

*Handbooks in
Finance*



HANDBOOK of CORPORATE FINANCE

EMPIRICAL CORPORATE FINANCE
Volume 2

Editor: B. Espen Eckbo

North-Holland

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EMPIRICAL CORPORATE FINANCE

VOLUME 2

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**HANDBOOK OF
CORPORATE FINANCE:
EMPIRICAL CORPORATE FINANCE
VOLUME 2**

HANDBOOKS IN FINANCE

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William T. Ziemba
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Publisher's Note

For a complete overview of the Handbooks in Finance Series, please refer to the listing at the end of this volume.

CONTENTS OF THE HANDBOOK

VOLUME 1

Introduction to the Series

Preface: Empirical Corporate Finance

PART 1: ECONOMETRIC ISSUES AND METHODOLOGICAL TRENDS

Chapter 1

Econometrics of Event Studies

S.P. KOTHARI and JEROLD B. WARNER

Chapter 2

Self-Selection Models in Corporate Finance

KAI LI and NAGPURNANAND R. PRABHALA

Chapter 3

Auctions in Corporate Finance

SUDIPTO DASGUPTA and ROBERT G. HANSEN

Chapter 4

Behavioral Corporate Finance

MALCOLM BAKER, RICHARD S. RUBACK and JEFFREY WURLER

PART 2: BANKING, PUBLIC OFFERINGS, AND PRIVATE SOURCES OF CAPITAL

Chapter 5

Banks in Capital Markets

STEVEN DRUCKER and MANJU PURI

Chapter 6

Security Offerings

B. ESPEN ECKBO, RONALD W. MASULIS and ØYVIND NORLI

Chapter 7

IPO Underpricing

ALEXANDER LJUNGQVIST

Chapter 8

Conglomerate Firms and Internal Capital Markets

VOJISLAV MAKSIMOVIC and GORDON PHILLIPS

Chapter 9
Venture Capital
PAUL GOMPERS

VOLUME 2

Preface: Empirical Corporate Finance

PART 3: DIVIDENDS, CAPITAL STRUCTURE, AND FINANCIAL DISTRESS

Chapter 10
Payout Policy
AVNER KALAY and MICHAEL LEMMON

Chapter 11
Taxes and Corporate Finance
JOHN R. GRAHAM

Chapter 12
Tradeoff and Pecking Order Theories of Debt
MURRAY Z. FRANK and VIDHAN K. GOYAL

Chapter 13
Capital Structure and Corporate Strategy
CHRIS PARSONS and SHERIDAN TITMAN

Chapter 14
Bankruptcy and the Resolution of Financial Distress
EDITH S. HOTCHKISS, KOSE JOHN, ROBERT M. MOORADIAN and KARIN S. THORBURN

PART 4: TAKEOVERS, RESTRUCTURINGS, AND MANAGERIAL INCENTIVES

Chapter 15
Corporate Takeovers
SANDRA BETTON, B. ESPEN ECKBO and KARIN S. THORBURN

Chapter 16
Corporate Restructuring: Breakups and LBOs
B. ESPEN ECKBO and KARIN S. THORBURN

Chapter 17
Executive Compensation and Incentives
RAJESH K. AGGARWAL

Chapter 18
Managing Corporate Risk
CLIFFORD W. SMITH, Jr.

PREFACE: EMPIRICAL CORPORATE FINANCE

Judging by the sheer number of papers reviewed in this Handbook, the empirical analysis of firms' financing and investment decisions—empirical corporate finance—has become a dominant field in financial economics. The growing interest in everything “corporate” is fueled by a healthy combination of fundamental theoretical developments and recent widespread access to large transactional data bases. A less scientific—but nevertheless important—source of inspiration is a growing awareness of the important social implications of corporate behavior and governance. This Handbook takes stock of the main empirical findings to date across an unprecedented of corporate finance issues, ranging from econometric methodology, to raising capital and capital structure choice, and to managerial incentives and corporate investment behavior. The surveys are written by leading empirical researchers that remain active in their respective areas of interest. With few exceptions, the writing style makes the chapters accessible to industry practitioners. For doctoral students and seasoned academics, the surveys offer dense roadmaps into the empirical research landscape and provide suggestions for future work.

