reorganization is also more conducive to a stable ownership structure. This could explain why control blocks are transacted less frequently and bank customer relationships are relatively stable over time in bank-oriented systems. The higher degree of repetition in contractual relations may increase the likelihood of successful informal procedures.

4.6 Two Models of Financial Systems

The six financial systems in this study have maintained their fundamental characteristics from the Second World War well into the 1980s. The two types - bank-oriented and market-oriented systems - have undoubtedly demonstrated survival properties. We cannot rule out that they do indeed represent two model 'equilibria' with different and interconnected structural characteristics. Even if this is true empirically, it is not easy to substantiate based on existing economic theory. This section suggests that the two

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systems may be viewed as two fundamentally different solutions to fundamental economic problems¹¹.

A financial system has to allocate control and risk among investors. In the market-oriented system the emphasis is on specialization of management and risk bearing through diversification of risk among shareholders and creditors. To deal with the collective choice problems arising as a firm's securities become widely held, control is delegated to management. External control mechanisms, such as markets for corporate control and managerial labour controls, are assumed to reduce the agency costs associated with the separation of ownership and control. Portfolio-oriented ownership dominates, particularly among institutional owners. The bank-oriented system, on the other hand, stresses risk shifting from shareholders to creditors in intermediate states. The emphasis is on reducing collective choice costs and providing investors with adequate incentives to monitor firms and engage in entrepreneurial activities. Compared to market-oriented systems, owners, individual as well as institutional, have a strong orientation towards control. In evaluating the properties of the two systems, the costs of delegating strategic decisions from shareholders to managers, and the potential underproduction of monitoring services due to free-riding among investors, should be compared to the gains from risk spreading.

A financial system must also have institutional arrangements for rebundling and liquidation of real and financial assets as existing constellations become obsolete. Such reorganizations are likely to give rise to conflicts; control over assets may have to be transferred from incumbent owner/manager to an investor in the initial contractual arrangement or to a third party. For this reason it is important to evaluate the two systems and their chief reorganization mechanisms in terms of how they ensure that a transfer of control really takes place; indeed, previous international comparisons argue

¹¹ In his analysis of the Japanese firm, Aoki (1988 and 1990) claims that these differences in financial systems are connected also to the organization of the firm. He identifies two distinct models with internally consistent properties: The Japanese J-model and the Anglo-American M-model. These two models differ in terms of (i) horizontal vs. hierarchical coordination; (ii) market-oriented incentive contracting vs. rank hierarchy; and (iii) bank-oriented vs. market-oriented financial control.

that this is perhaps the most significant difference between systems (Rybczinski, 1985; Zysman, 1983; and Dahmén, 1990). By analysing the properties of the different reorganization mechanisms, we may be able to make inferences about the strengths and weaknesses of the two systems. However, the effectiveness of the two mechanisms is conditioned by the institutional constraints under which they operate.

Table 4.9 Predominant Mechanisms for Control Transfer

Type of financial system		
	Market-oriented	Bank-oriented
Good states of nature	Hostile takeovers	
Bad states of nature	Hostile takeovers Formal court proceedings	Creditor-led reorganizations

Table 4.9 presents the predominant forms of control transfers in good and bad states of nature in the two types of systems. In good states, market-oriented systems primarily make use of hostile takeovers, whereas such transfers against the desire of incumbent owners are rare in bank-oriented systems. In low performance states, an intervention by an external party - a takeover or a bankruptcy court - is more likely in countries with market-oriented systems. The diffused creditor structure in these systems, often in combination with strict restrictions on creditor involvement in individual firms, makes more informal procedures difficult to administer. In bank-oriented systems, the dominating commercial bank normally assumes control in these situations through its large share of debt claims.

We also suggest that the two systems have different propensities for committing the two types of mistakes discussed in Chapter 3. The strong long-term ties within contractual arrangements in bank-oriented systems make these systems more susceptible

to errors of Type 2, i.e., a firm is maintained when it should be liquidated or thoroughly reorganized. Market-oriented systems, on the other hand, may be more likely to close down viable firms (Type 1-error). Of course, the expected costs of the two types of errors depend on the frequency at which these mistakes are committed.

Since creditor reorganization relies on internal conflict resolution, this procedure is likely to reinforce reputation effects in contractual relations. These lock-in effects should also facilitate internal conflict resolution. In market-oriented financial systems these relationships are more flexible and change over time. Hostile takeovers, or more generally external mechanisms, are likely to be more conducive to major restructurings of firms. However, frequent changes in ownership may also promote short-sightedness in the strategic interaction between investors.

In general, bank-oriented systems appear better equipped to handle the incentive distortions arising as a firm approaches financial distress. Market-oriented systems, on the other hand, seem relatively superior when a transfer from one group of shareholders to another is called for¹². Whereas bank-oriented systems appear to reveal their primary weakness in ensuring that control is transferred to a new, more efficient management in good states of nature, market-oriented systems rely on the uncertain event of a rival appearing to implement necessary reorganizations in bad states (as discussed in Chapter 3, a takeover may mitigate some conflicts but could also introduce new ones).

In addition, there seems to be a distinction between investors in bank-oriented and market-oriented systems in terms of their relative propensity for exit and voice behavior (Hirschman, 1970). When an organization is in decline, its members can either decide to leave (exit) or to try to improve it (voice). The mentioned lock-in effects in bank-

¹² Dahmén (1990) makes a similar point when he suggests that bank-oriented systems, or more specifically bank-led groups, are superior in exerting "negative transformation pressure", i.e., in forcing firms to adapt to new situations. A market-oriented system with a dispersed ownership is at least as capable as its bank-oriented counterpart in channeling "positive transformation pressure". The significance of the allocation of control is greatest when firms are in low performance states of nature.

oriented systems induce voice behaviour by making exit more costly. Again, the relative effectiveness of the two systems is likely to depend on characteristics of the individual firm - which phase of the life cycle it is in, and in which activities it is involved (for an application of Hirschman's approach to shareholders see Hedlund et al., 1985).

The more diffused and less stable ownership structure in the market-oriented systems makes investors more anonymous. The relative anonymity of shareholders and creditors in these systems should have implications for the role in management. Furthermore, it is more difficult to hold anonymous investors accountable for firm decisions. In the bank-oriented system, where the separation of ownership from control has not gone as far, ownership contracts are less standardized, i.e., shareholders and creditors are expected to intervene actively in the strategic decisions of the firm.

4.7 Hypotheses for Further Testing

The purpose of this chapter has been two-fold: (i) to test the fruitfulness of the new property rights approach in describing and analysing international variations in the allocation of control; and (ii) to interpret these variations. In evaluating the extent to which these goals have been achieved, we must bear in mind the early state of development of the theoretical framework. Formal analysis has been confined primarily to the closely held firms and bilateral bargaining situations. Extrapolations to the widely held firms and multilateral bargaining are still tentative. Furthermore, in its focus on the conflicts between classes of investors, the approach may overemphasize the significance of financial distress in the financial system. Despite these shortcomings we believe the new property rights framework has improved our understanding of international differences in corporate capital structure.

By focusing on the entire capital structure, rather than solely on the debt-equity dimension or on equity, some interesting patterns emerged. The description based on available statistics suggested a number of correlations between countries and among the different dimensions of capital structure. Furthermore, the new property rights

framework provided us with suggestive interpretations of these correlations. Finally, the analysis generated some potentially testable implications.

First, the general observation of clusters of financial patterns suggested that there is an internal consistency between the various aspects of capital structure and between capital structure and the rest of the financial system, including the regulatory framework. This general conclusion suggests important implications for public policy and should be further explored. Recent work by Hoshi et al. (1989a; 1989b; and 1989c) comparing firms within the Japanese financial keiretsu and independent firms illustrates how a claim of internal consistency can also be tested within a financial system across firms and over time.

Second, a number of specific correlations between different aspects of capital structure have been submitted. For example, higher gearing levels are associated with more concentrated holdings of debt and equity. In general, we have suggested some variables that may affect whether a firm prefers to give up control in certain bad states of nature through the issue of debt or to share control in good states through equity issues. Needless to say, the structure of equity ownership at the time of the choice of financial instruments is important. However, other factors influencing the risks for conflicts, such as the specificity and plasticity of assets and the degree of regulatory constraints, should also be of significance.

Third, the analysis indicated that the choice of capital structure has real implications, for example, through its effects on how firms are reorganized; the different reorganization procedures have different properties. The claim that financial systems differ in terms of how they deal with low performing firms must be supported through more systematic study. Such further research should also establish the suggested differences between mechanisms. For example, creditor-led reorganizations should have more limited effects on capital structure and on real variables such as number of employees, size and composition of production. This research could be undertaken within, as well as across, financial systems.

4.8 Some Implications for Financial Deregulation

If regulations of financial institutions, in particular commercial banks, have a significant impact on the allocation of returns and control, this should have implications for our predictions about the effects of the ongoing homogenization of legislation within the European Community. The final outcome of these negotiations, which are likely to also affect Japan and the United States, is not yet known. However, financial markets and financial institutions will be further liberalized, as will restrictions imposed on contractual arrangements designed to prevent transfers of ownership. To the extent that these regulatory changes will relax the constraints on commercial banks and other financial institutions in their exercise of control, we may anticipate some unforeseen consequences for the allocation of control in the corporate sector.

It is widely held that deregulation will lead to the proliferation of equity securities among the general public or at least to an increase in indirect private ownership in the form of large portfolio-oriented institutional investors. In contrast, the approach taken here suggests that equity ownership may become more concentrated, accumulating in large commercial banks and control-oriented financial institutions; when banks are allowed to hold equity and more effectively exercise control, debt levels are likely to rise and the need for equity issues decrease.

