



ELSEVIER

Journal of Financial Economics 60 (2001) 187–243

JOURNAL OF  
Financial  
ECONOMICS

www.elsevier.com/locate/econbase

# The theory and practice of corporate finance: evidence from the field<sup>☆</sup>

John R. Graham<sup>a</sup>, Campbell R. Harvey<sup>a,b,\*</sup>

<sup>a</sup>*Fuqua School of Business, Duke University, Durham, NC 27708, USA*

<sup>b</sup>*National Bureau of Economic Research, Cambridge, MA 02912, USA*

Received 2 August 1999; received in revised form 10 December 1999

---

## Abstract

We survey 392 CFOs about the cost of capital, capital budgeting, and capital structure. Large firms rely heavily on present value techniques and the capital asset pricing model, while small firms are relatively likely to use the payback criterion. A surprising number of firms use firm risk rather than project risk in evaluating new investments. Firms are concerned about financial flexibility and credit ratings when issuing debt, and earnings

---

<sup>☆</sup>We thank Franklin Allen for his detailed comments on the survey instrument and the overall project. We appreciate the input of Chris Allen, J.B. Heaton, Craig Lewis, Cliff Smith, Jeremy Stein, Robert Taggart, and Sheridan Titman on the survey questions and design. We received expert survey advice from Lisa Abendroth, John Lynch, and Greg Stewart. We thank Carol Bass, Frank Ryan, and Fuqua MBA students for help in gathering the data, and Kathy Benton, Steve Fink, Anne Higgs, Ken Rona, and Ge Zhang for computer assistance. The paper has benefited from comments made by an anonymous referee, the editor (Bill Schwert), as well as Michael Bradley, Alon Brav, Susan Chaplinsky, Magnus Dahlquist, Gene Fama, Paul Gompers, Ravi Jagannathan, Tim Opler, Todd Pulvino, Nathalie Rossiensky, Rick Ruback, David Smith, René Stulz, and seminar participants at the Harvard Business School/Journal of Financial Economics Conference on the interplay between theoretical, empirical, and field research in finance, the 2000 Utah Winter Finance Conference, the University of Wisconsin and the 2001 American Finance Association Meetings. Finally, we thank the executives who took the time to fill out the survey. This research is partially sponsored by the Financial Executives Institute (FEI). The opinions expressed in the paper do not necessarily represent the views of FEI. Graham acknowledges financial support from the Alfred P. Sloan Research Foundation. Some supplementary research results are available at <http://www.duke.edu/~charvey/Research/indexr.htm>.

\* Corresponding author. Fuqua School of Business, Duke University, Durham, NC 27708, USA. Tel.: + 1-919-660-7768; fax: + 1-919-660-7971.

*E-mail address:* [cam.harvey@duke.edu](mailto:cam.harvey@duke.edu) (C.R. Harvey).

per share dilution and recent stock price appreciation when issuing equity. We find some support for the pecking-order and trade-off capital structure hypotheses but little evidence that executives are concerned about asset substitution, asymmetric information, transactions costs, free cash flows, or personal taxes. © 2001 Published by Elsevier Science S.A.

*JEL classification:* G31; G32; G12

*Keywords:* Capital structure; Cost of capital; Cost of equity; Capital budgeting; Discount rates; Project valuation; Survey

---

## 1. Introduction

In this paper, we conduct a comprehensive survey that describes the current practice of corporate finance. Perhaps the best-known field study in this area is John Lintner's (1956) path-breaking analysis of dividend policy. The results of that study are still quoted today and have deeply affected the way that dividend policy research is conducted. In many respects, our goals are similar to Lintner's. We hope that researchers will use our results to develop new theories – and potentially modify or abandon existing views. We also hope that practitioners will learn from our analysis by noting how other firms operate and by identifying areas where academic recommendations have not been fully implemented.

Our survey differs from previous surveys in a number of dimensions.<sup>1</sup> First, the scope of our survey is broad. We examine capital budgeting, cost of capital, and capital structure. This allows us to link responses across areas. For example, we investigate whether firms that consider financial flexibility to be a capital structure priority are also likely to value real options in capital budgeting decisions. We explore each category in depth, asking more than 100 total questions.

Second, we sample a large cross-section of approximately 4,440 firms. In total, 392 chief financial officers responded to the survey, for a response rate of 9%. The next largest survey that we know of is Moore and Reichert (1983) who study 298 large firms. We investigate for possible nonresponse bias and conclude that our sample is representative of the population.

---

<sup>1</sup> See, for example, Lintner (1956), Gitman and Forrester (1977), Moore and Reichert (1983), Stanley and Block (1984), Baker et al. (1985), Pinegar and Wilbricht (1989), Wansley et al. (1989), Sangster (1993), Donaldson (1994), Epps and Mitchem (1994), Poterba and Summers (1995), Billingsley and Smith (1996), Shao and Shao (1996), Bodnar et al. (1998), Bruner et al. (1998) and Block (1999).

Third, we analyze the responses conditional on firm characteristics. We examine the relation between the executives' responses and firm size, *P/E* ratio, leverage, credit rating, dividend policy, industry, management ownership, CEO age, CEO tenure, and the education of the CEO. By testing whether responses differ across these characteristics, we shed light on the implications of various corporate finance theories related to firm size, risk, investment opportunities, transaction costs, informational asymmetry, and managerial incentives. This analysis allows for a deeper investigation of corporate finance theories. For example, we go beyond asking whether firms follow a financial pecking order (Myers and Majluf, 1984). We investigate whether the firms that most strongly support the implications of the pecking-order theory are also the firms most affected by informational asymmetries, as suggested by the theory.

Survey-based analysis complements other research based on large samples and clinical studies. Large sample studies are the most common type of empirical analysis, and have several advantages over other approaches. Most large-sample studies offer, among other things, statistical power and cross-sectional variation. However, large-sample studies often have weaknesses related to variable specification and the inability to ask qualitative questions. Clinical studies are less common but offer excellent detail and are unlikely to "average away" unique aspects of corporate behavior. However, clinical studies use small samples and their results are often sample-specific.

The survey approach offers a balance between large sample analyses and clinical studies. Our survey analysis is based on a moderately large sample and a broad cross-section of firms. At the same time, we are able to ask very specific and qualitative questions. The survey approach is not without potential problems, however. Surveys measure beliefs and not necessarily actions. Survey analysis faces the risk that the respondents are not representative of the population of firms, or that the survey questions are misunderstood. Overall, survey analysis is seldom used in corporate financial research, so we feel that our paper provides unique information to aid our understanding of how firms operate.

The results of our survey are both reassuring and surprising. On one hand, most firms use present value techniques to evaluate new projects. On the other hand, a large number of firms use company-wide discount rates to evaluate these projects rather than a project-specific discount rate. Interestingly, the survey indicates that firm size significantly affects the practice of corporate finance. For example, large firms are significantly more likely to use net present value techniques and the capital asset pricing model for project evaluation than are small firms, while small firms are more likely to use the payback criterion. A majority of large firms have a tight or somewhat tight target debt ratio, in contrast to only one-third of small firms.

Executives rely heavily on practical, informal rules when choosing capital structure. The most important factors affecting debt policy are financial flexibility and a good credit rating. When issuing equity, respondents are concerned

about earnings per share dilution and recent stock price appreciation. We find very little evidence that executives are concerned about asset substitution, asymmetric information, transactions costs, free cash flows, or personal taxes. We acknowledge but do not investigate the possibility that these deeper implications are, for example, impounded into prices and credit ratings, and so executives react to them indirectly.

The paper is organized as follows. In the second section, we present the survey design, the sampling methodology, and discuss some caveats of survey research. In the third section we study capital budgeting. We analyze the cost of capital in the fourth section. In the fifth section we examine capital structure. We offer some concluding remarks in the final section.

## 2. Methodology

### 2.1. Design

Our survey focuses on three areas: capital budgeting, cost of capital, and capital structure. Based on a careful review of the existing literature, we developed a draft survey that was circulated to a group of prominent academics for feedback. We incorporated their suggestions and revised the survey. We then sought the advice of marketing research experts on the survey design and execution. We made changes to the format of the questions and overall survey design with the goal of minimizing biases induced by the questionnaire and maximizing the response rate.

The survey project is a joint effort with the Financial Executives Institute (FEI). FEI has approximately 14,000 members that hold policy-making positions as CFOs, treasurers, and controllers at 8,000 companies throughout the U.S. and Canada. Every quarter, Duke University and the FEI poll these financial officers with a one-page survey on important topical issues (Graham, 1999b). The usual response rate for the quarterly survey is 8–10%.

Using the penultimate version of the survey, we conducted beta tests at both FEI and Duke University. This involved having graduating MBA students and financial executives fill out the survey, note the required time, and provide feedback. Our beta testers took, on average, 17 minutes to complete the survey. Based on this and other feedback, we made final changes to the wording on some questions. The final version of the survey contained 15 questions, most with subparts, and was three pages long. One section collected demographic information about the sample firms.

The survey instrument appears on the Internet at the address <http://www.duke.edu/~charvey/Research/indexr.htm>. We sent out two different versions with questions 11–14 and questions 1–4 interchanged. We were concerned that the respondents might fill in the first page or two of the survey

but leave the last page blank. If this were the case, we would expect to see a higher proportion of respondents answering the questions that appear at the beginning of either version of the survey. We find no evidence that the response rate differs depending on whether the questions are at beginning or the end of the survey.

## *2.2. Delivery and response*

We used two mechanisms to deliver the survey. We sent a mailing from Duke University on February 10, 1999 to each CFO in the 1998 Fortune 500 list. Independently, the FEI faxed out 4,440 surveys to their member firms on February 16, 1999. Three hundred thirteen of the Fortune 500 CFOs belong to the FEI, so these firms received both a fax and a mailed version. We requested that the surveys be returned by February 23, 1999. To encourage the executives to respond, we offered an advanced copy of the results to interested parties.

We employed a team of 10 MBA students to follow up on the mailing to the Fortune 500 firms with a phone call and possible faxing of a second copy of the survey. On February 23, FEI refaxed the survey to the 4,440 FEI corporations and we remailed the survey to the Fortune 500 firms, with a new due date of February 26, 1999. This second stage was planned in advance and designed to maximize the response rate.

The executives returned their completed surveys by fax to a third-party data vendor. Using a third party ensures that the survey responses are anonymous. We feel that anonymity is important to obtain frank answers to some of the questions. Although we do not know the identity of the survey respondents, we do know a number of firm-specific characteristics, as discussed below.