Part 1 (Volume 1): Econometric Issues and Methodological Trends

The empirical corporate finance literature is progressing through a combination of large-sample data descriptions, informal hypotheses testing, as well as structural tests of theory. Researchers are employing a wide spectrum of econometric techniques, institutional settings, and markets structures in order to distill the central message in the data. Part 1 of Volume 1 begins by reviewing key econometric issues surrounding event studies, and proceeds to explain the econometrics of self-selection. It then explains and illustrates methodological issues associated with the growing use of auction theory, and it ends with a discussion of key elements of the corporate finance evidence from a behavioral perspective.

In Chapter 1, “Econometrics of Event Studies,” S.P. Kothari and Jerold Warner review the power of the event-study method; the most successful empirical technique to date for isolating the price impact of the information content of corporate actions. The usefulness of event studies arises from the fact that the magnitude of abnormal performance at the time of an event provides a measure of the (unanticipated) impact of this type of event on the wealth of the firms' claimholders. Thus, event studies focusing on announcement effects for a short horizons around an event provide evidence relevant for understanding corporate policy decisions. Long-horizon event studies also serve an important purpose

in capital market research as a way of examining market efficiency. The survey discusses sampling distributions and test statistics typically used in event studies, as well as criteria for reliability, specification and power. While much is known about the statistical properties of short-horizon event studies, the survey provides a critical review of potential pitfalls of long-horizon abnormal return estimates. Serious challenges related to model specification, skewness and cross-correlation remain. As they also point out, events are likely to be associated with return-variance increases, which are equivalent to abnormal returns varying across sample securities. Misspecification induced by variance increases can cause the null hypothesis to be rejected too often unless the test statistic is adjusted to reflect the variance shift. Moreover, the authors emphasize the importance of paying close attention to specification issues for nonrandom samples of corporate events.

Self-selection is endemic to voluntary corporate events. In Chapter 2, “Self-Selection Models in Corporate Finance,” Kai Li and Nagpuranand Prabhala review the relevant econometric issues with applications in corporate finance. The statistical issue raised by self-selection is the wedge between the population distribution and the distribution within a selected sample, which renders standard linear (OLS/GLS) estimators biased and inconsistent. This issue is particularly relevant when drawing inferences about the determinants of event-induced abnormal stock returns from multivariate regressions, a technique used by most event studies today. These regressions are typically run using samples that exclude non-event firms. The standard solution is to include a scaled estimate of the event probability—the inverse Mills ratio (the expected value of the true but unobservable regression error term)—as an additional variable in the regression. Interestingly, as the authors point out, testing for the significance of the inverse Mills ratio is equivalent to testing whether the sample firms use private information when they self-select to undertake the event. Conversely, if one believes that the particular event being studied is induced by or reflects private information (market overpricing of equity, arrival of new investment projects, merger opportunities, etc.), then consistent estimation of the parameters in the cross-sectional regression requires the appropriate control for self-selection. What is “appropriate” generally depends on the specific application and should ideally be guided by economic theory. The survey also provides a highly useful overview of related econometric techniques—including matching (treatment effect) models, panel data with fixed effects, and Bayesian self-selection models—with specific applications.