Similarly, deregulation is commonly believed to foster the emergence of new markets for debt securities and the dissemination of these instruments among a wider set of investors. While agreeing with the general prediction, we would add that some markets may also be undermined. For example, the rise of the markets for high risk debentures, so-called junk bonds, in the United States could be seen as a response to the absence of investors willing to assume these risks¹³. An analysis based on the new property rights literature suggests that large institutional investors may come to dominate, or even replace, the markets for many debt securities. Deregulation may, contrary to

¹³ At the beginning of the 1990s, issues classified as junk bonds accounted for more than 25 per cent of the face value of bonds rated by Moody's.

popular belief, lead to a decrease in the demand for high risk bonds rather than promoting new markets for such instruments.

It also generally believed that deregulation will lead to a wave of strategically motivated corporate takeovers within and across national boundaries, in particular within the European Community. The approach suggested here does not contend with this general conclusion. However, deregulation may also lead to higher debt-equity ratios and thus to a more frequent use of financial distress and creditor-led reorganization. Thus, whereas there is a general increase in activity in the market for corporate control, takeovers may in fact become less important as a means of reorganizing low-profitability firms in countries with market-oriented systems. In addition, we submit that deregulation of commercial banks may make informal reorganization more viable and thus reduce the need for formal court proceedings.

Furthermore, an increased control-orientation of equity, and debt, may imply that the turnover of control in individual firms will decrease rather than increase as suggested by many observers. This could have wide-ranging implications for the accountability of individual owners and for their roles in the larger political and social system.

To summarize, the conventional wisdom holds that the bank-oriented systems will become increasingly market-oriented. This statement contains two parts: that the systems are converging and that this convergence leads to increased market-orientation. Furthermore, this statement assumes that the two systems converge in all dimensions. Data, particularly for Japan, support convergence and indicate that bank-oriented systems have become more market-oriented, at least in some dimensions, during the second half of the 1980s (Hoshi et al., 1990b). While not contending with the general prediction of increasing market-orientation, in some dimensions we would also point to movements towards bank-orientation. One example would be the increasing control-orientation of large institutional investors in the United States (Lowenstein, 1990). Furthermore, leveraged buyouts have many of the features associated with firms in bank-oriented financial systems, for example, high gearing and strip financing (combined debt and equity holdings). Venture capitalists also have some of the characteristics of

main banks in these systems; control is shared in good states, while it is transferred to creditors when the firm's performance deteriorates.

We have also suggested some transitional problems in moving from one type of system to another. The different dimensions of a firm's capital structure are seen as interrelated; changes in one dimension have implications for other dimensions. Furthermore, we have emphasized that financial contracts are embedded in a larger context. For example, market-oriented financial systems rely on a number of external control mechanisms such as a well-functioning control market and a market for managers. As the bank-oriented financial systems become increasingly market-oriented, they risk being "stuck-in-the-middle", i.e., caught between the two systems with many of the deficiencies, but few of the benefits, of each system. At the very least, the change process is likely to be costly; external control mechanisms require time to develop. In the transition process there may considerable scope for managerial excess. Similarly, even if market-oriented financial systems attempt to emulate procedures for reorganizing low-profitability firms in bank-oriented systems, creditors capable of reorganizing firms do not emerge over night.

CHAPTER 5: THE JAPANESE FINANCIAL KEIRETSU AS A COLLECTIVE ENFORCEMENT MECHANISM¹

5.1 Introduction

Most larger firms in Japan are affiliated with a financial keiretsu. The main features of these groupings are extensive intragroup trade and a capital structure with elaborate crossholdings of debt and equity, a strong domination for the group's main bank in corporate borrowing, and high levels of gearing in member firms. This chapter analyses the financial keiretsu and their peculiar pattern of control allocation as a privately organized collective enforcement mechanism designed to facilitate transactions between member firms. We suggest that the pattern of financial contracting within the groups implies that the mode of enforcing cooperation in transactions is contingent on firm performance. When the firm is doing well, enforcement is achieved collectively through the reciprocal shareholdings. In states with low performance, control rights are transferred to creditors, and enforcement is shifted to a more hierarchical form with the group's main bank as the chief actor. Finally, the higher ratios of debt to equity in group firms than in independent firms indicate that a shift in enforcement mode is more likely to occur.

In most complex transactions conflicts are bound to occur. Transacting agents cannot easily anticipate and resolve contractually all potential conflicts. Even if they can foresee all contingencies, contractual agreements may not satisfactorily be enforced by a public court; either because relevant variables are not verifiable by a third party or because agreements are of a kind which are not enforceable by a court². In these situations, agents may delegate the right to make allocative decisions in contingencies not contracted upon, to one of the parties (residual control rights) or to a third party (arbitration) (Tirole, 1988). In our view, the Japanese financial keiretsu can be

¹ This chapter is a thoroughly revised version of an article written jointly with Enrico Perotti. The article was included as Chapter 3 in his PhD thesis presented at Massachusetts Institute of Technology.

² Obviously, a court will not enforce agreements which run against some body of law or which stipulate anticompetitive collusive behavior. See Reuter (1984) for a discussion of the Mafia as a private enforcement mechanism when agreements cannot be enforced by law.

interpreted as an intermediate mechanism where a coalition of agents allocate control rights among themselves, creating a third party enforcement mechanism for resolution of bilateral and multilateral conflicts.

Our interpretation of the financial keiretsu as an enforcement mechanism suggests that this arrangement may support a broad range of functions which have been identified in previous literature on the keiretsu. They may facilitate bilateral trade between member firms by reducing underinvestment in relation-specific assets. Furthermore, the financial keiretsu may allow credible exchange of information or coordinate research efforts. They can also enforce timely and coordinated reorganization of firms in financial distress. In principle, the same private mechanism could also be used to support entrenchment in the form of takeover defence and risk-sharing among member firms. Our rationale does not necessarily contradict any of the previous explanations: Rather, by analysing the allocation of control within the financial keiretsu, we provide a "missing link": an internal regulatory mechanism, which could explain their stability over time.

This rationale for the financial keiretsu focuses on the pattern of financial contracting among firms within the groups, and the conspicuous intermingling of property rights and preferential trading relationships. However, our justification for the groups is also consistent with their remarkable stability over time, the lack of control contests in member firms, and the patterns of corporate reorganization observed within the groups. Finally, the predictions of our model are in general agreement with the structure and composition of the groups in terms of number and size of member firms as well as their dispersion across industries. In particular, the analysis highlights the significance of the so-called Presidents' Clubs, the regular meetings between representatives of group companies. The clubs, and ultimately the financial keiretsu, could serve both as loci for intragroup transactions, e.g., permitting a credible exchange of information or commitment to joint research projects, and as private courts which ensure compliance with cooperative arrangements.

The article starts out with a brief history and characterization of the financial keiretsu, emphasizing how financial contracts allocate property rights. The second section discusses previous explanations for the existence of the financial keiretsu. In the third section our rationale for the crossholding arrangement and the internal lending relationships is outlined. We then compare our justification for the groups with empirical observations and previous explanations. The final section discusses the wider implications of our interpretation for the understanding of Japanese business practices and society.

5.2 Legal Informality and the Financial Keiretsu

Perhaps the most conspicuous feature of the Japanese legal system is the predominance of informal conflict resolution³. Legal informality in Japan is reflected in relatively low levels of litigation, in particular in comparison with the United States⁴. The informal nature of conflict resolution is perhaps even more pronounced in the commercial sector. Prior to the Meiji restoration in 1868, contracts played little or no role in commercial transactions (Hirschmeier and Yui, 1978). In the reform and modernization of Japanese society, a number of legal concepts and institutions were imported, primarily from German civil law tradition. However, public enforcement based on contracts never took root in Japanese commercial life. Transactions were enforced chiefly through reputation and hierarchical enforcement in the family-controlled zaibatsu

³ Legal informality is in no way confined to Japan; any economic system combines informal private and public conflict resolution with formal enforcement based on contractual agreements between private parties, and enforced by public courts. In fact, private enforcement is the predominant form of conflict resolution.

⁴ The reasons for this unwillingness to litigate have been the subject of considerable debate. Observers seem to agree that there is an inherent bias against litigation in Japanese ethics, and suing parties suffer reputational losses. However, Japan's level of litigation, while lower, is not as conspicuous when compared to countries in Western Europe. Haley (1978), in his discussion of "the reluctant litigant", identifies a number of inefficiencies in the court system that systematically discourage litigation. Ramseyer (1986), on the other hand, attributes the phenomenon partially to the predictability of the Japanese courts, i.e., the absence of litigation is a sign of a well-functioning system. In addition, the government provides a number of informal mechanisms for dispute resolution such as institutionalized mediation.

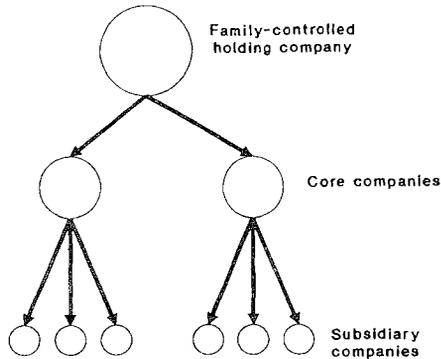
groupings, i.e., strategic decisions were often made, and management appointed and fired, by the family-controlled holding company (Hirschmeier & Yui, 1981). These groups of firms emerged around the large trading houses in 19th century Japan. Their importance grew steadily and peaked in the late 1930s and early 1940s. Following World War II, the zaibatsu groups were dismantled under the US occupation in an attempt to reform the Japanese economic and political system. The goal was to establish a public enforcement system based on US precedent. The Commercial Code, for example, was modelled directly on state legislation in the United States. Furthermore, the US administration dissolved the holding companies under the control of the zaibatsu families and largely eliminated other ownership ties within the groups. Several thousand managers were fired, and family-held equity was confiscated and distributed to the general public⁵.