Three hundred ninety-two completed surveys were returned, for a response rate of nearly 9%. Given the length (three pages) and depth (over 100 questions) of our survey, this response rate compares favorably to the response rate for the quarterly FEI-Duke survey. The rate is also comparable to other recent academic surveys. For example, Trahan and Gitman (1995) obtain a 12% response rate in a survey mailed to 700 CFOs. The response rate is higher (34%) in Block (1999), but he targets Chartered Financial Analysts - not senior officers of particular firms.

## *2.3. Summary statistics and data issues*

Fig. 1 presents summary information about the firms in our sample. The companies range from very small (26% of the sample firms have sales of less than \$100 million) to very large (42% have sales of at least \$1 billion) (see Fig. 1A). In subsequent analysis, we refer to firms with revenues greater than \$1 billion as “large”. Forty percent of the firms are manufacturers (Fig. 1C). The nonmanufacturing firms are evenly spread across other industries, including

financial (15%), transportation and energy (13%), retail and wholesale sales (11%), and high-tech (9%). In the appendix, we show that the responding firms are representative of the corporate population for size, industry, and other characteristics.

The median price–earnings ratio is 15. Sixty percent of the respondents have price–earnings ratios of 15 or greater (Fig. 1D). We refer to these firms as growth

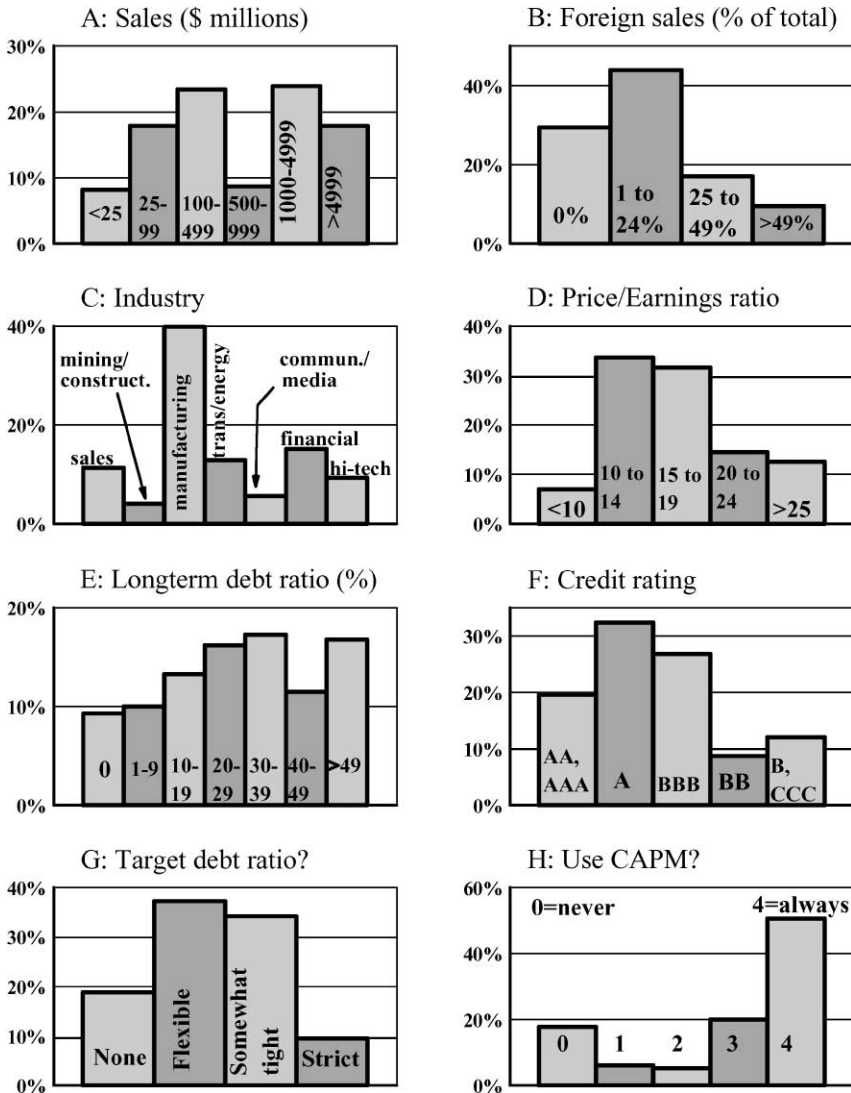


Fig. 1. Sample characteristics based on the survey responses of 392 CFOs.

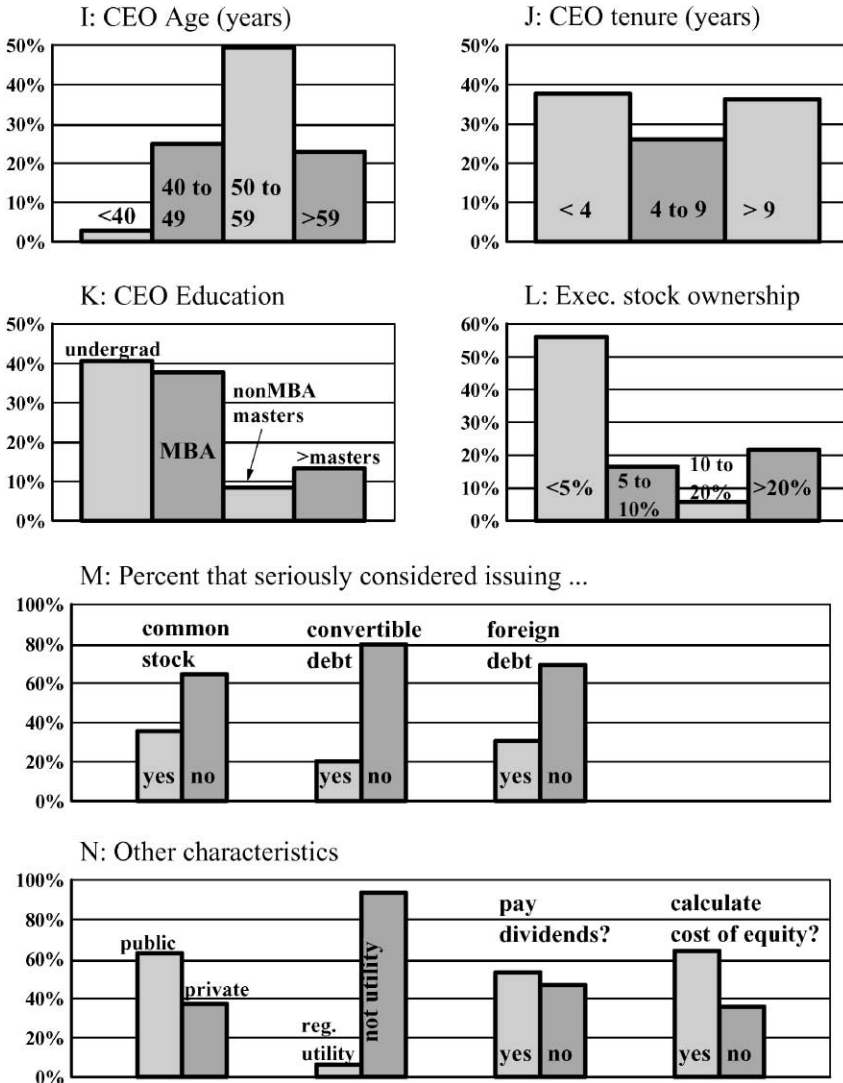


Fig. 1. (continued).

firms when we analyze how investment opportunities affect corporate behavior. We refer to the remaining 40% of the respondents as nongrowth firms.

The distribution of debt levels is fairly uniform (Fig. 1E). Approximately one-third of the sample firms have debt-to-asset ratios below 20%, another third have debt ratios between 20% and 40%, and the remaining firms have debt ratios greater than 40%. We refer to firms with debt ratios greater than 30% as

highly levered. The creditworthiness of the sample is also dispersed (Fig. 1F). Twenty percent of the companies have credit ratings of AA or AAA, 32% have an A credit rating, and 27% have a BBB rating. The remaining 21% have speculative debt with ratings of BB or lower.

Though our survey respondents are CFOs, we ask a number of questions about the characteristics of the chief executive officers. We assume that the CFOs act as agents for the CEOs. Nearly half of the CEOs for the responding firms are between 50 and 59 years old (Fig. 1I). Another 23% are over age 59, a group we refer to as “mature.” Twenty-eight percent of the CEOs are between the ages of 40 and 49. The survey reveals that executives change jobs frequently. Nearly 40% of the CEOs have been in their jobs less than four years, and another 26% have been in their jobs between four and nine years (Fig. 1J). We define the 34% who have been in their jobs longer than nine years as having “long tenure”. Forty-one percent of the CEOs have an undergraduate degree as their highest level of educational attainment (Fig. 1K). Another 38% have an MBA and 8% have a non-MBA masters degree. Finally, the top three executives own at least 5% of the common stock of their firm in 44% of the sample. These CEO characteristics allow us to examine whether managerial incentives or entrenchment affect the survey responses. We also study whether having an MBA affects the choices made by corporate executives.

Fig. 1M shows that 36% of the sample firms seriously considered issuing common equity, 20% considered issuing convertible debt, and 31% thought about issuing debt in foreign markets. Among responding firms, 64% calculate the cost of equity, 63% have publicly traded common stock, 53% issue dividends, and 7% are regulated utilities (Fig. 1N). If issuing dividends is an indication of a reduced informational disadvantage for investors relative to managers (Sharpe and Nguyen, 1995), the dividend issuance dichotomy allows us to examine whether the data support corporate theories based on informational asymmetry.

Table 1 presents correlations for the demographic variables. Not surprisingly, small companies have lower credit ratings, a higher proportion of management ownership, a lower incidence of paying dividends, a higher chance of being privately owned, and a lower proportion of foreign revenue. Growth firms are likely to be small, have lower credit ratings, and have a higher degree of management ownership. Firms that do not pay dividends have low credit ratings.