In Chapter 3, “Auctions in Corporate Finance,” Sudipto Dasgupta and Robert Hansen introduce auction theory and discuss applications in corporate finance. The authors explain theoretical issues relating to pricing, efficiency of allocation (the conditions under which the asset is transferred to the most efficient buyer), differential information, collusion among buyers, risk aversion, and the effects of alternative auction designs (sealed-bids versus open auction, seller reserve price, entry fees, etc.). It is important for empirical research in corporate finance to be informed of auction theory for at least two reasons. First, when sampling a certain transaction type that in fact takes place across a variety of transactional settings, auction theory helps identify observable characteristics

that are likely to help explain the cross-sectional distribution of things like transaction/bid prices, expected seller revenues, valuation effects, and economic efficiency. This is perhaps most obvious in studies of corporate takeovers (negotiation versus auction, strategic bidding behavior, etc.) and in public security offerings (role of intermediaries, degree and role of initial underpricing, long-run pricing effects, etc.). Second, auction theory provides solutions to the problem of optimal selling mechanism design. This is highly relevant in debates over the efficiency of the market for corporate control (negotiations versus auction, desirability of target defensive mechanisms, the role of the board), the optimality of the bankruptcy system (auctions versus court-supervised negotiations, allocation of control during bankruptcy, prospects for fire-sales, risk-shifting incentives, etc.), and the choice of selling mechanism when floating new securities (rights offer, underwritten offering, fixed-price, auction, etc.).

In Chapter 4, “Behavioral Corporate Finance,” Malcolm Baker, Richard Ruback and Jeffery Wurgler survey several aspects of corporate finance and discuss the scope for competing behavioral and rational interpretations of the evidence. The idea that inherent behavioral biases of CEOs—and their perception of investor bias—may affect corporate decisions is both intuitive and compelling. A key methodological concern is how to structure tests with the requisite power to discriminate between behavioral explanations and classical hypotheses based on rationality. The “bad model” problem—the absence of clearly empirically testable predictions—is a challenge for *both* rational and behavioral models. For example, this is evident when using a scaled-price ratio such as the market-to-book ratio (B/M), and where the book value is treated as a fundamental asset value. A high value of B/M may be interpreted as “overvaluation” (behavioral) or, alternatively, as B poorly reflecting economic fundamentals (rational). Both points of view are consistent with the observed inverse relation between B/M and expected returns (possibly with the exception of situations with severe short-selling constraints). Also, measures of “abnormal” performance following some corporate event necessarily condition on the model generating expected return. The authors carefully discuss these issues and how researchers have tried to reduce the joint model problem, e.g., by considering cross-sectional interactions with firm-characteristics such as measures of firm-specific financing constraints. The survey concludes that behavioral approaches help explain a number of important financing and investment patterns, and it offers a number of open questions for future research.

Part 2 (Volume 1): Banking, Public Offerings, and Private Sources of Capital

In Part 2, the Handbook turns to investment banking and the capital acquisition process. Raising capital is the lifeline of any corporation, and the efficiency of various sources of capital, including banks, private equity and various primary markets for new securities is an important determinant of the firm’s cost of capital.

In Chapter 5, “Banks in Capital Markets,” Steven Drucker and Manju Puri review empirical work on the dual role of banks as lenders and as collectors of firm-specific

private information through the screening and monitoring of loans. Until the late 1990s, U.S. commercial banks were prohibited from underwriting public security offerings for fear that these banks might misuse their private information about issuers (underwriting a low quality issuer and market it as high quality). Following the repeal of the Glass–Steagall Act in the late 1990s, researchers have examined the effect on underwriter fees of the emerging competition between commercial and investment banks. Commercial banks have emerged as strong competitors: in both debt and equity offerings, borrowers receive lower underwriting fees when they use their lending bank as underwriter. The evidence also shows that having a lending relationship constitutes a significant competitive advantage for the commercial banks in terms of winning underwriting mandates. In response, investment banks have started to develop lending units, prompting renewed concern with conflicts of interest in underwriting. Overall, the survey concludes that there are positive effects from the interaction between commercial banks' lending activities and the capital markets, in part because the existence of a bank lending relationship reduces the costs of information acquisition for capital market participants.