Interestingly, these reforms seem to have had little impact on how commercial transactions were undertaken and enforced *ex post*. The early fifties saw a brief period of widely held firms, but by the mid-sixties the zaibatsu groupings had been re-incarnated in the shape of the financial keiretsu. The family-controlled holding companies were replaced by a complex network of reciprocal shareholdings. The previous zaibatsu banks and the large commercial banks, the so-called city banks, played a central role in the restoration of the groupings. Several government institutions were also actively involved in this process. Figure 5.1 illustrates how a more horizontal arrangement has taken the place of the hierarchical structure of the pre-WW II zaibatsu.

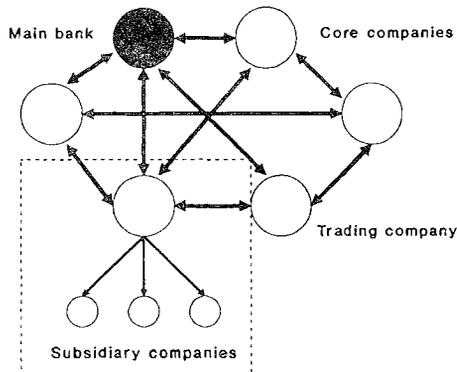
⁵ In 1949, more than 69 per cent of corporate shares listed on the Tokyo stock exchange were held by individuals. By 1984 this share had fallen to 27 per cent.

Figure 5.1 Zaibatsu and Financial Keiretsu Compared*

THE ZAIBATSU GROUPINGS BEFORE WORLD WAR II



POST-WAR FINANCIAL KEIRETSU



*Arrows indicate ownership ties. Double arrows indicate cross-shareholdings. The enlarged square indicates that a group firm can also be a member of an industrial keiretsu.

Most firms listed on the Japanese stock exchanges are members of a financial keiretsu⁶ (for thorough discussions of these arrangements, see Clark (1979), Sheard (1986), and Aoki (1988)). Member firms (20-45 in the larger keiretsu) are interconnected through a complex network of reciprocal ownership as well as lender-borrower and buyer-seller relationships (see Table 5.1)⁷. Within the financial keiretsu, there are also personal interlockings in the form of a limited exchange of board directors⁸. Furthermore, representatives on different levels in the core companies meet on a regular basis in the so-called Presidents' Clubs⁹.

⁶ Nakatani (1984) states that, out of 859 companies on the first section of the Tokyo stock exchange in 1981, as many as 719 (84 per cent) can be considered as members of such a group. This number differs somewhat across sources depending on the criteria used for group classification. According to Nakatani, the six largest financial groupings - Mitsui, Mitsubishi, Sumitomo, Fuji, Dai-Ichi Kangyo and Sanwa - counted no less than 546 (76 per cent) of these firms. Among the 140 companies judged to be more or less independent, only 54 lacked known group connections. Among the independent firms were the large steel producer Shin Nippon Steel, Hitachi and a number of smaller firms with predominantly local connections. The companies belonging to financial keiretsu are on average larger than the independent counterparts and were overrepresented in heavy, mature industries. In 1983, the companies belonging to one of the six largest groups together accounted for slightly less than 5 per cent of employment, but for approximately 15 per cent of both total assets and total capital (Survey of Enterprise Groups, 1985). The criteria for classifying group membership vary across studies. While some use membership in Presidents' Clubs, others identify group connection through various ownership ratios.

⁷ Cross-holdings of shares here refers to reciprocal ownership. The Japanese term, "kabushiki mochiai", denotes reciprocal holdings, but it has a wider meaning of mutual help, shared interdependence and stability (Gerlach, 1987).

⁸ Board members are predominantly internally recruited. On average, 90 per cent of the board members of a particular firm are employees (Ballon, 1978).

⁹ Membership in these clubs is often used as a criterion for the classification of group affiliation. This membership is not clearly defined; there are no dues or authorized lists of members.

Table 5.1: Intragroup Financing Patterns in Leading Financial Groups (1985)

	Mitsui	Mitsu- bishi	Sumi- tomo	Sanwa	Fuyo	Dai-Ichi Kangyo
Number of firms	24	28	21	44	29	47
Group members' share of total group equity	18	25	25	17	16	13
Group bank's share of total bank finance in group companies	21	22	28	20	18	12

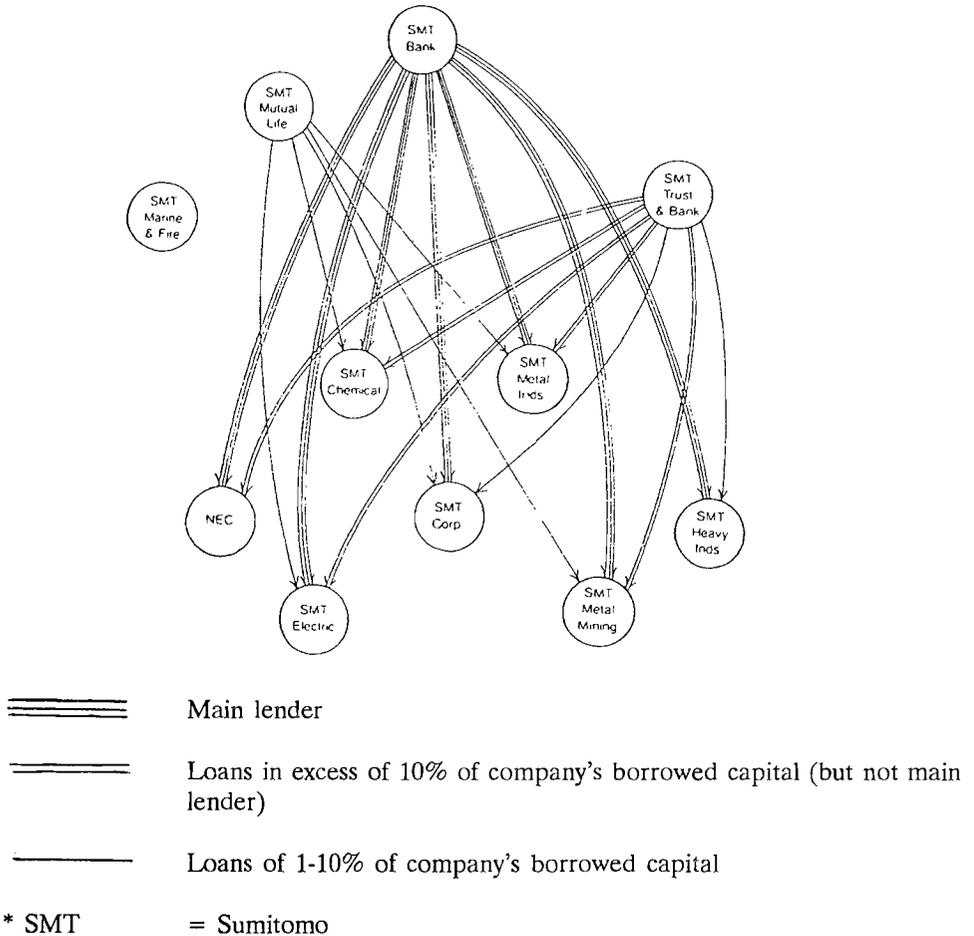
Source: Aoki, Masahiko, 1988, Information, Incentives and Bargaining in the Japanese Economy, Cambridge: Cambridge University Press

Each financial keiretsu typically has one member company in every important industry and attempts to avoid direct competition between group companies (Clark, 1979). The division of labor is well developed, and there is a strong preference among member firms for intragroup trade¹⁰. The most advanced specialization and the strongest cohesion can be found in the financial keiretsu which have emerged around the old zaibatsu banks, i.e., Mitsui, Mitsubishi and Sumitomo. In the following we concentrate on the financial keiretsu as an allocation of property rights defined by the financial

¹⁰ Reliable statistics on internal group trade are not available. According to Japan's Fair Trade Commission, 20 per cent of all sales transactions (above 1 mn yen) and 12 per cent of purchases (above 1 mn yen) of manufacturing firms were to and from fellow keiretsu members, respectively (Flath, 1990). However, while indicative of a preference for intragroup transactions, these figures underestimate the significance of intragroup trade since they do not include trade with affiliates and subsidiaries of keiretsu members.

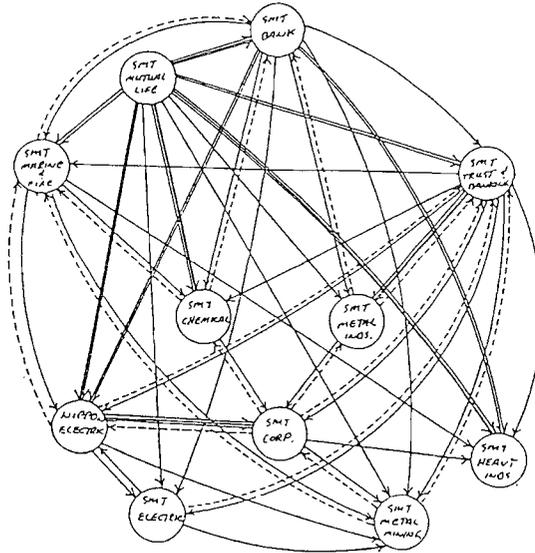
contracts connecting individual group members. These financial linkages within the groups can be illustrated by Figures 5.2 and 5.3, depicting the lending and shareholding ties, respectively, within the Sumitomo financial keiretsu.