Below, we perform univariate analyses on the survey responses conditional on each separate firm characteristic. However, because size is correlated with a number of different factors, we perform a robustness check for the nonsize characteristics. We split the sample into large firms versus small firms. On each size subsample, we repeat the analysis of the responses conditional on firm characteristics other than size. We generally only report the findings with respect to nonsize characteristics if they hold on the full sample and the two size



Table 1  
Demographic correlations of control variables from the survey<sup>a</sup>

	Size (small to large)	P/E (low to high)	D/E (low to high)	Dividends (yes to no)	Rating (high to low)	Industry (manu. to others)	Ownership (high to low)	Age (young to mature)	Tenure (short to long)	Education (MBA to others)	Regulated (yes to no)	Target D/E (no to yes)	Equity (public to private)	For. Rev (high to low)
P/E	0.199***													
D/E	0.113**	-0.032												
Dividends	-0.401***	-0.128*	-0.066											
Rating	-0.249***	-0.291***	0.303***	0.333***										
Industry	0.004	0.258***	-0.259***	0.220	-0.077									
Ownership	-0.432***	-0.194***	0.077	0.315***	0.296***	0.028								
Age	-0.040	-0.082	0.092	0.055	0.064	0.180***	-0.066							
Tenure	0.150***	-0.055	-0.036	-0.001	0.007	0.033	-0.256***	0.259***						
Education	-0.083	-0.006	-0.096*	-0.014	0.024	-0.061	0.111*	-0.152***	-0.133**					
Regulated	-0.191***	0.066	-0.095*	0.181***	0.147*	0.136**	0.141**	-0.076	-0.114**	-0.095*				
Target D/E	0.190***	-0.030	0.145***	-0.189***	-0.250***	-0.093*	-0.075	0.053	0.072	-0.033	-0.116**			
Equity	0.422***	-0.114*	-0.111**	0.307***	-0.083	0.079	0.304***	0.075	-0.099*	0.076	0.169***	-0.009		
Foreign Rev.	-0.238***	-0.071	-0.013	0.150***	0.038	0.176***	0.151***	0.038	-0.129***	0.061	-0.126**	-0.092*	0.255***	
Fortune 500	0.497***	0.144**	0.026	-0.260***	-0.158**	0.049	-0.255***	-0.020	0.036	-0.058	-0.257***	0.210***	0.323***	-0.039

<sup>a</sup>Index of mean square contingency or  $\phi$  is reported. This statistic measures the correlation of ordered groups of attributes. Cross tabulations are conducted by size (large firms have sales of at least \$1 billion), growth (growth has P/E ratio greater than 14), leverage (high has debt-equity greater than 0.3), investment grade (yes has debt rated BBB or above), whether the firm pays dividends, industry (manufacturing/energy/transportation versus all others), managerial stock ownership (high is greater than 5%), age (older than 59 versus younger than 60), CEO tenure (long is nine or more years on the job), whether the CEO has an MBA, whether the firm is regulated, whether the firm reports a target debt ratio, public versus private corporations, whether foreign sales are greater than 25%, and whether the survey was from the mailing to the Fortune 500 firms rather than the fax to a broader group of firms. \*\*\*, \*\*, \* denotes a significantly different from zero at the 1%, 5%, and 10% level, respectively.

subsamples. We also perform a separate robustness check relative to public versus private firms and only report the characteristic-based results if they hold for the full and public samples. The tables contain the full set of results, including those that do not pass these robustness checks.

All in all, the variation in executive and firm characteristics permits a rich description of the practice of corporate finance, and allows us to infer whether corporate actions are consistent with academic theories. We show in the appendix that our sample is representative of the population from which it was drawn, fairly representative of Compustat firms, and not adversely affected by non-response bias.

### **3. Capital budgeting methods**

#### *3.1. Design*

This section studies how firms evaluate projects. Previous surveys mainly focus on large firms and suggest that internal rate of return (IRR) is the primary method for evaluation. For example, Gitman and Forrester (1977), in their survey of 103 large firms, find that only 9.8% of firms use net present value as their primary method and 53.6% report IRR as primary method. Stanley and Block (1984) find that 65% of respondents report IRR as their primary capital budgeting technique. Moore and Reichert (1983) survey 298 Fortune 500 firms and find that 86% use some type of discounted cash flow analysis. Bierman (1993) finds that 73 of 74 Fortune 100 firms use some type of discounted cash flow analysis. These results are similar to the findings in Trahan and Gitman (1995), who survey 84 Fortune 500 and Forbes 200 best small companies, and Bruner et al. (1998), who interview 27 highly regarded corporations. (See <http://www.duke.edu/~charvey/Research/indexr.htm> for a review of the capital budgeting literature.)

Our survey differs from previous work in several ways. The most obvious difference is that previous work almost exclusively focuses on the largest firms. Second, given that our sample is larger than all previous surveys, we are able to control for many different firm characteristics. Finally, we go beyond NPV versus IRR analysis and ask whether firms use the following evaluation techniques: adjusted present value (see Brealey and Myers, 1996), payback period, discounted payback period, profitability index, and accounting rate of return. We also inquire whether firms bypass discounting techniques and simply use earnings multiples. A price-earnings approach can be thought of as measuring the number of years it takes for the stock price to be paid for by earnings, and therefore can be interpreted as a version of the payback method. We are also interested in whether firms use other types of analyses that are taught in many MBA programs, such as simulation analysis and value at risk (VaR). Finally, we

are interested in the importance of real options in project evaluation (see Myers, 1977).

### 3.2. Results

Respondents are asked to score how frequently they use the different capital budgeting techniques on a scale of 0 to 4 (0 meaning “never”, 4 meaning “always”). In many respects, the results differ from previous surveys, perhaps because we have a more diverse sample. An important caveat here, and throughout the survey, is that the responses represent beliefs. We have no way of verifying that the beliefs coincide with actions.

Most respondents select net present value and internal rate of return as their most frequently used capital budgeting techniques (see Table 2); 74.9% of CFOs always or almost always (responses of 4 and 3) use net present value (rating of 3.08); and 75.7% always or almost always use internal rate of return (rating of 3.09). The hurdle rate is also popular. These results are summarized in Fig. 2.

The most interesting results come from examining the responses conditional on firm and executive characteristics. Large firms are significantly more likely to use NPV than small firms (rating of 3.42 versus 2.83). There is no difference in techniques used by growth and nongrowth firms. Highly levered firms are significantly more likely to use NPV and IRR than are firms with small debt

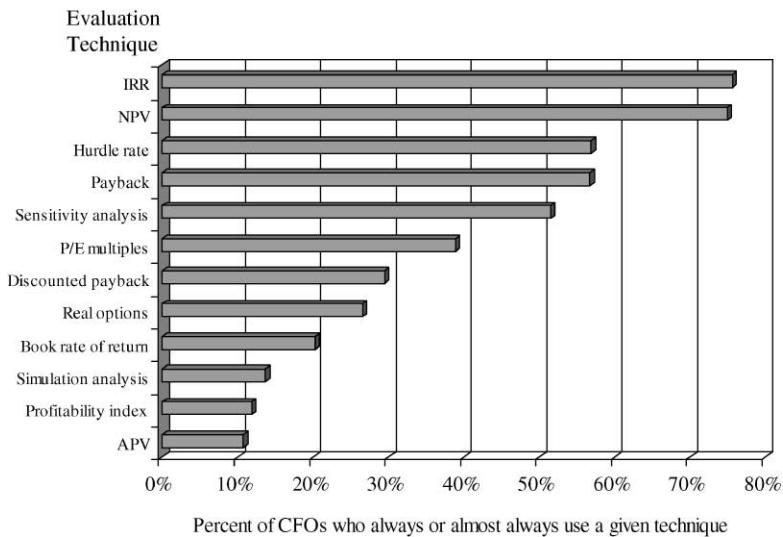


Fig. 2. Survey evidence on the popularity of different capital budgeting methods. We report the percentage of CFOs who always or almost always use a particular technique. IRR represents internal rate of return, NPV is net present value, *P/E* is the price-to-earnings ratio, and APV is adjusted present value. The survey is based on the responses of 392 CFOs.

Table 2  
Survey responses to the question: how frequently does your firm use the following techniques when deciding which projects or acquisitions to pursue?<sup>a</sup>

	% always or almost always	Size		P/E		Leverage		Investment grade		Pay dividends		Industry		Management own		
		Mean	Small	Large	Growth	Non-G	Low	High	Yes	No	Yes	No	Mann.	Others	Low	High
(b) Internal rate of return	75.61	3.09	2.87	3.41***	3.36	3.36	2.85	3.36***	3.52	3.35	3.43	2.68***	3.19	2.94**	3.34	2.85***
(a) Net present value	74.93	3.08	2.83	3.42***	3.30	3.27	2.84	3.39***	3.47	3.38	3.35	2.76***	3.23	2.82***	3.35	2.77***
(f) Payback period	56.74	2.53	2.72	2.25***	2.55	2.41	2.58	2.46	2.48	2.36	2.46	2.63	2.68	2.33***	2.39	2.70***
(c) Hurdle rate	56.94	2.48	2.13	2.95***	2.78	2.87	2.27	2.63**	3.01	2.92	2.84	2.06***	2.60	2.29**	2.70	2.12***
(i) Sensitivity analysis (e.g., "good" vs. "fair" vs. "bad")	51.54	2.31	2.13	2.56***	2.35	2.41	2.10	2.56***	2.60	2.62	2.42	2.17**	2.35	2.24	2.37	2.18
(d) Earnings multiple approach	38.92	1.89	1.79	2.01*	1.97	2.11	1.67	2.12***	1.90	2.22*	1.88	1.88	1.85	2.00	1.85	2.04
(g) Discounted payback period	29.45	1.56	1.58	1.55	1.52	1.67	1.49	1.64	1.84	1.49*	1.54	1.62	1.61	1.50	1.49	1.76*
(f) We incorporate the "real options" of a project when evaluating it	26.59	1.47	1.40	1.57	1.31	1.55	1.50	1.41	1.34	1.61	1.37	1.52	1.49	1.45	1.40	1.52
(i) Accounting rate of return (or book rate of return on assets)	20.29	1.34	1.41	1.25	1.43	1.19	1.34	1.32	1.22	1.21	1.40	1.27	1.36	1.34	1.30	1.44
(k) Value-at-risk or other simulation analysis	13.66	0.95	0.76	1.22***	0.84	0.86	0.78	1.10***	1.09	1.04	1.04	0.82**	0.95	0.92	0.95	0.86
(e) Adjusted present value	10.78	0.85	0.93	0.72*	0.97	0.69**	0.87	0.80	0.80	0.79	0.80	0.91	0.78	0.92	0.79	0.99*
(h) Profitability index	11.87	0.83	0.88	0.75	0.73	0.81	0.74	0.96*	0.66	0.67	0.81	0.83	0.90	0.76	0.81	0.98