In Chapter 6, “Security Offerings,” Espen Eckbo, Ronald Masulis and Øyvind Norli review studies of primary markets for new issues, and they extend and update evidence on issue frequencies and long-run stock return performance. This survey covers all of the key security types (straight and convertible debt, common stock, preferred stock, ADR) and the most frequently observed flotation methods (IPO, private placement, rights offering with or without standby underwriting, firm commitment underwritten offering). The authors review relevant aspects of securities regulations, empirical determinants of underwriter fees and the choice of flotation method, market reaction to security issue announcements internationally, and long-run performance of U.S. issuers. They confirm that the relative frequency of *public* offerings of seasoned equity (SEOs) is low and thus consistent with a financial pecking order based on adverse selection costs. They also report that the strongly negative announcement effect of SEOs in the U.S. is somewhat unique to U.S. issuers. Equity issues in other countries are often met with a significantly positive market reaction, possibly reflecting a combination of the greater ownership concentration and different selling mechanisms in smaller stock markets. They conclude from this evidence that information asymmetries have a first-order effect on the choice of which security to issue as well as by which method. Their large-sample estimates of post-issue long-run abnormal performance, which covers a wide range of security types, overwhelmingly reject the hypothesis that the performance is ‘abnormal.’ Rather, the long-run performance is commensurable with issuing firms’ exposures to commonly accepted definitions of pervasive risk factors. They conclude that the long-run evidence fails to support hypotheses which hold that issuers systematically time the market, or hypotheses which maintain that the market systematically over- or under-reacts to the information in the issue announcement.

The cost of going public is an important determinant of financial development and growth of the corporate sector. In Chapter 7, “IPO Underpricing,” Alexander Ljungqvist surveys the evidence on one significant component of this cost: IPO underpricing, commonly defined as the closing price on the IPO day relative to the IPO price. He classifies

theories of underpricing under four broad headings: ‘asymmetric information’ (between the issuing firm, the underwriter, and outside investors), ‘institutional’ (focusing on litigation risk, effects of price stabilization, and taxes), ‘control’ (how the IPO affects ownership structure, agency costs and monitoring), and ‘behavioral’ (where irrational investors bid up the price of IPO shares beyond true value). From an empirical perspective, these theories are not necessarily mutually exclusive, and several may work to successfully explain the relatively modest level of underpricing (averaging about 15%) observed before the height of the technology-sector offerings in 1999–2000. Greater controversy surrounds the level of underpricing observed in 1999–2000, where the dollar value of issuers’ underpricing cost (‘money left on the table’) averaged more than four times the typical 7% investment banking fee. Two interesting—and mutually exclusive—candidate explanations for this unusual period focus on inefficient selling method design (failure of the fix-priced book-building procedure to properly account for the expected rise in retail investor demand) and investor irrationality (post-offering pricing ‘bubble’). Additional work on the use and effect of IPO auctions, and on the uniquely identifying characteristics of a pricing ‘bubble,’ is needed to resolve this issue.

Multidivisional (conglomerate) firms may exist in part to take advantage of internal capital markets. However, in apparent contradiction of this argument, the early literature on conglomerate firms identified a ‘conglomerate discount’ relative to pure-play (single-plant) firms. In Chapter 8, “Conglomerate Firms and Internal Capital Markets,” Vojislav Maksimovic and Gordon Phillips present a comprehensive review of how the literature on the conglomerate discount has evolved to produce a deeper economic understanding of the early discount evidence. They argue that issues raised by the data sources used to define the proper equivalent ‘pure-play’ firm, econometric issues arising from firms self-selecting the conglomerate form, and explicit model-based tests derived from classical profit-maximizing behavior, combine to explain the discount without invoking agency costs and investment inefficiencies. As they explain, a firm that chooses to diversify is a different type of firm than one which stays with a single segment—but either type may be value-maximizing. They conclude that, on balance, internal capital markets in conglomerate firms appear to be efficient in reallocating resources.