Figure 5.2: Intragroup Lending Patterns in the Sumitomo Group* (excluding trade credits)



Source: Gerlach, Michael, 1987, "Business Alliances and the Strategy of the Japanese Firm," California Management Review (Fall)

Figure 5.3: Intragroup Shareholdings in the Sumitomo Group



- ≡≡≡≡ 5 per cent or more and the largest owner
- ≡≡≡≡ 5 per cent or more or less than 5 per cent and the largest owner
- one of the ten largest shareholders but less than 5 per cent
- small, reciprocal shareholdings

Source: Gerlach, Michael, 1987, "Business Alliances and the Strategy of the Japanese Firm," California Management Review (Fall)

The figures demonstrate the strategic role of the main bank, here Sumitomo Bank, as the chief lender to member firms and one of the most important shareholders¹¹. According to Table 5.1, the main bank on average covered between 12 and 28 per cent of group members' bank loans in 1985. The group trading house is instrumental

¹¹ The main bank for firms listed on the first section of the Tokyo Stock Exchange with bank borrowings in 1980 was the number-one or number-two shareholder in 39 per cent of firms, and among the top five shareholders in 72 per cent of firms (Sheard, 1986).

in providing short and medium-term finance and in mediating intragroup trade. Like the main bank, the trading house assists problem firms within the group.

The most conspicuous feature of these groups is the extensive cross-shareholdings among firms. The combined holdings of group companies are usually sufficient to guarantee a voting majority in every member firm. However, each group member's ownership share in a particular firm is small, typically 2-5 per cent. Table 5.1 showed the extent of crossholdings in the six largest groups. If we take into account that shareholdings of individuals are typically dispersed, the importance of intragroup holdings of equity becomes even more striking. Table 5.2 depicts only the 20 largest shareholdings among the 100 largest manufacturing companies and the 23 largest financial institutions.

Table 5.2 Crossholdings of Shares Within the Financial Keiretsu

<u>Issuing Company</u>	<u>Owing Company</u>						Independent
	Mitsui	Mitsu- bishi	Sumi- tomo	Fuji	Dai- Ichi	Sanwa	
Mitsui (12)	<u>55.2</u>	5.4	7.3	4.9	2.1	--	25.2
Mitsubishi (13)	1.7	<u>74.2</u>	0.8	3.8	3.8	1.0	14.8
Sumitomo (10)	1.7	0.3	<u>68.8</u>	3.6	1.6	0.2	23.9
Fuji (14)	3.5	6.4	6.8	<u>49.2</u>	5.5	4.9	23.6
Dai-Ichi (10)	4.2	9.1	4.7	6.2	<u>42.3</u>	2.4	31.1
Sanwa (12)	3.2	5.6	2.6	12.7	11.3	<u>32.8</u>	31.8
Independent (12)	11.2	13.0	9.8	9.2	9.5	7.2	40.0

The figure indicates the shares held within groups (underlined) and between groups as well as between independent firms. The data comprises only the 20 largest owners in each company. The sample covers only the 100 largest non-financial corporations and the 23 largest financial corporations. (Within parenthesis you find the number of firms in each category).

Source: Futasugi (1976) referred to in Michael Gerlach (1986) "Institutionalized Markets: Corporate Control and Large-Firm Organization in Japan," Yale University (unpublished working paper).

Companies which are part of financial keiretsu have also generally been more highly leveraged than independent companies (Nakatani, 1984). Furthermore, trade credits are a relatively more important source of credit than in, for example, the United States¹²; the extensive use of such credits gives rise to a peculiar structure of crosslending.

Shareholdings in Japan are remarkably stable (Clark, 1979). Banks, trading houses, and group-affiliated insurance companies serve as so-called stable shareholders. Such shareholders purchase large portions of new issues of member firms' shares with the implicit, and sometimes explicit, understanding that they will not be sold on the market without prior consultation of the issuing firm. As a result, the bulk of the shares listed on Japanese exchanges are never traded¹³. The stable shareholdings are also important when, as is common in Japan, a firm may have to dispose of its shareholdings to offset business losses (Sheard (1986) documents a large number of such transactions). Furthermore, to maintain the ownership and control structure of the groupings, member firms purchase new issues of shares in proportion to previous holdings.

5.3 Previous Interpretations

A fairly rich literature has attempted to explain the existence and the specific structure of the financial keiretsu (for a thorough economic analysis, see Aoki (1988)). This section reviews some of these contributions with particular emphasis on how they explain the intricate web of crossholdings among member firms and the role of main banks. For expositional purposes, we distinguish between rationales based on the pursuit of economic performance and those that view the keiretsu primarily as

¹² Trade credits contributed 18 per cent of gross financing (unweighted) of nonfinancial enterprises 1970-1985. The corresponding figures for the United States and West Germany were 8.4 and 2.2 per cent, respectively (Mayer, 1990).

¹³ A brief look at the trading statistics from the Tokyo stock exchange illustrates this phenomenon. In 1983, about 20 per cent of the corporate stocks were owned by banks, but these institutions accounted for less than 2 per cent of the total transactions volume. The corresponding figures for non-financial corporations were 25 and 7 per cent, respectively (Nomura Securities, 1985).

examples of successful entrenchment by insider stakeholders. However, these explanations are not necessarily mutually exclusive. In fact, as argued by Dore (1983) and others, entrenchment may serve to improve efficiency by allowing long-term planning and by preventing disruptive takeovers.

5.3.2 Economic Performance Rationales

Superior performance may be attributed either to enhanced market power or to efficiency advantages. In a traditional market power argument, the coalition enables member firms to keep higher prices by controlling output. While this argument may help explain other institutional arrangements in Japan, such as industry organizations, it hardly seems appropriate for the financial keiretsu. The keiretsu are carefully organized across industries and apparently do not establish monopoly power in individual markets.

Caves & Uekusa (1976) suggest that in an imperfect market the keiretsu could still utilize market power by trading at a two-tier price schedule with one set of prices aimed towards other group members and another set towards outsiders. Intragroup trade would occur at price ratios equal to internal marginal opportunity costs, while group members would utilize their market power in trade with outside companies¹⁴. This explanation may help explain the preference among group companies for intragroup trade, but it does not address the complex allocation of property rights implied by the pattern of financing within the group. Furthermore, while intragroup trade may have been a main driving force behind the formation of the pre-WW II zaibatsu and their reemergence after the war, such trade is only one aspect of the complex relationships among firms within the financial keiretsu.

¹⁴ Although this explanation suggests economic distortions, this is not necessarily true. For instance, when entry into new areas entails large initial sunk costs, this arrangement will provide member firms with a minimum customer base encouraging them to invest. If, in addition, each keiretsu has a similar role, the implication will be more rapid entry of several competitors, with ambiguous, but quite possibly favorable effects on competition.

The financial keiretsu could also be viewed as arrangements intended to enhance the members' bargaining strength vis-a-vis other companies and the central government. This appears plausible for the period following WW II when there was significant government control over, among other things, the allocation of credit and foreign exchange; however, the development of the financial keiretsu occurred at a later stage when these constraints were being relaxed. While subsidies may still be significant in some segments of industry, this corporatist bargaining argument is insufficient as the main justification for the groups in their present form. Moreover, this explanation lacks an explicit model of the governance structure of the arrangement.

A number of contributions have rationalized the arrangement as profit maximizing through transaction costs savings. Goto (1982) suggests that the groups economize on contracting costs by facilitating the transfer of information. According to this explanation, strategic information is exchanged in the Presidents' Clubs and other fora for group interaction to facilitate the coordination of decision-making within the keiretsu. However, to be credible, such an exchange of information and strategic coordination must be supported by some enforcement mechanism preventing deviations by individual members.

In a similar vein, Hoshi et al (1990a, b, and c), among others, view the groups as primarily financial arrangements mitigating information and incentive problems when investors are diffused. This explanation emphasizes the links between group firms and the main banks. Their empirical evidence suggests that firms within the financial keiretsu have been less liquidity-constrained than independent companies. This is explained by better monitoring opportunities within the keiretsu as a result of the long-term relationships between group banks and member companies¹⁵. The concentration of financial claims to a few banks improves incentives for monitoring. While these informational interpretations offer a plausible rationale for the concentrated creditor structure and the close relationship between banks and group companies, they do not explain the presence of elaborate crossholdings of equity.

¹⁵ Hodder (1987) bases his observations on case studies and more impressionistic data but reaches similar conclusions.

However, the exchange of information is apparently an important function of the groups; we argue that it is the existence of elaborate crossholdings of debt and equity that makes this exchange credible.

5.3.2 Entrenchment Rationales

Entrenchment arguments assume that the financial keiretsu allow management or employees to reduce risk¹⁶ or obtain private benefits from control. Aoki (1984 and 1988) argues that the financial keiretsu should be viewed as risk sharing arrangements which have emerged in response to the absence of markets for managers and skilled workers and of a well-functioning social welfare system¹⁷. Since a substantial part of the individual's wealth is tied to the corporation where he or she is employed, bankruptcy may lead to personal disasters for employees. This exposure to risk has provided managers as well as workers with incentives to find risk-sharing arrangements.

While the risk reduction argument could have contributed to the general acceptance of the financial keiretsu in Japanese society, it does not explain their complicated structure or why they originally emerged on the ashes of the zaibatsu. The pre-war groups were presumably formed for other reasons than to diversify away management or employee risk. Furthermore, as Aoki (1988) recognizes, it is not clear that the bankruptcy risk of firms of the size we find in the groups could be significant enough to motivate these elaborate arrangements. Risk exposure could also be reduced more efficiently, for example, by diversifying corporate investments into a broader set of securities and to risks outside the industrial sector¹⁸; an optimal risk-sharing arrange-

¹⁶ In principle, investors can diversify their holdings at least as well as corporations; therefore, risk reduction by management through corporate diversification is often believed to be self-serving.

¹⁷ Aoki (1988) suggests that the risk-sharing role of the Japanese groupings may have been less important after 1975.