	CEO age		CEO tenure		CEO MBA		Regulated		Target debt ratio		Public corp.		Foreign sales		Fortune 500 mailing			
	Mean	> 59	Ynger	Long	Short	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes		
	% always or almost always																	
(b) Internal rate of return	75.61	3.09	3.21	3.06	2.97	3.16*	3.17	3.03	3.76	3.04***	3.03	3.18	3.27	2.77***	3.31	3.01**	3.00	3.57***
(a) Net present value	74.93	3.08	3.08	3.09	2.90	3.17**	3.17	3.00*	3.50	3.07**	2.99	3.23**	3.24	2.78***	3.38	2.95***	2.97	3.60***
(f) Payback period	56.74	2.53	2.83	2.43***	2.80	2.37***	2.48	2.55	2.05	2.56**	2.65	2.43*	2.45	2.67*	2.62	2.49	2.57	2.35
(c) Hurdle rate	56.94	2.48	2.88	2.38***	2.39	2.51	2.57	2.42	3.18	2.42**	2.33	2.64**	2.70	2.10***	2.56	2.43	2.30	3.28***
(f) Sensitivity analysis (e.g., "good" vs. "fair" vs. "bad")	51.54	2.31	2.20	2.36	2.20	2.37	2.41	2.25	3.14	2.26***	2.24	2.43	2.37	2.18	2.36	2.28	2.22	2.76***
(d) Earnings multiple approach	38.92	1.89	2.25	1.79**	1.93	1.86	1.98	1.86	1.62	1.90	1.85	1.96	2.08	1.56***	1.98	1.84	1.83	2.15*
(g) Discounted payback period	29.45	1.56	1.94	1.48***	1.72	1.46*	1.68	1.49	1.52	1.60	1.57	1.61	1.56	1.60	1.62	1.53	1.51	1.84*
(f) We incorporate the "real options" of a project when evaluating it	26.59	1.47	1.68	1.40*	1.56	1.36	1.49	1.39	0.95	1.48*	1.44	1.46	1.40	1.59	1.53	1.43	1.44	1.57
(i) Accounting rate of return (or book rate of return on assets)	20.29	1.34	1.49	1.33	1.39	1.34	1.42	1.29	1.76	1.30*	1.30	1.39	1.31	1.43	1.27	1.38	1.36	1.26
(k) Value-at-risk or other simulation analysis	13.66	0.95	1.07	0.90	0.92	0.93	0.99	0.88	1.76	0.89*	0.77	1.12***	0.89	1.01	0.90	0.96	0.86	1.36***
(e) Adjusted present value	10.78	0.85	1.18	0.75***	0.88	0.80	0.74	0.91*	0.67	0.86	0.88	0.81	0.83	0.90	0.74	0.89	0.86	0.80
(h) Profitability index	11.87	0.83	0.87	0.83	0.95	0.77*	0.83	0.85	0.57	0.85	0.75	0.99**	0.76	1.00**	0.81	0.83	0.85	0.75

\* Respondents are asked to rate on a scale of 0 (never) to 4 (always). We report the overall mean as well as the % of respondents that answered 3 (almost always) or 4 (always). \*\*\*, \*\*, \*, denotes a significant difference at the 1%, 5%, and 10% level, respectively. All table columns are defined in Table 1.

ratios. This is not just an artifact of firm size. In unreported analysis, we find a significant difference between high- and low-leverage small firms as well as high- and low-leverage large firms. Interestingly, highly levered firms are also more likely to use sensitivity and simulation analysis. Perhaps because of regulatory requirements, utilities are more likely to use IRR and NPV and perform sensitivity and simulation analyses. We also find that CEOs with MBAs are more likely than non-MBA CEOs to use net present value, but the difference is only significant at the 10% level.

Firms that pay dividends are significantly more likely to use NPV and IRR than are firms that do not pay dividends. This result is also robust to our analysis by size. Public companies are significantly more likely to use NPV and IRR than are private corporations. As the correlation analysis indicates in Table 1, many of these attributes are correlated. For example, private corporations are also smaller firms.

Other than NPV and IRR, the payback period is the most frequently used capital budgeting technique (rating of 2.53). This is surprising because financial textbooks have lamented the shortcomings of the payback criterion for decades. (Payback ignores the time value of money and cash flows beyond the cutoff date; the cutoff is usually arbitrary.) Small firms use the payback period (rating of 2.72) almost as frequently as they use NPV or IRR. In untabulated analysis, we find that among small firms, CEOs without MBAs are more likely to use the payback criterion. The payback is most popular among mature CEOs (rating of 2.83). In separate examinations of small and large firms, we find that mature CEOs use payback significantly more often than younger CEOs. Payback is also frequently used by CEOs with long tenure (rating of 2.80). Few firms use the discounted payback (rating of 1.56), a method that eliminates one of the payback criterion's deficiencies by accounting for the time value of money.

It is sometimes argued that the payback approach is rational for severely capital constrained firms: if an investment project does not pay positive cash flows early on, the firm will cease operations and therefore not receive positive cash flows that occur in the distant future, or else will not have the resources to pursue other investments during the next few years (Weston and Brigham, 1981, p. 405). We do not find any evidence to support this claim because we find no relation between the use of payback and leverage, credit ratings, or dividend policy. Our finding that payback is used by older, longer-tenure CEOs without MBAs instead suggests that lack of sophistication is a driving factor behind the popularity of the payback criterion.

McDonald (1998) notes that rules of thumb such as payback and hurdle rates can approximate optimal decision rules that account for the option-like features of many investments, especially in the evaluation of very uncertain investments. If small firms have more volatile projects than do large firms, this could explain why small firms use these ad hoc decision rules. It is even possible that small firms use these rules not because they realize that they approximate the optimal rule but simply because the rules have worked in the past.

A number of firms use the earnings multiple approach for project evaluation. There is weak evidence that large firms are more likely to employ this approach than are small firms. We find that a firm is significantly more likely to use earnings multiples if it is highly levered. The influence of leverage on the earnings multiple approach is also robust across size (i.e., highly levered firms, whether they are large or small, frequently use earnings multiples).

In summary, compared to previous research, our results suggest increased prominence of net present value as an evaluation technique. In addition, the likelihood of using specific evaluation techniques is linked to firm size, firm leverage, and CEO characteristics. In particular, small firms are significantly less likely to use net present value. They are also less likely to use supplementary sensitivity and VaR analyses. The next section takes this analysis one step further by detailing the specific methods firms use to obtain the cost of capital, the most important risk factors, and a specific capital budgeting scenario.

## **4. Cost of capital**

### *4.1. Methodology*

Our first task is to determine how firms calculate the cost of equity capital. We explore whether firms use the capital asset pricing model (CAPM), a multi-beta CAPM (with extra risk factors in addition to the market beta), average historical returns, or a dividend discount model. The results in Table 3 and summarized in Fig. 3 indicate that the CAPM is by far the most popular method of estimating the cost of equity capital: 73.5% of respondents always or almost always use the CAPM (rating of 2.92; see also Fig. 1H). The second and third most popular methods are average stock returns and a multibeta CAPM, respectively. Few firms back the cost of equity out from a dividend discount model (rating of 0.91). This sharply contrasts with the findings of Gitman and Mercurio (1982) who survey 177 Fortune 1000 firms and find that only 29.9% of respondents use the CAPM “in some fashion” but find that 31.2% of the participants in their survey use a version of the dividend discount model to establish their cost of capital. More recently, Bruner et al. (1998) find that 85% of their 27 best-practice firms use the CAPM or a modified CAPM. While the CAPM is popular, we show later that it is not clear that the model is applied properly in practice. Of course, even if it is applied properly, it is not clear that the CAPM is a very good model (see Fama and French, 1992).

The cross-sectional analysis is particularly illuminating. Large firms are much more likely to use the CAPM than are small firms (rating of 3.27 versus 2.49, respectively). Smaller firms are more inclined to use a cost of equity capital that

Table 3  
Survey responses to the question: does your firm estimate the cost of equity capital? (If “no”, please go to next question). If “yes”, how do you determine your firm’s cost of equity capital?<sup>a</sup>

	% always or almost always	Size		P/E		Leverage		Investment grade		Pay dividends			Industry			Management ownership			
		Mean	Small	Large	Growth	Non-G	Low	High	Yes	No	Yes	No	Mann.	Others	Low	High	Low	High	
(b) using the capital asset pricing model (CAPM, the “beta” approach)	73.49	2.92	2.49	3.27***	3.19	3.03	2.57	3.23***	3.13	3.34	3.00	2.76	3.02	2.87	3.26	2.36***			
(a) with average historical returns on common stock	39.41	1.72	1.80	1.65	1.65	1.78	1.80	1.56	1.67	1.48	1.77	1.63	1.60	1.84	1.66	1.87			
(c) using the CAPM but including some extra “risk factors”	34.29	1.56	1.39	1.70*	1.62	1.48	1.57	1.45	1.71	1.76	1.51	1.54	1.69	1.49	1.59	1.44			
(f) back out from discounted dividend/earnings model, e.g., Price = Div <sub>t</sub> /(cost of cap. – growth)	15.74	0.91	0.96	0.87	0.90	1.02	0.72	1.05**	0.92	0.98	0.90	0.95	0.98	0.80	0.97	1.10			
(d) whatever our investors tell us they require	13.93	0.86	1.22	0.54***	0.76	0.44**	0.92	0.88	0.48	0.79*	0.70	1.12**	0.80	0.97	0.65	1.23***			
(e) by regulatory decisions	7.04	0.44	0.37	0.50	0.56	0.32*	0.48	0.36	0.51	0.44	0.54	0.24**	0.44	0.44	0.51	0.41			
				CEO age	CEO tenure	CEO MBA	Regulated	Target debt ratio	Public corp.	Foreign sales	Fortune 500 mailing								
				> 59	Ynger	Long	Short	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
(b) using the capital asset pricing model (CAPM, the “beta” approach)		2.85	2.93	2.83	2.96	3.08	2.77*	3.00	2.87	2.83	3.03	3.13	2.13***	3.23	2.75**	2.78	3.46***		
(a) with average historical returns on common stock		2.43	1.54***	1.70	1.73	1.53	1.90*	1.60	1.70	1.64	1.80	1.65	1.91	1.62	1.78	1.80	1.38*		
(c) using the CAPM but including some extra “risk factors”		1.91	1.48*	1.66	1.49	1.62	1.48	2.17	1.41**	1.53	1.49	1.56	1.53	1.57	1.52	1.38	2.17***		
(f) back out from discounted dividend/earnings model, e.g., Price = Div <sub>t</sub> /(cost of cap. – growth)		1.21	0.82**	1.05	0.83	0.78	1.02*	1.20	0.88	0.93	0.92	0.99	0.68*	0.81	0.97	0.90	0.95		
(d) whatever our investors tell us they require		0.76	0.87	1.02	0.79	0.72	0.99*	0.69	0.87	0.94	0.81	0.67	1.53***	0.65	0.97**	0.96	0.46**		
(e) by regulatory decisions		0.32	0.47	0.39	0.43	0.41	0.47	2.19	0.28***	0.49	0.43	0.49	0.27*	0.20	0.55***	0.37	0.71**		

<sup>a</sup> Respondents are asked to rate on a scale of 0 (never) to 4 (always). We report the overall mean as well as the % of respondents that answered 3 (almost always) and 4 (always). \*\*\*, \*\*, \* denotes a significant difference at the 1%, 5%, and 10% level, respectively. All table columns are defined in Table 1.