After reviewing internal capital markets, bank financing, and public securities markets, Volume 1 ends with the survey “Venture Capital” in Chapter 9. Here, Paul Gompers defines venture capital as “independent and professionally managed, dedicated pools of capital that focus on equity or equity-linked investments in privately held, high-growth companies.” The venture capital industry fuels innovation by channeling funds to start-up firms and, while relatively small compared to the public markets, has likely had a disproportionately positive impact on economic growth in the United States where the industry is most developed. The empirical literature on venture capital describes key features of the financial contract (typically convertible preferred stock), staging of the investment, active monitoring and advice, exit strategies, etc., all of which affect the relationship between the venture capitalist and the entrepreneur. While data sources are relatively scarce, there is also growing evidence on the risk and return of venture capital

investments. Paul Gompers highlights the need for further research on assessing venture capital as a financial asset, and on the internationalization of venture capital.

Part 3 (Volume 2): Dividends, Capital Structure, and Financial Distress

The first half of Volume 2 is devoted to the classical issue of capital structure choice. This includes the effect of taxes, expected bankruptcy costs, agency costs, and the costs of adverse selection in issue markets on the firm's choice of financial leverage and dividend policy. More recent empirical work also links debt policy to competition in product markets and to the firm's interaction with its customers and suppliers. There is also substantial empirical work on the effect on expected bankruptcy and distress costs of the design of the bankruptcy code, where claim renegotiation under court supervision (such as under Chapter 11 of the U.S. code) and auctions in bankruptcy (such as in Sweden) are major alternatives being studied.

In Chapter 10, "Payout Policy," Avner Kalay and Michael Lemmon refer to payout policy as "the ways in which firms return capital to their equity investors." Classical dividend puzzles include why firms keep paying cash dividends in the presence of a tax-disadvantage relative to capital gains, and why dividend changes have information contents. In contrast to increases in debt interest payments, dividend increases are not contractually binding and therefore easily reversible. So, where is the commitment to maintain the increased level of dividends? While there is strong evidence of a positive information effect of unanticipated dividend increases, they argue that available signaling models are unlikely to capture this empirical phenomenon. Moreover, there is little evidence that dividend yields help explain the cross-section of expected stock returns—which fails to reveal a tax effect of dividend policy. Recent surveys indicate that managers today appear to consider dividends as a second order concern after investment and liquidity needs are met, and to an increased reliance on stock repurchase as an alternative to cash payouts.

In Chapter 11, "Taxes and Corporate Finance," John Graham reviews research specifically relating corporate and personal taxes to firms' choice of payout policy, capital structure, compensation policy, pensions, corporate forms, and a host of other financing arrangements. This research often finds that taxes do appear to affect corporate decisions, but the economic magnitude of the tax effect is often uncertain. There is cross-sectional evidence that high-tax rate firms use debt more intensively than do low-tax rate firms, but time-series evidence concerning whether firm-specific changes in tax status affect debt policy is sparse. Many firms appear to be "underleveraged" in the sense that they could capture additional tax-related benefits of debt at a low cost—but refrain from doing so. Conclusions concerning "underleverage" are, however, contingent on a model of the equilibrium pricing implications of the personal tax-disadvantage of interest over equity income, a topic that has been relatively little researched. Graham also points to the need for a total tax-planning view (as opposed to studying tax issues one by one) to increase the power of tests designed to detect overall tax effects on firm value.