¹⁸ Horiuchi et al. (1988) provide an empirical test of the risk-sharing hypothesis. Even though their study focuses on the relationship between the main bank and member firms and not the wider intragroup relations, their data put this rationale into question. In situations where firms change main bank affiliation, the bank-customer relationship is not significantly related to the risk that banks and companies face.

ment would involve as many firms as possible, without any special role for reciprocal holdings concentrated among a well defined set of firms; nor would it justify the neat separation among the groups, and their apparent strong sense of identification. We argue that reciprocal holdings of shares primarily can be understood as an allocation of control rights rather than of income rights.

Aoki (1988) and Sheard (1986) submit that the financial groupings should also be viewed as entrenchment mechanisms defending incumbent management against hostile takeovers. Crossholdings of shares may allow managers to increase the firm's capital base while retaining control over the firm. The entrenchment hypothesis could help explain the low level of takeover activity in the Japanese financial markets, in particular within the groups. However, even though fear of foreign purchases of undervalued Japanese companies was expressed, takeovers were not rampant in the interim period before the groups reemerged after the war; in any case, the strict regulation on capital flows would have provided sufficient protection. In addition, a purely defensive mechanism should be susceptible to disintegration as subcoalitions realize that they can gain by selling off their holdings in a particular firm to another management team which values them more highly.

In general, none of these previous explanations explain the crossholdings of shares in the financial keiretsu. The expectations also lack an explicit model of how the arrangement is maintained over time, i.e., what makes individual firms comply with the agreement to cooperate. Furthermore, entrenchment theories also do not explain why reciprocal shareholdings are associated with other business transactions between the interlocked parties. In the following, we provide an explicit formal model of a mechanism which allows a group of parties to credibly commit in transactions among themselves.

Moreover, if groups were truly designed to share risk, member firms would be able to compensate for changes in operating profits by adjusting financial expenses. However, the correlation between financial expenses and operating profits of specific companies are not significantly related to the degree of dependence on the main bank.

5.4 The Collective Enforcement Mechanism

Most complex economic transactions require some specific investment from the transacting parties, i.e., some investment, such as in managerial effort, is worth more within a particular relationship than if sold on the market. When investments are specific, there are quasi-rents to be allocated. Unconstrained ex post bargaining over these rents gives rise to conflicts and may distort ex ante investment. If complete or comprehensive contracts specifying the payoffs and actions for every conceivable state of nature could be written, there would be no such ex post conflicts. However, specific investments are often hard to specify in contracts. When contracts are incomplete, contracting parties may mitigate conflicts by ex ante mechanisms constraining ex post bargaining (Williamson, 1985). One alternative to unconstrained bargaining is to delegate the right to make decisions not specified in the contract to one of the parties, the residual control rights (Grossman & Hart, 1986). The allocation of these control rights, along with income rights, among a firm's suppliers of capital are assumed to be specified in the firm's financial contracts (Aghion & Bolton, 1988). Equity entitles its holder to a proportional share in the firm's residual income and a vote at the general shareholders meeting. Debt specifies a fixed payment and, if this payment is not met, a transfer of control to creditors and a share in the remaining value of the firm.

We suggest that the Japanese financial keiretsu may be interpreted as a private collective enforcement mechanism mitigating conflicts between transacting firms, and between shareholders and management. Our explanation focuses on the key features of the allocation of residual control rights within the financial keiretsu: the elaborate crossholdings of equity and debt, the dominant role of the main bank in group financing and the high debt-equity ratios. First, we generate a rationale for the crossholdings of equity (Section 5.4.1). Secondly, we suggest an arrangement which also includes crossholdings of debt and a concentrated creditor structure (Section 5.4.2). Finally, a rationale for the strong reliance on external financing through banks is developed.

We consider two moral hazard problems giving rise to underinvestment. Section 5.4.1 assumes that financial compensation schemes provide sufficient incentives to managers to exert effort within the firm; the manager's interest is identical to that of the firm and its shareholders. Underinvestment arises because contracts are incomplete and transacting parties care differently about specific investments (cf. Grossman & Hart, 1986). Through crossholdings of equity a group of transacting firms may improve their commitment possibilities. In Section 5.4.2, financial compensation schemes and the crossholdings of equity are insufficient to induce the manager to exert effort in bad states of nature, i.e., when the firm should be liquidated. Underinvestment stems from conflicts between management and shareholders, and from the manager receiving early information about firm profitability. This justifies crossholdings of debt. The debt instrument here has three functions: (i) to provide a signal about the bad state of nature (cf. Harris & Raviv, 1990); (ii) to transfer control over assets in these states to creditors (cf. Aghion & Bolton, 1988); and (iii) to raise outside capital without upsetting the crossholding arrangement.

The context we describe is a simple transaction with mutual specific investment plagued by a Prisoners' Dilemma which discourages cooperation in the one-stage game. Once the interaction is known to last indefinitely, however, there is scope for collaboration. Although in principle there are multiple equilibria in such a game, we assume an initial stage where all the agents agree on a set of behavioral rules, which support the collaboration equilibrium.

5.4.1 Collective Enforcement Through Crossholdings of Equity

We consider an economy where public courts solely enforce control rights and rights to share in verifiable revenues. A firm is characterized by specific assets, with its capital structure defining the allocation of revenues and control. We distinguish between managerial and corporate control. Managerial control is defined as the entitlement to make production decisions regarding the use of the firm's assets. Corporate control is exercised by a shareholder or coalition of shareholders that own a majority of the shares outstanding and can assign managerial control over assets to a manager of

choice. The firm's manager may or may not be a major shareholder; if he does not hold shares, his compensation scheme, or salary, is assumed to be directly proportional to the firm's profits.

The exercise of managerial control provides a manager with private benefits¹⁹. We can think of these benefits as various forms of on-the-job-consumption, such as large expense accounts, golf club memberships and general social prestige, associated with being in charge of the corporation. For simplicity, these benefits of control are assumed to be the main component of the manager's compensation scheme. Managing the firm and engaging in transactions with other firms require specific effort investments by the manager. The decision to exert effort is discrete (work, shirk); work costs c , while shirking has no cost. Thus, a manager's utility is a function of his wage and his private benefits are net of effort costs. All agents discount future payoffs.

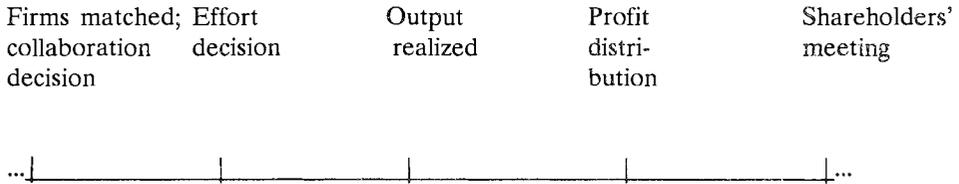
Over time there are random opportunities for firms to transact with each other. This opportunity may take the form of direct trading, or pooling of research efforts, the value of which is enhanced by joint relation-specific investment. The gains from trade may also arise from the exchange of reliable information; or from coordination of actions vis-a-vis third parties. Because contracts are incomplete, matched firms must bargain for a division of collaboration benefits. For simplicity, we assume that parties split these benefits evenly and focus on the effort investment and the private benefits.

The basic stage game, i.e., the one-period game repeated in each period is as illustrated in Figure 5.5. At first, transaction opportunities are unveiled. Agents then choose whether to expend effort. After the transaction has taken place, profits net of private benefits are distributed. Finally, a shareholders' meeting is held for each firm.

¹⁹ These non-verifiable benefits from control derive from the broad discretion exercised by managers who daily take allocative decisions. In Grossman and Hart (1986), such benefits accrue to the owner of the vertically integrated firm. In our economy, there may not be a unique owner, but there is only one manager; because of this separation of ownership and control, it is natural to postulate that the private benefit of control over the asset accrues to the managers (cf. Hart, 1988). The private benefits could also be thought of as an efficiency wage which is well in excess of compensation in alternative employment.

Upon complaint the coalition inspects the outcome and the effort investment. A voting majority then decides to confirm or dismiss incumbent management.

Figure 5.5 Timing of Events in the Stage Game



A firm's return when it decides not to transact is θ . The profitability of outside transactions is enhanced by effort investment by the managers of the two firms: effort by both parties produces α , effort by one agent produces β , and no effort on either side produces 0, where $\alpha > 2\theta > \beta$. Figure 5.6 describes the payoffs to each firm.

Figure 5.6 Payoffs in the Stage Game

		Second agent	
		Effort	No effort
First agent	Effort	$\alpha/2-c, \alpha/2-c$	$\beta/2-c, \beta/2$
	No effort	$\beta/2, \beta/2-c$	0, 0

Since collaboration is valuable, both managers would like to commit themselves to exert effort. However, in the absence of credible precommitment, the only pure-strategy

Nash equilibrium in a one-shot game may be Pareto-inefficient²⁰: both agents shirk, and their payoff is zero. Since the payoff from own production θ dominates the Nash equilibrium, rational agents will refuse to enter in collaborative arrangements.

It is well known that when the stage game is repeated an infinite number of times, cooperation can be sustained through the threat of loss of reputation; the collective threat of refusing future transactions may discourage opportunism. However, the threat of losing future collaboration gains could be insufficient, when the agents' discount factor for future payoffs falls short of a critical level (Fudenberg and Maskin, 1986). When reputation is not sufficient, a stronger mechanism than loss of reputation is necessary to support collaboration. In the rest of this section we describe how a coalition of firms may credibly commit through a feasible redistribution of ownership rights among themselves.