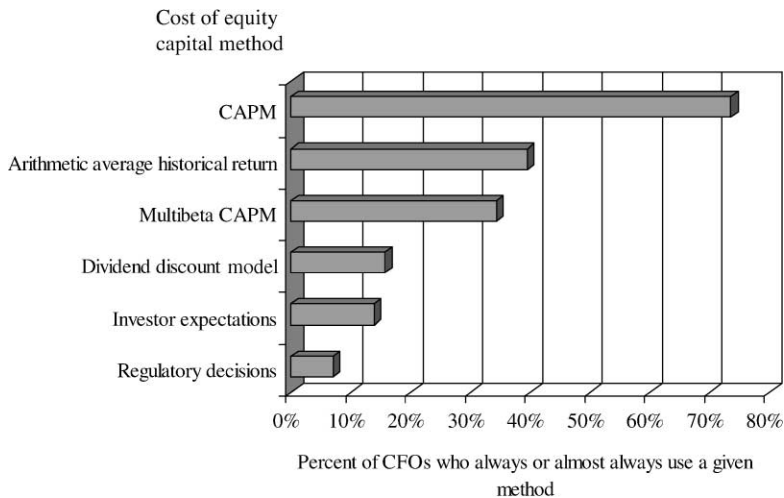


Fig. 3. Survey evidence on the popularity of different methods of calculate the cost of equity capital. We report the percentage of CFOs who always or almost always use a particular technique. CAPM represents the capital asset pricing model. The survey is based on the responses of 392 CFOs.

is determined by “what investors tell us they require”. CEOs with MBAs are more likely to use the single-factor CAPM or the CAPM with extra risk factors than are non-MBA CEOs, but the difference is only significant for the single-factor CAPM.

We also find that firms with low leverage or small management ownership are significantly more likely to use the CAPM. We find significant differences for private versus public firms (public more likely to use the CAPM). This is perhaps expected given that the beta of the private firm could only be calculated via analysis of comparable publicly traded firms. Finally, we find that firms with high foreign sales are more likely to use the CAPM.

Given the sharp difference between large and small firms, it is important to check whether some of these control effects just proxy for size. It is, indeed, the case that foreign sales proxy for size. Table 1 shows that that there is a significant correlation between percent of foreign sales and size. When we analyze the use of the CAPM by foreign sales controlling for size, we find no significant differences. However, this is not true for some of the other control variables. There is a significant difference in use of the CAPM across leverage that is robust to size. The public/private effect is also robust to size. Finally, the difference in the use of the CAPM based on management ownership holds for small firms but not for large firms. That is, among small firms, CAPM use is inversely related to managerial ownership. There is no significant relation for larger firms.

#### 4.2. *Specific risk factors*

Table 4 investigates sources of risk other than market risk, and how they are treated in project evaluation. The list of risk factors includes the fundamental factors in Fama and French (1992), and momentum as defined in Jegadeesh and Titman (1993), as well as the macroeconomic factors in Chen et al. (1986) and Ferson and Harvey (1991).

The format of Table 4 is different from the others. We ask whether, in response to these risk factors, the firm modifies its discount rate, cash flows, both, or neither. We report the percentage of respondents for each category. In the cross-tabulations across each of the demographic factors, we test whether the “neither” category is significantly different conditional on firm characteristics.

Overall, the most important additional risk factors are interest rate risk, exchange rate risk, business cycle risk, and inflation risk (see Fig. 4). For the calculation of discount rates, the most important factors are interest rate risk, size, inflation risk, and foreign exchange rate risk. For the calculation of cash flows, many firms incorporate the effects of commodity prices, GDP growth, inflation, and foreign exchange risk.

Interestingly, few firms adjust either discount rates or cash flows for book-to-market, distress, or momentum risks. Only 13.1% of respondents consider the book-to-market ratio in either the cash flow or discount rate calculations. Momentum is only considered important by 11.1% of the respondents.

Small and large firms have different priorities when adjusting for risk. For large firms, the most important risk factors (in addition to market risk) are foreign exchange risk, business cycle risk, commodity price risk, and interest rate risk. This closely corresponds to the set of factors detailed in Ferson and Harvey (1993) in their large-sample study of multibeta international asset pricing models. Ferson and Harvey find that the most important additional factor is foreign exchange risk. Table 4 shows that foreign exchange risk is by far the most important nonmarket risk factor for large firms (61.7% of the large firms adjust for foreign exchange risk; the next closest is 51.4% adjusting for business cycle risk).

The ordering is different for small firms. Small firms are more affected by interest rate risk than they are by foreign exchange risk. This asymmetry in risk exposure is consistent with the analysis of Jagannathan and Wang (1996) and Jagannathan et al. (1998). They argue that small firms are more likely to be exposed to labor income risk and, as a result, we should expect to find these firms relying on a different set of risk factors, and using the CAPM less frequently, when estimating their cost of capital.

As might be expected, firms with considerable foreign sales are sensitive to unexpected exchange rate fluctuations. Fourteen percent of firms with substantial foreign exposure adjust discount rates for foreign exchange risk, 22% adjust

Multibeta risks for adjusting discount rates or cash flows

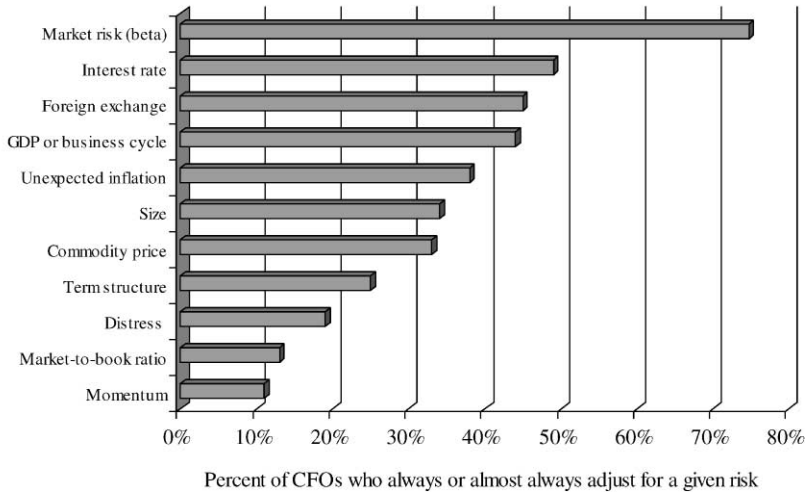


Fig. 4. Survey evidence on types of multibeta risk that are important for adjusting cash flows or discount rates. We report the percentage of CFOs who always or almost always adjust for a particular type of risk. The survey is based on the responses of 392 CFOs.

cash flows, and 32% adjust both. These figures represent the highest incidence of “adjusting something” for any type of non-market risk, for any demographic.

There are some interesting observations for the other control variables. Highly levered firms are more likely to consider business cycle risk important; surprisingly, however, indebtedness does not affect whether firms adjust for interest rate risk, term structure risk, or distress risk. Growth firms are much more sensitive to foreign exchange risk than are nongrowth firms. (Table 4 only reports the results for four control variables; A full version of Table 4 is available on the Internet at <http://www.duke.edu/~charvey/Research/indexr.htm>.)

4.3. Project versus firm risk

Finally, we explore how the cost of equity models are used. In particular, we consider an example of how a firm evaluates a new project in an overseas market. We are most interested in whether corporations consider the company-wide risk or the project risk in evaluating the project.

Table 5 contains some surprising results. Remarkably, most firms would use a single company-wide discount rate to evaluate the project; 58.8% of the respondents would always or almost always use the company-wide discount rate, even though the hypothetical project would most likely have different risk characteristics. However, 51% of the firms said they would always or almost

Table 4

Survey responses to the question: when valuing a project, do you adjust either the discount rate or cash flows for the following risk factors? (Check the most appropriate box for each factor). Percentage of respondents choosing each category is reported<sup>d</sup>