In Chapter 12, “Tradeoff and Pecking Order Theories of Debt,” Murray Frank and Vidhan Goyal review the empirical evidence on firms capital structure choice more generally. Under the classical tradeoff theory, the firm finds the optimal debt level at the point where the marginal tax benefit of another dollar of debt equals the marginal increase in expected bankruptcy costs. This theory is somewhat challenged by the evidence of underleverage surveyed by Graham. However, corporate leverage ratios appears to be mean-reverting over long time horizons, which is consistent with firms trying to maintain target leverage ratios. This target may reflect transaction costs of issuing securities, agency costs, and information asymmetries as well as taxes and bankruptcy costs, and the available evidence does not indicate which factors are the dominant ones. They report several stylized facts about firms leverage policies. In the aggregate for large firms (but not for small firms), capital expenditures track closely internal funds, and the “financing deficit” (the difference between investments and internal funds) track closely debt issues. This is as predicted by the “pecking order” hypothesis, under which debt is preferred over equity as a source of external finance. For small firms, however, the deficit tracks closely equity issues, which reverses the prediction of the pecking order. The authors conclude that “no currently available model appears capable of simultaneously accounting for the stylized facts.”

In Chapter 13, “Capital Structure and Corporate Strategy,” Chris Parsons and Sheridan Titman survey arguments and evidence that link firms’ leverage policies to structural characteristics of product markets. Capital structure may affect how the firm chooses to interact with its non-financial stakeholders (customers, workers, and suppliers concerned with the firm’s survival) as well as with competitors. To account for endogeneity problems that commonly arise in this setting, most papers in this survey analyze firms’ responses to a “shock,” whether it be a sharp (and hopefully unanticipated) leverage change, an unexpected realization of a macroeconomic variable, or a surprising regulatory change. This approach often allows the researcher to isolate the effect of leverage on a firm’s corporate strategy, and in some cases, makes it possible to pinpoint the specific channel (for example, whether a financially distressed firm lowers prices in response to predation by competitors or by making concessions to its customers). There is evidence that debt increases a firm’s employment sensitivity to demand shocks (perhaps perpetuating recessions), but can also protect shareholder wealth by moderating union wage demands. Excessive leverage can also inhibit a firm’s ability to compete in the product market, as measured by prices and market shares. Firms that depend crucially on non-fungible investments from stakeholders are most sensitive to these losses, and choose more conservative capital structures as a result.

To avoid formal bankruptcy, financially distressed firms engage in asset sales, equity issues and debt renegotiations. In Chapter 14, “Bankruptcy and the Resolution of Financial Distress,” Edith Hotchkiss, Kose John, Robert Mooradian and Karin Thorburn survey empirical work on the costs, benefits, and effectiveness of out-of-court debt workouts and of formal “one size fits all” bankruptcy procedures. Failing to renegotiate their debt claims out of court, the firm files for bankruptcy, where it is either liquidated piecemeal or restructured as a going concern under court protection. For reasons that are poorly

understood, different bankruptcy systems have evolved in different countries, with a trend toward the structured bargaining process characterizing Chapter 11 of the U.S. code. The U.S. code substantially restricts the liquidation rights of creditors as filing triggers automatic stay of debt payments, prevents repossession of collateral, and allows the bankrupt firm to raise new debt with super-priority (debtor-in-possession financing). In contrast, UK bankruptcy is akin to a contract-driven receivership system where creditor rights are enforced almost to the letter. Here, assets pledged as collateral can be repossessed even if they are vital for the firm, and there is no stay of debt claims. This makes it difficult to continue to operate the distressed firm under receivership, even if the bankrupt firm is economically viable. A third system is found in Sweden where the filing firm is automatically turned over to a court-appointed trustee who arranges an open auction (while all debt claims are stayed). The authors survey the international evidence on bankruptcies (which also includes France, Germany, and Japan). They conclude that it remains an open question whether Chapter 11 in the U.S.—with its uniquely strong protection of the incumbent management team—represents an optimal bankruptcy reorganization procedure.

Part 4 (Volume 2): Takeovers, Restructurings, and Managerial Incentives

Modern corporate finance theory holds that in a world with incomplete contracting, financial structure affects corporate investment behavior and therefore firm value. The Handbook ends with comprehensive discussions of the value-implications of major corporate investment and restructuring decisions (outside of bankruptcy) and of the role of pay-for-performance type of executive compensation contracts on managerial incentives and risk taking behavior.