Consider the following arrangement. Managers in a group of widely held firms agree to purchase each others' shares or issue new shares to each other until the combined holdings of the group exceed the full control level (say, one half). A first effect of exchanging shares is profit-sharing, so that all members internalize to some extent the profitability of all other firms in the coalition. However, reciprocal holdings not only redistribute net claims to residual income, but, more importantly, also reallocate control rights; mutual stakes carry voting power on each firm's shareholders meeting. By

²⁰ More precisely, the equilibrium is inefficient when the following conditions for a classic Prisoner's Dilemma are satisfied:

$$H1a) \quad \alpha - c > 2\theta > \beta - c$$

(Collaboration is Pareto-superior to independent use of assets when both agents exert effort, and Pareto-dominated if neither does)

$$H1b) \quad \alpha/2 - c < \beta/2$$

(If the other agent works, it is optimal to shirk)

$$H1c) \quad \beta/2 - c < 0$$

(It does not pay to be the only one to work)

exchanging shares, each manager has made himself vulnerable to a takeover by the rest of the coalition; the potential loss of control rents implies a credible commitment in transactions with other coalition members.

The complete arrangement includes certain implicit behavioral rules in addition to the share exchange. Members should enter into collaborative ventures offering gains from trade with other members; both parties must then collaborate (expend effort). The arrangement also stipulates that if any firm management deviates from the prescribed behavior, the rest of the coalition must vote at the shareholders' meeting to oust the firm's manager from his position. The final provision stipulates that if the coalition fails to punish a deviating manager through expulsion, or alternatively, if the coalition removes a manager from control without just cause, members are no longer bound by an obligation to collaborate with each other.

Under this coalition rule, the manager will not find it in his interest to act in an opportunistic fashion in transactions with other member firms, if the one period net gain from shirking, plus the present value of the future income stream when not in charge, is less than the value of profits and control benefits enjoyed while in control. Note that in this model profit sharing is not the main instrument to reduce the incentive to act in an opportunistic way. Whereas the deviating firm, as a partial crossholder, loses from the lower returns of the other firm, this loss is shared by all coalition members; indeed, profit sharing may worsen opportunism. Instead, the enforcement mechanism relies on the existence of managerial private benefits which would be lost if control were transferred to another agent. (In fact, when these benefits are large, the exchange of control rights separate from income rights is sufficient to sustain cooperation). The control rent sufficient to sustain the arrangement decreases in the number of member firms; a minimum size of the coalition may thus be necessary.

5.4.2 Hierarchical Enforcement Through Debt

In the previous section we showed that the interests of management and shareholders (i.e., the rest of the coalition) became aligned through the threat of dismissal exercised by the mutual enforcement mechanism. However, in circumstances where this threat is not effective, there will be underinvestment in bilateral relations. In particular, when the firm is unprofitable and should be liquidated, presumably the future benefits associated with managing the firm vanish; therefore, the threat of expulsion loses its effectiveness, and managers will prefer to shirk. As a result, if the other members of the coalition could observe the state of nature in the ailing firm, they would choose not to transact with it.

The collective enforcement mechanism therefore should be complemented by an arrangement which discourages the manager from shirking in states of poor profitability. In principle, an explicit reward scheme for managers may provide such incentives. In practice, financial compensation schemes for management have serious limitations. In particular, such schemes have limited liability constraints; legal and wealth constraints prevent managers from being severely fined. This reduces their effectiveness in bad states. Below we show how debt financing and a certain distribution of debt claims may be used to mitigate these problems associated with low performance states²¹.

Consider two transacting firms, A and B. At the time of contracting, A's manager has private information about the profitability of the firm (e.g., about costs or demand conditions for his firm's products). For simplicity, we think of two states of nature, good and bad; a bad state of nature implies that the firm should be closed down or thoroughly reorganized. We assume, realistically, that management learns the state of the firm before everyone else. Since management enjoys private benefits from control, it has imperfect incentives to announce the state; firm closure or thorough reorganization may erase management's control rents, possibly because old management

²¹ We focus on the underinvestment problem in bilateral transactions between two coalition members. The argument could be applied also to the mitigation of agency costs in own production when default is the outcome of a failure by management to exert proper effort or take the most efficient but more costly action.

skills are worthless in the new structure. Now the threat of expulsion is no longer effective. The state of nature is only with delay observable to the other coalition members. Based on his private information about the state of nature, the manager of company A decides on his level of effort investment. When the state of nature is good, the manager exerts effort, but in bad states he will underinvest (in the sense of taking a less efficient, less costly action).

To avoid poor incentives in unprofitable states, crossholdings within the coalition extend to debt, both in the form of bank loans with the group bank and trade credits among member firms. Unlike equity, debt stipulates fixed payments which permits coalition members to obtain valuable information; a failure to meet payment obligations is an early signal of the bad state of nature (or possibly a lack of earlier effort by the manager)(cf. Harris & Raviv, 1990a). Following default, the coalition assumes control and decides to close down or reorganize the firm. Presumably, even reorganizations require demotion or firing of current management, either because management has not exerted sufficient effort or because of a reduced competence in the reorganized firm. Extensive trade credits among member firms allow frequent updating and mutual monitoring.

Such a dispersed creditor structure associated with the use of diffused crosslending may, however, threaten the commitment properties of debt. To prolong its control over assets and to extract more surplus, the management of the debtor firm may collude with one or more creditors at the expense of the rest of the creditor, e.g., the firm could choose to pay off some creditors but not others (Bulow & Shoven, 1978)²². Thus, the existence of more than one creditor may strengthen the ex post bargaining power of the debtor (Bolton & Scharfstein, 1990b). The enforcement mechanism associated with crossholdings of equity may mitigate this problem by preventing individual trade creditors from settling separately with the firm in distress; a manager who attempted this could be expelled from the crossholding arrangement. However, such settlements may not be observable to the rest of the coalition, and collusion may

²² This is the "common pool problem" where an individual creditor has incentives to settle with the debtor at the expense of the creditors as a collective (Jackson, 1988).

be hard to prove. Since partial settlements which postpone default are beneficial to both parties involved, they will never be brought before the coalition unless they are observed by a third party, e.g., another creditor.

In principle, to solve this conflict, debt may be distributed or syndicated so that one creditor represents all or a large section of the creditors and acts as an overall monitor. This pattern of debtholdings also makes the allocation of voting rights in default much more concentrated and allows for a more hierarchical enforcement mode when firms are in financial distress. The crossholding arrangement underlying the relations between the bank and the other member firms can also facilitate reorganization of the firm in default by ensuring that all member firms contribute to the recapitalization by forsaking part of their claims on the firm in default.

So far we have analyzed the financial liabilities of keiretsu firms instruments mostly in terms of control. However, crossholdings of debt and equity do not provide new capital for investments. Suppose a member firm needs external funds to finance its expansion; public issues of debt and equity may upset the described allocation of control²³. To mitigate these problems, one coalition member, the main bank, could serve as an intermediary between external investors and group firms (cf. Diamond, 1984). The extensive use of debt financing from the group bank, insurance company or trading company, means that external funds can be raised without dispersing voting rights outside the coalition.

The view of debt as mitigating problems of asymmetric information echoes conclusions from several authors (see, for example, Harris & Raviv, 1990; and Grossman & Hart, 1982). In contrast, the notion of interfirm monitoring is, to our knowledge, novel. In our view, the use of trade credits multiplies opportunities for coalition members to verify the state of profitability of their trading partners; this information permits collective monitoring and supports the collective enforcement mechanism.

²³ Moreover, such issues may have poor commitment properties; group firms may be viewed as favoring members of their own groups at the expense of outside investors.

In conclusion, it is often suggested that a large intermediary may have better incentives than dispersed shareholders or bondholders to monitor debtor firms (cf. Hoshi et al., 1990a). Here we add that the concentration of voting rights in one lender may mitigate the multicreditor problem. The dominant role of this intermediary in the keiretsu is supported by crossholdings of debt, ensuring that the bulk of creditors belong to the coalition; and by crossholdings of equity, guaranteeing the cooperation of creditors in the event of default. Thus, the group combines two modes of enforcement: mutual enforcement by shareholders in good states, and hierarchical enforcement led by the financial intermediary in default states.

5.5 Empirical Evidence

We have formally modelled a private collective enforcement mechanism resembling the financial keiretsu. The conclusion is that crossholdings could be viewed as a hostage exchange, where contracting parties exchange control rights in order to commit to cooperative behavior (Williamson, 1983)²⁴. The model rests on a few crucial assumptions. This section discusses these assumptions and the predictions generated.

A crucial feature of the collective enforcement is that it remains stable over time; sustained interaction is necessary for the mechanism to police its own survival. In fact, in order to support long-term interaction, the arrangement should have no definite terminal date. This is consistent with the remarkable stability of the keiretsu groups; crossholding firms tend to retain constant stakes by subscribing to all stock issues in proportion to their historical holdings, and equity positions sold off by distressed firms are purchased proportionately by other members (Sheard, 1986).

²⁴ The traditional static hostage model suffers from opportunism problems once the transaction is completed: how do we know that the hostages really will be turned over, and once they have been turned over what guarantees that the other party will stick to the agreement? In our analysis, this is resolved by relying on an infinite horizon of interaction.

Commitment to a coalition is facilitated when the group is well-defined, and insiders and outsiders are easily distinguished. Indeed, the boundaries of each keiretsu are very clearly drawn, and there is a strong sense of identification. The core of the group is defined by membership in the Presidents' Clubs. Interestingly, detailed statistics on ownership and lending patterns within the groups are published yearly ensuring that gradual changes in the allocation of voting rights will not go unnoticed. In addition, recurrent campaigns promote the name of each keiretsu, encouraging group cohesion (Gerlach, 1988).

The proposed enforcement mechanism relies on the existence of significant managerial rents; these private benefits make the threat of expulsion effective. Evidence suggests that the private benefits associated with top management positions in Japanese corporations are indeed substantial (Clark, 1979). More generally, when managers stay in the same corporation for their entire careers, their skills become distinctly firm-specific. Indeed, the very features of Japan's economy invoked to motivate the financial keiretsu as risk-sharing arrangements, i.e., the absence of the managerial labor markets and a well-functioning social security system, magnify the costs of expulsion (Aoki, 1984).