	Overall											Size											P/E			
	Disc. rate			Cash flow			Both		Neither		Discount rate			Cash Flow			Both		Neither		Growth		Non-G			
	Small	Large	Neither	Small	Large	Neither	Small	Large	Small	Large	Small	Large	Neither	Small	Large	Neither	Small	Large	Small	Large	Neither	Small	Large			
	15.30	8.78	24.65	51.27	17.33	12.67	7.43	10.67	29.70	17.33	45.54	59.33**	13.39	7.06	7.09	16.47	22.83	18.82	56.69	57.65	18.82	22.83	18.82	56.69		
(b) Interest rate risk (change in general level of interest rates)	15.30	8.78	24.65	51.27	17.33	12.67	7.43	10.67	29.70	17.33	45.54	59.33**	13.39	7.06	7.09	16.47	22.83	18.82	56.69	57.65	18.82	22.83	18.82	56.69		
(f) Foreign exchange risk	10.80	15.34	18.75	55.11	7.43	15.44	9.90	22.82	15.35	23.49	67.33	38.26***	10.24	18.75	14.96	22.50	22.83	23.75	51.97	35.00**	23.75	22.83	23.75	51.97		
(d) GDP or business cycle risk	6.84	18.80	18.80	55.56	6.93	6.76	12.87	27.03	19.80	17.57	60.40	48.65**	6.98	7.41	24.03	18.52	22.48	14.81	46.51	59.26*	14.81	22.48	14.81	46.51		
(a) Risk of unexpected inflation	11.90	14.45	11.90	61.76	13.43	9.93	9.95	20.53	14.93	7.95	61.69	61.59	12.40	9.64	14.73	16.87	10.08	12.05	62.79	61.45	12.05	10.08	12.05	62.79		
(h) Size (small firms being riskier)	14.57	6.00	13.43	66.00	14.43	14.67	7.46	4.00	16.92	8.67	61.19	71.33**	14.84	15.66	7.03	3.61	17.19	9.64	60.94	68.67	9.64	17.19	9.64	60.94		
(e) Commodity price risk	2.86	18.86	10.86	67.43	2.49	3.38	12.94	27.03	9.45	12.84	75.12	56.76***	3.12	4.94	20.31	24.69	12.50	7.41	64.06	62.96	7.41	12.50	7.41	64.06		
(c) Term structure risk (change in the long-term vs. short-term interest rate)	8.57	3.71	12.57	75.14	10.45	6.08	2.99	4.73	14.93	9.46	71.64	79.73*	7.03	6.10	3.12	6.10	10.94	17.07	78.91	70.73	17.07	10.94	17.07	78.91		
(g) Distress risk (probability of bankruptcy)	7.41	6.27	4.84	81.48	5.94	9.40	4.95	8.05	6.93	2.01	82.18	79.87	6.98	15.85	6.98	6.10	6.98	n/a	79.07	76.83	n/a	6.98	6.10	79.07		
(i) "Market-to-book" ratio (ratio of market value of firm to book value of assets)	3.98	1.99	7.10	86.93	4.46	3.36	1.49	2.68	8.91	4.70	85.15	89.26	2.38	8.43	3.17	1.20	5.56	6.02	88.89	84.34	6.02	5.56	6.02	88.89		
(j) Momentum (recent stock price performance).	3.43	2.86	4.86	88.86	3.98	2.70	2.99	2.70	6.47	2.70	86.57	91.89	3.15	4.94	2.36	4.94	4.72	1.23	89.76	88.89	1.23	4.72	1.23	89.76		

Leverage Foreign sales

	Leverage						Foreign sales									
	Discount rate		Cash Flow		Both		Neither		Discount rate		Cash Flow		Both		Neither	
	Low	High	Low	High	Low	High	Low	High	Yes	No	Yes	No	Yes	No	Yes	No
(b) Interest rate risk (change in general level of interest rates)	14.29	18.12	10.71	6.52	24.40	23.19	50.60	52.17	13.54	15.94	8.33	8.76	19.79	26.29	58.33	49.00
(f) Foreign exchange risk	12.88	7.09	12.88	18.44	17.18	21.99	57.06	52.48	13.83	9.52	22.34	12.30	31.91	13.49	31.91	64.68***
(d) GDP or business cycle risk	6.83	4.96	13.66	28.37	16.15	24.82	63.35	41.84***	6.45	7.14	26.88	15.87	16.13	19.44	50.54	57.54
(a) Risk of unexpected inflation	13.94	10.71	10.91	16.43	8.48	13.57	66.67	59.29	7.29	13.55	19.79	12.75	13.54	11.55	59.38	62.15
(b) Size (small firms being riskier)	10.37	15.60	6.71	5.67	17.68	9.93	65.24	68.09	12.77	15.02	7.45	5.53	11.70	14.23	68.09	64.43
(e) Commodity price risk	1.24	4.32	14.29	26.62	12.42	8.63	72.05	60.43**	3.23	2.79	26.88	15.14	10.75	10.76	59.14	71.31**
(c) Term structure risk (change in the long-term vs. short-term interest rate)	6.17	11.43	6.17	2.14	10.49	15.71	77.16	70.71	6.45	9.52	4.30	3.57	13.98	12.30	75.27	74.60
(g) Distress risk (probability of bankruptcy)	4.82	8.45	6.63	6.34	4.82	4.23	83.73	80.99	9.38	6.75	7.29	5.95	2.08	5.95	81.25	80.95
(i) "Market-to-book" ratio (ratio of market value of firm to book value of assets)	3.61	4.32	3.61	0.72	6.63	7.19	86.14	87.77	4.26	3.95	5.32	0.79	5.32	7.91	85.11	87.35
(j) Momentum (recent stock price performance)	3.68	3.55	2.45	3.55	4.91	4.26	88.96	88.65	4.26	3.19	3.19	2.79	4.26	5.18	88.30	88.84

\* Percentage of respondents choosing each category is reported. The percentages for discount rate, cash flow, both and neither should sum to 100. \*\*\*, \*\*, \* denotes a significant difference at the 1%, 5%, and 10% level, respectively. All table columns are defined in Table 1.

Table 5  
Survey responses to the question: How frequently would your company use the following discount rates when evaluating a new project in an overseas market? To evaluate this project we would use<sup>a</sup>

	% always or almost always		Size		P/E		Leverage		Investment grade		Pay dividends		Industry		Management ownership		
	Mean	Small	Large	Non-G	Growth	Low	High	Yes	No	Yes	No	Yes	No	Manu.	Others	Low	High
(a) The discount rate for our entire company	58.79	2.50	2.50	2.76	2.37**	2.45	2.58	2.41	2.83**	2.46	2.53	2.56	2.32*	2.61	2.41		
(d) A risk-matched discount rate for this particular project (considering both country and industry)	50.95	2.09	1.86	2.26	2.36***	1.99	2.30**	2.43	2.25	2.31	1.82***	2.22	2.01	2.22	2.01		
(b) The discount rate for the overseas market (country discount rate)	34.52	1.65	1.49	1.84	1.69	1.54	1.81*	1.82	2.01	1.75	1.52*	1.86	1.42***	1.70	1.52		
(c) A divisional discount rate (if the project line of business matches a domestic division)	15.61	0.95	0.82	1.09**	1.12	0.88	1.08*	1.17	1.05	1.05	0.84*	1.01	0.90	0.96	1.08		
(e) A different discount rate for each component cash flow that has a different risk characteristic (e.g. depreciation vs. operating cash flows)	9.87	0.66	0.68	0.64	0.49	0.85***	0.61	0.68	0.75	0.58	0.68	0.64	0.68	0.65	0.56	0.85**	
	% always or almost always	CEO age		CEO tenure		CEO MBA		Regulated		Target debt ratio		Public corp.		Foreign sales		Fortune 500 mailing	
		Mean	> 59	Ynger	Long	Short	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
(a) The discount rate for our entire company	58.79	2.50	2.54	2.49	2.18	2.64***	2.49	2.51	2.00	2.52*	2.39	2.64*	2.55	2.42	2.87	2.33***	2.57
(d) A risk-matched discount rate for this particular project (considering both country and industry)	50.95	2.09	2.31	2.02*	2.11	2.06	2.20	1.99	2.55	2.03*	1.90	2.25**	2.24	1.79***	2.21	2.02	1.97
(b) The discount rate for the overseas market (country discount rate)	34.52	1.65	1.80	1.61	1.49	1.73*	1.77	1.60	1.50	1.66	1.70	1.58	1.78	1.41**	1.81	1.58	1.58
(c) A divisional discount rate (if the project line of business matches a domestic division)	15.61	0.95	1.18	0.87**	0.99	0.92	0.88	0.98	1.27	0.89*	0.91	1.01	1.08	0.66***	0.94	0.93	0.89
(e) A different discount rate for each component cash flow that has a different risk characteristic (e.g. depreciation vs. operating cash flows)	9.87	0.66	0.72	0.62	0.55	0.68	0.59	0.67	0.38	0.67	0.67	0.57	0.61	0.79*	0.63	0.68	0.71

<sup>a</sup> Respondents are asked to rate on a scale of 0 (never) to 4 (always). We report the overall mean as well as the % of respondents that answered 3 (almost always) and 4 (always). \*\*\*, \*\*, \* denotes a significant difference at the 1%, 5%, and 10% level, respectively. All table columns are defined in Table 1.

always use a risk-matched discount rate to evaluate this project. These results are related to Bierman (1993) who finds that 93% of the Fortune 100 industrial firms use the company-wide weighted average cost of capital for discounting, 72% use the rate applicable to the project based on the risk or the nature of the project, and 35% use a rate based on the division's risk.

The reliance of many firms on a company-wide discount rate might make sense if these same firms adjust cash flows for foreign exchange risk when considering risk factors (i.e., in Table 4). However in untabulated results, we find the opposite: firms that do not adjust cash flows for foreign exchange risk are also relatively less likely (compared to firms that adjust for foreign exchange risk) to use a risk-matched discount rate when evaluating an overseas project.

Large firms are significantly more likely to use the risk-matched discount rate than are small firms (rating of 2.34 versus 1.86). This is also confirmed in our analysis of Fortune 500 firms, which are much more likely to use the risk-matched discount rate than the firm-wide discount rate to evaluate the foreign project (rating of 2.61 versus 1.97). Very few firms use a different discount rate to separately value different cash flows within the same project (rating of 0.66), as Brealey and Myers (1996) suggest they should for cash flows such as depreciation.

The analysis across firm characteristics reveals some interesting patterns. Growth firms are more likely to use a company-wide discount rate to evaluate projects. Surprisingly, firms with foreign exposure are significantly more likely to use the company-wide discount rate to value an overseas project. Public corporations are more likely to use a risk-matched discount rate than are private corporations; however, this result is not robust to controlling for size. CEOs with short tenures are more likely to use a company-wide discount rate (significant at the 5% level for both large and small firms).

## **5. Capital structure**

Our survey has separate questions about debt, equity, debt maturity, convertible debt, foreign debt, target debt ratios, credit ratings, and actual debt ratios. Instead of stepping through the responses security by security, this section distills the most important findings from the capital structure questions and presents the results grouped by theoretical hypothesis or concept. These groupings are neither mutually exclusive nor all-encompassing; they are intended primarily to organize the exposition.