In Chapter 15, “Corporate Takeovers,” Sandra Betton, Espen Eckbo and Karin Thorburn review and extend the evidence on mergers and tender offers. They focus in particular on the bidding process as it evolves sequentially from the first bid through bid revision(s) and towards the final bid outcome. Central issues include bid financing, strategic bidding, agency issues and the impact of statutory and regulatory restrictions. The strategic arsenal of the initial bidder includes approaching the target with a tender offer or a merger bid, acquiring a toehold to gain an advantage over potential competitors, offering a payment method (cash or stock) which signals a high bidder valuation of the target, and/or simply bid high (a preemptive strike). The survey provides new evidence on the magnitude of successive bid jumps, and on the speed of rival firm entry and the time between the first and the final bids in multi-bidder contests. The survey confirms that the average abnormal return to bidders is insignificantly different from zero, and that the sum of the abnormal returns to targets and bidders is positive, suggesting that takeovers improve the overall efficiency of resource allocation. Takeover bids also tend to generate positive abnormal returns throughout the industry of the target, in part because they increase the likelihood that industry rivals may become targets themselves

(industry “in-play” effect). The evidence strongly rejects the hypothesis that horizontal mergers reduce consumer welfare through increased market power—even when the merger-induced change in industry concentration is non-trivial. However, some input suppliers suffer losses following downstream mergers that increase the downstream industry’s bargaining power.

In Chapter 16, “Corporate Restructuring: Breakups and LBOs,” Espen Eckbo and Karin Thorburn review a number of financial and asset restructuring techniques—other than corporate takeovers and bankruptcy reorganizations. They distinguish between transactions that securitize corporate divisions from those that recapitalize the entire firm. Forms of divisional securitization include spinoff, splitoff, divestiture, equity carve-out and tracking stock. Forms of recapitalizations of the entire firm include leveraged recapitalization, leveraged buyout (LBO), demutualization, going-private transactions, and state privatizations. They show transaction frequency, describe the financing technique, discuss regulatory and tax issues, and review evidence on the associated valuation effects. Announcement-induced abnormal stock returns are generally reported to be positive. Potential sources of this wealth creation include improved alignment of management and shareholder incentives through post-transaction compensation contracts that include divisional stock grants, the elimination of negative synergies, improved governance systems through the disciplinary effect of leverage, the avoidance of underinvestment costs, wealth transfers from old bondholders experiencing claim dilution and risk increase following new debt issues, and an “in-play” effect as divisional securitization increases the probability that the division will become a future acquisition target. Unbundling corporate assets and allowing public trade of securities issued by individual divisions also leads to a general welfare increase from increased market completeness and analyst following. The evidence indicates improved operating performance following spinoffs and LBOs, and increased takeover activity after spinoffs and carveouts, and that a minority of LBO firms goes public within five years of the going-private transaction.

Delegation of corporate control to managers gives rise to costly agency conflicts as the personal interests of managers and owners diverge. The literature on executive compensation seeks to identify the form of the employment contract that minimizes agency costs. In Chapter 17, “Executive Compensation and Incentives,” Rajesh Aggarwal surveys the empirical findings of this literature over the past two decades, focusing in particular on evidence concerning stock options and restricted stock grants. The optimal provision of incentives in managerial compensation contracts depends on factors such as executive risk and effort aversion, managerial productivity, and information asymmetries. A key limitation on incentive provision appears to be the need to share risk between managers and shareholders. Also, while optimal contracting theory implies that firm performance should be evaluated relative to an industry or market wide benchmark, relative performance provisions (e.g., by indexing the exercise price of a stock option to the market) are rarely observed. This puzzle may be explained in part by accounting and tax rules, and in part by the cost to shareholders of indexed options (relative to other forms of compensation) when managers are risk averse. Observed compensation practices may also reflect a governance problem if the CEO has undue influence over the determination