Our model suggests that supporting bilateral trade may be an important function performed by the financial keiretsu. To motivate such an elaborate structure of property rights, intragroup trade must be sufficiently large. The data on such trade is poor, but overwhelming evidence suggests that group members do prefer to transact with other firms of the same keiretsu (see, for example, Clark (1979); Caves & Uekusa (1976); Sheard (1988); Gerlach (1988); and Flath (1990)). The historical reemergence of the groups from the pre-WW II zaibatsu, which had extensive intrafirm trading, also lends support to the claim that the enforcement of bilateral trade is an important function of the groups.

Our rationale suggests that there is a minimum as well as a maximum size of the group; the group should be large enough to allow for repeated interaction between several firms, but small enough to permit mutual monitoring. In addition, to avoid

conflicts of interest or antitrust action, firms should be in different industries. The size of member firms should also preferably be of similar magnitude, since the proposed model suggests an "inter-*par*" relationship rather than an hierarchical structure or pure vertical integration. These predictions of the model fit well with the structure of the groups and, in particular, with the fact that the groupings are represented in most industries ("one-setism"), but only rarely is more than one firm from each keiretsu in a particular industry (Clark, 1979)²⁵. Furthermore, as predicted in the model, the group's combined holdings in each member firm are typically large enough to ensure group control (see Table 5.2). No firm enjoys sufficient self-control to always overcome the votes of the coalition, and no firm has a controlling interest in another member firm. Thus, this coalition seems to capture some of the benefits of vertical integration without giving rise to some of its costs, such as loss of incentives and loss of information.

The discussion in Section 5.4.2 suggested that the enforcement mechanism is particularly vulnerable when individual firms are in bad states of nature, since the prospect of liquidation or thorough reorganization weakens the enforcement power of expulsion; the manager would lose his private benefits in any case. Through dependence on the main bank and extensive use of trade credits, the coalition can achieve frequent monitoring and will switch into a hierarchical enforcement mode when member firms are in financial distress. When firms in financial distress have to be reorganized, the reciprocal holdings of equity ensure collaboration under the direction of the main lender. The following well-known example from the reorganization of a firm in the Sumitomo group may illustrate how the enforcement mechanism works in financial distress (Pascal & Rohlen, 1983).

²⁵ If we assume that a firm wants to maximize the opportunity of being matched with other group members in the future and avoid transactions outside the group, the "one-setism" feature may, in fact, be generated endogenously in our model. Assume that the group consists of a number of firms in different industries. If a new member in a industry previously not represented in the group joins, the likelihood for the individual group member of inside transactions increases. However, if the new member comes from an industry already represented in the group, the likelihood of being matched will go down for the group member in that industry; there will now be two firms instead of one supplying other group members with the same products.

In the mid-1970s the Japanese company Toyo Kogyo, the producer of Mazda cars, experienced serious difficulties. The company is a member of the Sumitomo financial keiretsu. At the time, Sumitomo bank, the main bank of Toyo Kogyo, held 16 per cent of the company's accumulated debt and 5 per cent of its outstanding shares. In addition, Toyo Kogyo held 3 per cent of the equity capital in Sumitomo bank. Through bank managers working in the company, the bank had access to detailed information. As the problems became increasingly severe, the bank acted swiftly to remove management and find successors. Sumitomo Bank was actively involved throughout the rescue operation, for example, by designing adjustment plans and ensuring the cooperation of other claimants, to a large extent trade creditors affiliated with the Sumitomo group.

Sheard (1986) provides numerous similar accounts of how member companies have assisted in the restructuring of other group members, and in the process absorbed considerable losses. The reorganization of member firms in financial distress may be the most important aspect of the financial keiretsu; evidence suggests that bankruptcy is virtually non-existent within the groups whereas it is common among independent companies (Hoshino, 1984). The empirical results provided by Hoshi et al. (1990c) also indicate that costs of financial distress are lower in firms belonging to the financial keiretsu than in independent firms.

The arrangement we describe is in agreement with the observation made by Hoshi et al. (1989a) that members of the financial groupings have been less liquidity-constrained than firms outside these arrangements. The explanation offered by Hoshi et al. relies on bank monitoring. We have suggested a mechanism which makes commitments to truthful information exchange and future repayments credible. In our view, centralized monitoring without the collaboration of trading partners or the ability to enforce contractual agreements is less effective.

Finally, the model suggests the existence of a body, a superboard where all firms in the group are represented, with the potential of coordinating enforcement. The

dispersion of ownership shares in the coalition are such that the general shareholders' meeting of the individual member firms will have a similar composition as the superboard. This implies that opportunistic actions can occur only at the managerial level but not at the level of corporate control; the majority in the superboard also controls the majority in each firm. The Presidents' Clubs correspond fairly well to such a superboard²⁶.

The boards of individual keiretsu firms may not reflect the distribution of control suggested by the crossholding arrangement; as previously described they are dominated by managers from the firm. To the extent that these boards are responsible for hiring and firing top management, our rationale would imply that actual control is different from that implied by the nominal representation on the board of directors. We would argue that the threat of a concerted effort from a majority shareholder would be sufficient to enforce the coalitions's code of behavior.

In general, our focus on the enforcement aspect of the financial keiretsu may tend to exaggerate the extent of coordination within these groups. While the financial keiretsu are an important aspect of the Japanese economic system, their influence on the daily operation of individual members is limited. Group intervention and subsequent dismissals of managers are relatively rare when the firm is not in default. However, intervention is common in distressed firms (see, for example, Sheard (1986)). Furthermore, an evaluation of the importance of a particular enforcement scheme should not be based on how often punishment is carried out; in equilibrium an efficient mechanism would never need to punish. This is clearly unrealistic; in a model with greater uncertainty, opportunistic actions and punishment may occur in some circumstances. In any case, we would argue that the significance of powerful enforcement schemes may be considerable, even when they are seldom utilized (cf. nuclear deterrence); the crossholding arrangement should be regarded as a base upon which relationships between coalition members can be developed.

²⁶ Aoki (1988) suggests that the Presidents' Clubs, among other things, settle conflicts between individual group members. This is in line with our rationale suggesting that the financial keiretsu mitigate conflicts.

The proposed crossholding arrangement is always at least as strong as that of a mechanism based on loss of reputation, i.e., loss of future benefits from future transactions. Our punishment scheme contains one more element, the loss of private benefits through expulsion. A parallel can be drawn to the exit and voice mechanisms analysed by Hirschman (1970); "exit" corresponds to the discontinuation of trade and "voice" to the active interference through expulsion. Of course, this characterization does not capture the full richness of the "voice"-mechanism as developed by Hirschman.

5.6 Implications and Concluding Remarks

Our interpretation of the structure of the financial keiretsu as a private enforcement mechanism is compatible with several previous rationales advanced in the literature, in particular with explanations that focus on transaction efficiency within the group. The suggested mechanism may also enforce agreements to defend individual members against takeovers by outsiders, as well as to provide risk-sharing; the financial keiretsu can police their own survival²⁷. We view our contribution as providing an explicit mechanism to explain how relationships among coalition members are sustained over time.

The rationale offered here most closely resembles a view held in the non-economic literature where reciprocal holdings are interpreted as implicit long-term agreements and expressions of mutual trust (Clark, 1979). The exchange of equity holdings is then only part of a broader business relationship between member firms involving, for example, the extension of loans or the provision of insurance services; "shareholdings are the mere expression of their relationship, not the relationship itself". However, as economists we are not satisfied with the assumption of collective will and inherent

²⁷ It should be noted, however, that if takeover defence were the primary motive for the existence of the extensive crossholdings, the groups should be expected to be less stable than observed. If a rival offers the coalition all or a majority of their holdings in a particular firm, it is not clear why the coalition would not accept it. An offer to buy the entire portfolio of an individual coalition member has limited effects on the arrangement and thus should not be resisted by the rest of the coalition.

reliability. Rather, we view collaboration as an (ex ante) desirable outcome of relationships among self-interested parties, supported by a mechanism for credible commitment. Our interpretation provides a theoretical mechanism for the support of such long-term relations, where the causal relation goes from crossholdings to trust, and not vice versa. Paradoxically, the existence of an effective enforcement mechanism may have allowed the relationships between member firms to develop in many dimensions, making the control aspect virtually invisible.

The corporate groupings could be viewed as an example of the role of groups in Japanese society. Some researchers argue that group membership plays the same role in Japan as individual self-realization and private property rights do in the Western world (Hirschmeier & Yui, 1978). Our model could be read as a formalization of the implicit punishment structure supporting group socialization, and in particular the importance of peer pressure, here managers of other group members, in determining behavior²⁸. However, rather than contrasting a self-centered against a group-centered view of the individual, we suggest a line of reasoning that is compatible with both: consensus can be achieved by self-interested individuals under implicit threats of expulsion.

The rationale put forward here may also provide a reasonable interpretation of the significance of shareholdings in Japan. Many observers have found it hard to reconcile the seemingly negligible role of the individual shareholder and the importance of managers in Japanese business, with the potential power of shareholders if they act in concert. Statements such as "Japanese companies belong to managers and not to shareholders" could be reinterpreted as implying that Japanese managers de facto are shareholders; not personally but through direct and indirect holdings by the firms they manage (Clark, 1979). Yet, the intricate arrangements of the financial keiretsu have

²⁸ In recent work, Kandel & Lazear (1989) model the influence of peer pressure on the level of effort exerted by members of an organization. Kandel & Lazear also demonstrate how a discontinuous punishment scheme, such as the exclusion of members, under certain conditions may be as effective as an elaborate non-linear incentive scheme.

allowed a separation of corporate and managerial control; the group only intervenes when there is deviation by individual members. The financial keiretsu have in fact become a crucial element in an extreme form of managerialism, where managers have virtual insurance against hostile takeovers and can choose their heirs from within their own organizations.