### *5.1. Trade-off theory of capital structure choice*

#### *5.1.1. Target debt ratios and the costs and benefits of debt*

One of the longest-standing questions about capital structure is whether firms have target debt ratios. The trade-off theory says that firms have optimal

debt–equity ratios, which they determine by trading off the benefits of debt with the costs (e.g., Scott, 1976). In traditional trade-off models, the chief benefit of debt is the tax advantage of interest deductibility (Modigliani and Miller, 1963). The primary costs are those associated with financial distress and the personal tax expense bondholders incur when they receive interest income (Miller, 1977). In this section we discuss the traditional factors in the trade-off theory, namely distress costs and tax costs and benefits. Many additional factors (e.g., informational asymmetry, agency costs) can be modeled in a trade-off framework. We discuss these alternative costs and benefits in separate sections below.

Table 6 and Fig. 5 show the factors that determine the appropriate amount of debt for the firm. The CFOs tell us that the corporate tax advantage of debt is moderately important in capital structure decisions: Row a of Table 6 shows that the mean response is 2.07 on a scale from 0 to 4 (0 meaning not important, 4 meaning very important). The tax advantage is most important for large, regulated, and dividend-paying firms – companies that probably have high corporate tax rates and therefore large tax incentives to use debt. Desai (1998) shows that firms issue foreign debt in response to relative tax incentives, so we investigate whether firms issue debt when foreign tax treatment is favorable. We find that favorable foreign tax treatment relative to the U.S. is fairly important (overall rating of 2.26 in Table 7). Big firms (2.41) with large foreign exposure (2.50) are relatively likely to indicate that foreign tax treatment is an important

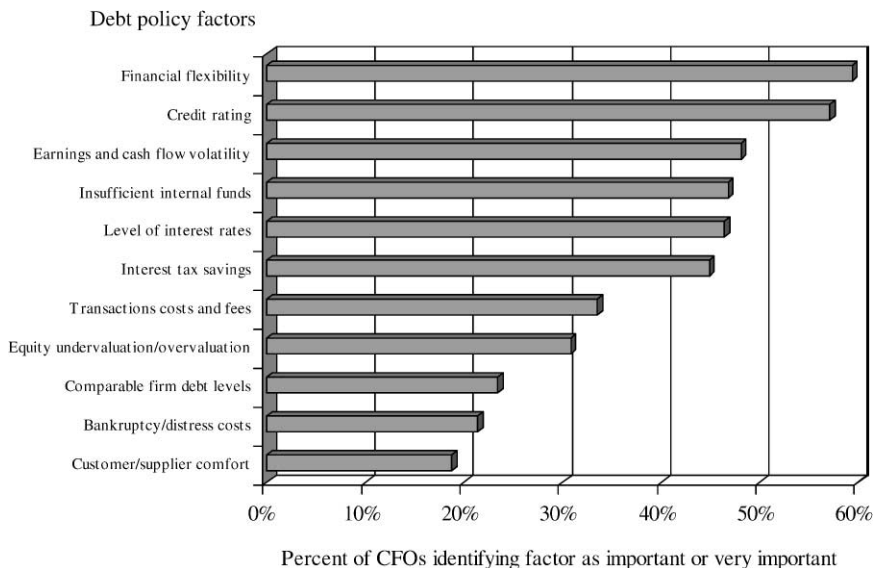


Fig. 5. Survey evidence on some of the factors that affect the decision to issue debt. The survey is based on the responses of 392 CFOs.



factor. This could indicate that firms need a certain level of sophistication and exposure to perform international tax planning.

In contrast, we find very little evidence that firms directly consider personal taxes when deciding on debt policy (rating of 0.68 in Table 6) or equity policy (rating of 0.82 in Table 8, the least popular equity issuance factor). Therefore, it seems unlikely that firms target investors in certain tax clienteles (although we can not rule out the possibility that investors choose to invest in firms based on payout policy, or that executives respond to personal tax considerations to the extent that they are reflected in market prices, see Graham, 1999a).

When we ask firms directly about whether potential costs of distress affect their debt decisions, we find they are not very important (rating of 1.24 in Table 6), although they are relatively important among speculative-grade firms. However, firms are very concerned about their credit ratings (rating of 2.46, the second most important debt factor), which can be viewed as an indication of concern about distress. Among utilities and firms that have rated debt, credit ratings are a very important determinant of debt policy. Credit ratings are also important for large firms (3.14) that are in the Fortune 500 (3.31). Finally, CFOs are also concerned about earnings volatility when making debt decisions (rating of 2.32), which is consistent with the trade-off theory's prediction that firms reduce debt usage when the probability of bankruptcy is high (Castanias, 1983).

We ask directly whether firms have an optimal or "target" debt–equity ratio. Nineteen percent of the firms do not have a target debt ratio or target range (see Fig. 1G). Another 37% have a flexible target, and 34% have a somewhat tight target or range. The remaining 10% have a strict target debt ratio (see Fig. 6). These overall numbers provide mixed support for the notion that companies trade off costs and benefits to derive an optimal debt ratio. However, untabulated analysis shows that large firms are more likely to have target debt ratios: 55% of large firms have at least somewhat strict target ratios, compared to 36% of small firms. Targets that are tight or somewhat strict are more common among investment-grade (64%) than speculative firms (41%), and among regulated (67%) than unregulated firms (43%). Targets are important if the CEO has short tenure or is young, and when the top three officers own less than 5% of the firm.

Finally, the CFOs tell us that their companies issue equity to maintain a target debt–equity ratio (rating of 2.26; Row e of Table 8), especially if their firm is highly levered (2.68), firm ownership is widely dispersed (2.64), or the CEO is young (2.41). Overall, the survey evidence provides moderate support for the trade-off theory.

### 5.1.2. *Deviations from target debt ratios*

Actual debt ratios vary across firms and through time. Such variability might occur if debt intensity is measured relative to the market value of equity, and yet firms do not rebalance their debt lock-step with changes in equity prices. Our

Table 6  
 Survey responses to the question: What factors affect how you choose the appropriate amount of debt for your firm?<sup>a</sup>

	% important or very important	Size			P/E		Leverage			Investment grade			Pay dividends			Industry			Management ownership		
		Mean	Small	Large	Growth	Non-G	Low	High	Yes	No	Yes	No	Yes	No	Manu.	Others	Low	High	Low	High	
(g) Financial flexibility (we restrict debt so we have enough internal funds available to pursue new projects when they come along)	59.38	2.59	2.54	2.65	2.61	2.75	2.61	2.60	2.71	2.59	2.73	2.40***	2.67	2.52	2.68	2.41**					
(d) Our credit rating (as assigned by rating agencies)	57.10	2.46	1.92	3.14***	2.89	2.81	2.29	2.64**	3.36	3.11**	2.76	2.04***	2.52	2.39	2.81	1.99***					
(h) The volatility of our earnings and cash flows	48.08	2.32	2.29	2.36	2.41	2.25	2.25	2.32	2.11	2.44**	2.33	2.28	2.35	2.31	2.32	2.41					
(a) The tax advantage of interest deductibility	44.85	2.07	1.77	2.44***	2.36	2.27	1.99	2.26**	2.32	2.54	2.35	1.65***	2.30	1.79***	2.27	1.89***					
(e) The transactions costs and fees for issuing debt	33.52	1.95	2.07	1.81**	1.98	1.80	1.94	1.87	1.85	2.06	1.91	2.02	1.89	1.95	1.88	2.02					
(c) The debt levels of other firms in our industry	23.40	1.49	1.29	1.77***	1.72	1.52	1.36	1.70***	1.80	1.71	1.63	1.34***	1.38	1.66**	1.57	1.37*					
(b) The potential costs of bankruptcy, near-bankruptcy, or financial distress	21.35	1.24	1.36	1.10**	1.29	1.02*	1.16	1.37**	0.99	1.40**	1.27	1.21	1.31	1.22	1.30	1.33					
(f) We limit debt so our customers/suppliers are not worried about our firm going out of business	18.72	1.24	1.20	1.30	1.43	1.00***	1.34	1.20	1.23	1.14	1.19	1.30	1.21	1.40*	1.17	1.45**					
(n) We restrict our borrowing so that profits from new/future projects can be captured fully by shareholders and do not have to be paid out as interest to debtholders	12.57	1.01	1.16	0.80***	1.09	0.69***	1.18	0.83***	0.77	0.85	0.95	1.06	1.08	0.97	0.78	1.30***					
(j) We try to have enough debt that we are not an attractive takeover target	4.75	0.73	0.57	0.91***	0.95	0.86	0.62	0.90***	0.84	0.96	0.76	0.66	0.83	0.66*	0.85	0.74					
(f) The personal tax cost our investors face when they receive interest income	4.79	0.68	0.59	0.72*	0.53	0.80**	0.68	0.63	0.87	0.51***	0.71	0.55*	0.65	0.63	0.65	0.72					
(k) If we issue debt our competitors know that we are very unlikely to reduce our output	2.25	0.40	0.41	0.37	0.48	0.32*	0.33	0.47**	0.38	0.51	0.38	0.41	0.46	0.36	0.37	0.52**					
(m) To ensure that upper management works hard and efficiently, we issue sufficient debt to make sure that a large portion of our cash flow is committed to interest payments	1.69	0.33	0.33	0.32	0.32	0.28	0.22	0.49***	0.28	0.38	0.32	0.34	0.40	0.26**	0.33	0.35					
(l) A high debt ratio helps us bargain for concessions from our employees	0.00	0.16	0.16	0.15	0.18	0.13	0.13	0.19*	0.14	0.17	0.13	0.19*	0.18	0.15	0.17	0.18					