The interpretation of the financial keiretsu as a private enforcement mechanism has major implications for Japanese society. We have suggested that such a mechanism could reduce the problem of underinvestment in specific assets that is associated with contractual incompleteness; the feasible set of contracts is enlarged through the creation of a commitment mechanism. However, the mechanism could also be utilized to support entrenchment through a collective takeover defence. Entrenchment may or may not be associated with inefficiency depending on the ability of the keiretsu to mitigate agency costs through internal monitoring.

Even if the financial keiretsu arrangement is beneficial for group members, it may potentially be costly for outsiders and, on balance, for society as a whole. The extensive use of informal, private mechanisms hampers the evolution of case law, and thus of the formal legal system. Furthermore, the groups promote insider trading which is likely to have a negative impact on the functioning of capital markets; insider shareholders have considerable influence over corporate decisions in Japan, whereas outside shareholders are virtually powerless. However, the keiretsu arrangement could also be viewed as an interesting answer to the question of "who monitors the monitors", i.e., which institution or individual is ultimately responsible for monitoring the use of assets. Our rationale suggests that mutual monitoring may be more successful, and less disruptive, than a form of monitoring relying on higher authority, which if used inefficiently may induce a loss of incentives among subordinates.

Whether the financial keiretsu are beneficial to society as a whole is an open issue, but the groups have undoubtedly demonstrated significant survival properties in the Japanese context. Though organized differently, bank-centered corporate groupings can be found on the European continent. This raises the question of why similar

arrangements have not emerged in the United States. There may be several explanations. First, even if US legislation does not explicitly prohibit crossholdings of shares, political interest groups and anti-trust authorities would most certainly have reacted to the emergence of financial groupings with extensive reciprocal ownership between members²⁹. Moreover, the Japanese commercial banks played an active role in recreating the zaibatsu by, for example, purchasing shares on the market and reselling them to corporate and institutional investors. In the United States, banking regulation prevents commercial banks from strategic holdings of corporate stock, and insolvency law deters bank involvement in individual firms.

The relative importance of the functions performed by the financial keiretsu changes over time in response to the general economic situation and to the specific needs of individual corporations. When firms are very profitable and do not need external financing, the likelihood of financial distress diminishes and consequently, so does the need for corporate reorganizations. Similarly, rapidly growing firms expanding into new geographical markets are likely to diversify their trading relationships, thus weakening the role of the financial keiretsu in supporting bilateral trade. Indeed, there are signs of weakening of the keiretsu as Japanese firms become increasingly globalized.

²⁹ Roe (1990) provides a thorough analysis of the role of interest groups in the emergence of financial regulation and corporate capital structure in the United States (see also Jensen (1989)).

APPENDIX 4.1: MEASUREMENT PROBLEMS IN INTERNATIONAL COMPARISONS OF CAPITAL STRUCTURE

A central claim in this thesis is that a firm's capital structure can be seen as a first approximation for the allocation of returns and control among investors. This appendix briefly discusses some problems associated with the measurement of capital structure. The emphasis is on measuring international variations. Before discussing specific problems, however, we make two general remarks about the implications of our theoretical approach for the measurement of capital structure.

First, capital structure is here defined more broadly than in the traditional capital structure literature. We include the relative importance of different financial instruments and their distribution among the firm's suppliers of capital. Consequently, this appendix addresses a wider range of measurement problems than this literature. Second, the construction of financial data should reflect an underlying theory of capital structure. Modern financial statistics are guided by the irrelevance proposition of Modigliani & Miller (1958). However, if the choice of financial instruments is not irrelevant, e.g., if these instruments have different control properties, this should also have implications for the derivation of financial statistics (Mayer, 1990). Unfortunately, the theoretical basis for distinguishing financial instruments in this respect is still weak.

1. The Relative Importance of Different Financial Instruments

Chapter 4 contains both secondary data derived from OECD Financial Statistics and tertiary data compiled from a number of secondary sources (primarily by Goldsmith (1969 and 1985) and Mayer (1990)). This data stem from two basic statistical sources for determining the relative importance of different financial contracts: flow-of-funds statistics and company accounts. Flow-of-funds statistics aggregate information sector by sector, while surveys of company financial statements provide information on an individual firm basis for a small sample of nonfinancial enterprises. Whereas flow-of-funds statistics have greater coverage, they are derived from a range of inconsistent

sources and the definition of the enterprise sector differs from country to country¹. Unlike flow-of-funds statistics, company financial statements are taken from one source and include subsidiaries abroad. Since survey data is available on an individual firm basis, adjustments for differences in accounting conventions are possible. Table 4.10 taken from Mayer (1990) compares the two sources of statistics in some important respects.

Table 4.10 Flow-of-Funds and Company Accounts Compared

	Flow-of-Funds	Company Accounts
Consistency of definitions of corporate sectors	Can be poor	Only aggregation is possible
Coverage of companies	Comprehensive	Limited, sometimes very limited
Coverage of items	Domestic	Global
Internal consistency	Poor	Good
Quality of data	Can be very poor	Good

Given the poor quality of flow-of-funds data, most studies have used company accounts to compare debt-equity ratios across countries. These comparisons typically are based on stock rather than flow data. The two basic stock measures are debt over total assets and debt over stockholders' funds where the former is more susceptible to errors resulting from the blurred distinction between debt and equity. Stock data are subject to a number of problems when used to study international variations (Rutterford, 1988).

¹ The Standard National Accounting conventions specify that public and private corporations should be included in nonfinancial enterprises, whereas unincorporated companies are to be included in the household sector. Of the countries in this study, France and Japan exclude large public corporations, and the United Kingdom all public corporations, from nonfinancial enterprises. Germany includes unincorporated businesses, and the United States both includes unincorporated businesses and excludes public corporations.

Differences in the use of consolidated accounts tend to overstate debt-equity ratios in countries with high interfirm indebtedness. Accounting conventions also differ significantly across countries in terms of, for example, the rules for various provisions, and whether property is frequently revalued or valued at historic cost. The use of historic costs is likely to bias gearing ratios upwards. In countries where companies make large provisions for pensions, both total assets and total liabilities tend to be inflated. In addition, rules of depreciation vary substantially across countries (Mayer, 1990).

Another problem of comparability concerns the measurement of debt itself. Some countries include short-term bank debt, while others do not. The treatment of trade credits also differs. Furthermore, the use of compensating balances, i.e., lenders requiring borrowers to keep cash reserves on special accounts, varies across countries. Where this practice is common, debt-equity ratios are inflated. Finally, leasing finance gives rise to a downward bias of gearing levels, since these transactions never enter the balance sheets.

This discussion suggests that there are considerable measurement errors in estimations of debt-equity ratios. Rutterford (1988) claims that the use of historical costs, the lack of consolidation and the extensive use of trade credits are likely to overstate gearing ratios in Japan, and to a lesser extent in Germany and France as compared to the United States and the United Kingdom. On the other hand, the widespread use of leasing arrangements understates corporate leverage in the two latter countries. The net effect is not clear. Attempts to adjust for differences in accounting conventions have reduced, but far from eliminated, the observed differences in debt-equity ratios (for examples of adjustments, see Kurodi & Oritani (1980); and Aoki (1984)). The use of market valuations to overcome differences in accounting conventions has yielded similar results (see Corbett (1988) for a compilation of studies of debt-equity ratios at market value)².

² However, as emphasized by Mayer (1990), market valuations reflect not only inflows and outflows of financial resources; they also respond to changes in the valuation of existing resources. Thus, market valuations are less suitable for studies of the relative importance of different forms of finance.

Due to the problems associated with stock data, Mayer (1990) advocates the use of data on flows. By using flow data, retentions are defined gross of depreciation. In this way, the distortions introduced by international variations in depreciation conventions are eliminated. Depreciation deductions also reflect accountants' subjective estimates and differ across countries. Table 4.3 shows financing proportions based on flow data; these proportions are recorded on a net basis, i.e., acquisitions of financial assets are subtracted from increases in corresponding liabilities. In this way, intrasector flows net out, and offsetting flows are eliminated. This is particularly important in the corporate sector where new issues of equity by one company are offset by share repurchases by another company.

2 The Distribution of Ownership of Financial Instruments

The methodological problems associated with international comparisons of how debt and equity are held are partly of a different nature. As with flow-of-funds statistics, the data on ownership structure in industry are often of poor quality. Furthermore, data are rarely directly comparable across countries owing to differences in methods of collection and in institutional arrangements. Another problem is the increasingly active markets for many financial assets which makes the determination of ownership difficult. This is particularly true for banks where the changes in bank assets do not necessarily reflect changes in the liabilities of borrowers.

For this report a number of independent studies have been used. They differ primarily in terms of sample size and measures of concentration. Sample sizes range from the 100 largest companies to slightly below the 600 largest according to turnover or employment. (For our purposes, market value would have been the best measure, since it provides an estimate of the cost of control, i.e., the cost of foregone diversification opportunities.) Because of the limited comparability of the results, only preliminary conclusions can be drawn. In particular, the difference in firm size across countries is critical.

Of course, measures based on the size of the largest shareholder(s), or debtor(s), do not translate directly into control. The dispersion of holdings within each class of financial instruments also influence possibilities for the largest investor to form majority coalitions. Furthermore, formally independent shareholders and debtors may have informal ties that influence their voting behavior. Ideally a comparison across countries should take into account differences in investors' propensity to collaborate. In the absence of satisfactory measures of this propensity, the studies covered in Table 4.6 do not group shareholders other than in the most obvious cases where family members and family-controlled companies, and parent and subsidiary companies, are known to cooperate. The holdings of the Japanese corporate groupings have also been merged. Our objective is not to establish an effective degree of control, but merely to provide an approximation of differences across countries in the distribution of holdings of debt and equity.

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