	% important or very important	CEO age		CEO tenure		CEO MBA		Regulated		Target debt ratio		Public corp.		Foreign sales		Fortune 500 mailing		
		Mean	> 59	Ynger	Long	Short	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
(g) Financial flexibility (we restrict debt so we have enough internal funds available to pursue new projects when they come along)	59.38	2.59	2.54	2.59	2.68	2.52	2.51	2.64	2.76	2.57	2.63	2.54	2.68	2.40**	2.91	2.45**	2.60	2.55
(d) Our credit rating (as assigned by rating agencies)	57.10	2.46	2.52	2.44	2.28	2.56**	2.37	2.50	3.59	2.32**	2.19	2.73***	2.86	1.68***	2.77	2.30***	2.26	3.31***
(h) The volatility of our earnings and cash flows	48.08	2.32	2.38	2.33	2.40	2.29	2.22	2.40*	2.27	2.31	2.34	2.26	2.34	2.31	2.43	2.27	2.32	2.30
(a) The tax advantage of interest deductibility	44.85	2.07	2.15	2.05	1.92	2.14*	2.11	2.07	2.64	1.98**	2.03	2.13	2.24	1.76***	2.45	1.91***	1.97	2.53***
(e) The transactions costs and fees for issuing debt	33.52	1.95	1.95	1.98	2.22	1.83***	2.03	1.97	1.71	1.95	2.02	1.89	1.92	2.03	1.98	1.94	2.00	1.70**
(c) The debt levels of other firms in our industry	23.40	1.49	1.43	1.52	1.46	1.53	1.61	1.45	2.32	1.40***	1.37	1.60**	1.63	1.27***	1.41	1.51	1.41	1.86***
(b) The potential costs of bankruptcy, near-bankruptcy, or financial distress	21.35	1.24	1.12	1.29	1.37	1.20	1.24	1.25	1.38	1.25	1.32	1.19	1.15	1.42**	1.29	1.22	1.27	1.08
(i) We limit debt so our customers/suppliers are not worried about our firm going out of business	18.72	1.24	1.32	1.23	1.39	1.17**	1.23	1.25	1.33	1.23	1.27	1.24	1.27	1.16	1.20	1.26	1.30	0.98**
(n) We restrict our borrowing so that profits from new/future projects can be captured fully by shareholders and do not have to be paid out as interest to debtholders	12.57	1.01	0.99	1.00	1.05	0.97	1.04	0.98	0.86	1.02	1.03	0.99	0.95	1.10	1.01	1.00	1.12	0.48***
(j) We try to have enough debt that we are not an attractive takeover target	4.75	0.73	0.82	0.70	0.78	0.70	0.76	0.73	0.71	0.71	0.71	0.77	0.94	0.34***	0.93	0.64***	0.70	0.88*
(f) The personal tax cost our investors face when they receive interest income	4.79	0.68	0.56	0.68	0.67	0.63	0.65	0.65	0.67	0.62	0.73	0.58*	0.65	0.64	0.78	0.61*	0.67	0.72
(k) If we issue debt our competitors know that we are very unlikely to reduce our output	2.25	0.40	0.45	0.39	0.48	0.34**	0.37	0.42	0.38	0.38	0.44	0.36	0.43	0.35	0.42	0.39	0.40	0.36
(m) To ensure that upper management works hard and efficiently, we issue sufficient debt to make sure that a large portion of our cash flow is committed to interest payments	1.69	0.33	0.38	0.32	0.42	0.28**	0.30	0.36	0.14	0.34*	0.34	0.34	0.31	0.36	0.27	0.35	0.37	0.17**
(l) A high debt ratio helps us bargain for concessions from our employees	0.00	0.16	0.14	0.16	0.16	0.15	0.16	0.16	0.14	0.16	0.16	0.18	0.17	0.15	0.16	0.16	0.17	0.14

\* Respondents are asked to rate on a scale of 0 (not important) to 4 (very important). We report the overall mean as well as the % of respondents that answered 3 and 4 (very important). \*\*\*, \*\*, \* denotes a significant difference at the 1%, 5%, and 10% level, respectively. All table columns are defined in Table 1.

Table 7  
 Survey responses to the question: has your firm seriously considered issuing debt in foreign countries? If “yes”, what factors affect your firm’s decisions about issuing foreign debt?<sup>a</sup>

	% important or very important	Size		P/E		Leverage		Investment grade		Pay dividends			Industry			Management ownership			
		Mean	Small	Large	Non-G	Low	High	Yes	No	Yes	No	Yes	No	Manu.	Others	Low	High		
(c) Providing a “natural hedge” (e.g., if the foreign currency devalues, we are not obligated to pay interest in US\$)	85.84	3.15	3.06	3.22	2.98	3.29	3.20	3.32	3.06	3.23	3.12	3.36	3.32	2.94*	3.00	3.28			
(b) Keeping the “source of funds” close to the “use of funds”	63.39	2.67	3.09	2.52**	2.73	2.35*	2.70	2.79	2.38	2.70	2.57	3.12**	2.92	2.23***	2.55	2.74			
(a) Favorable tax treatment relative to the U.S (e.g., different corporate tax rates)	52.25	2.26	1.94	2.41**	2.27	2.29	2.26	2.39	2.37	2.40	2.29	2.08	2.36	2.13	2.16	2.33			
(e) Foreign interest rates may be lower than domestic interest rates	44.25	2.19	2.33	2.11	2.27	2.03	2.22	2.13	2.20	2.48	2.08	2.40	2.22	2.10	2.04	2.54**			
(d) Foreign regulations require us to issue debt abroad	5.50	0.63	0.60	0.64	0.75	0.29**	0.55	0.72	0.65	0.57	0.63	0.73	0.64	0.66	0.59	0.61			
	% important or very important	Mean	> 59	Ynger	Long	Short	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
(c) Providing a “natural hedge” (e.g., if the foreign currency devalues, we are not obligated to pay interest in US\$)	85.84	3.15	3.30	3.13	3.39	3.13	3.33	3.06	3.33	3.14	3.30	3.17	3.21	2.95	3.34	2.92**	3.22	3.00	
(b) Keeping the “source of funds” close to the “use of funds”	63.39	2.67	2.57	2.71	2.74	2.67	2.77	2.66	3.33	2.66*	2.78	2.64	2.65	2.95	2.72	2.65	2.85	2.30**	
(a) Favorable tax treatment relative to the U.S (e.g., different corporate tax rates)	52.25	2.26	2.13	2.30	2.00	2.39*	2.42	2.04*	2.11	2.22	2.44	2.12	2.37	1.67**	2.50	1.94**	2.34	2.11	
(e) Foreign interest rates may be lower than domestic interest rates	44.25	2.19	2.30	2.16	2.26	2.17	2.22	2.14	1.67	2.14	2.40	1.93**	2.18	2.26	2.25	2.08	2.28	2.03	
(d) Foreign regulations require us to issue debt abroad	5.50	0.63	0.77	0.57	0.50	0.69	0.60	0.58	1.11	0.57*	0.57	0.64	0.61	0.56	0.59	0.64	0.64	0.62	

<sup>a</sup> Respondents are asked to rate on a scale of 0 (not important) to 4 (very important). We report the overall mean as well as the % of respondents that answered 3 and 4 (very important). \*\*\*, \*\*, \* denotes a significant difference at the 1%, 5%, and 10% level, respectively. All table columns are defined in Table 1.

evidence supports this hypothesis: the mean response of 1.08 indicates that firms do not rebalance in response to market equity movements (Row g in Table 9). Further, among firms targeting their debt ratio, few firms (rating of 0.99) state that changes in the price of equity affect their debt policy. Similarly, in their large-sample study of Compustat firms, Opler and Titman (1998) find that firms issue equity after stock price increases, which they note is inconsistent with firms targeting debt ratios because it moves them further from any such target.

Fisher et al. (1989) propose an alternative explanation of why debt ratios vary over time, even if firms have a target. If there are fixed transactions costs to issuing or retiring debt, a firm only rebalances when its debt ratio crosses an upper or lower hurdle. We find moderate evidence that firms consider transactions costs when making debt issuance decisions (rating of 1.95 in Row e of Table 6), especially among small firms (2.07) in which the CEO has been in office for at least ten years (2.22). Many papers (e.g., Titman and Wessels, 1988) interpret the finding that small firms use relatively little debt as evidence that transaction costs discourage debt usage among small firms; as far as we know, our analysis is the most direct examination of this hypothesis to date. However, when we ask whether they *delay* issuing debt (rating of 1.06 in Table 9) or retiring debt (1.04) because of transactions costs, which is a more direct test of the Fisher et al. (1989) hypothesis, the support for the transactions cost hypothesis is weak.

## 5.2. Asymmetric information explanations of capital structure

### 5.2.1. Pecking-order model of financing hierarchy

The pecking-order model of financing choice assumes that firms do not target a specific debt ratio, but instead use external financing only when internal funds are insufficient. External funds are less desirable because informational asymmetries between management and investors imply that external funds are undervalued in relation to the degree of asymmetry (Myers and Majluf, 1984; Myers, 1984). Therefore, if firms use external funds, they prefer to use debt, convertible securities, and, as a last resort, equity.

Myers and Majluf (1984) assume that firms seek to maintain financial slack to avoid the need for external funds. Therefore, if we find that firms value financial flexibility, this is generally consistent with the pecking-order theory. However, flexibility is also important for reasons unrelated to the pecking-order model (e.g., Opler et al., 1999), so finding that CFOs value financial flexibility is not sufficient to prove that the pecking-order model is the true description of capital structure choice.

We ask several questions related to the pecking-order model. We ask if firms issue securities when internal funds are not sufficient to fund their activities, and separately ask if equity is used when debt, convertibles, or other sources of financing are not available. We also inquire whether executives consider equity

**Table 8**  
 Survey responses to the question: has your firm seriously considered issuing common stock? If “yes”, what factors affect your firm’s decisions about issuing common stock?\*

	% important or very important	Size			P/E		Leverage		Investment grade		Pay dividends			Industry			Management ownership	
		Mean	Small	Large	Growth	Non-G	Low	High	Yes	No	Yes	No	Manu.	Others	Low	High		
(m) Earnings-per-share dilution	68.55	2.84	2.65	3.12**	3.17	3.03	2.81	2.93	3.00	3.18	3.06	2.63**	3.03	2.60**	3.07	2.63**		
(k) The amount by which our stock is undervalued or overvalued by the market	66.94	2.69	2.67	2.71	2.94	2.65	2.50	2.93**	2.58	3.08**	2.70	2.66	2.76	2.50	2.93	2.47**		
(a) If our stock price has recently risen, the price at which we can sell is “high”	62.60	2.53	2.57	2.47	2.57	2.61	2.45	2.67	2.42	2.92*	2.35	2.69*	2.79	2.26**	2.62	2.45		
(c) Providing shares to employee bonus/stock option plans	53.28	2.34	2.22	2.50	2.20	2.38	2.66	2.00***	2.77	1.97**	2.46	2.17	2.16	2.47	2.34	2.30		
(e) Maintaining a target debt-to-equity ratio	51.59	2.26	2.04	2.58**	2.56	2.03**	1.86	2.68***	2.44	2.58	2.68	1.85***	2.48	1.91**	2.64	1.84***		
(j) Diluting the holdings of certain shareholders	50.41	2.14	2.30	1.90*	1.94	2.23	2.20	2.09	1.46	2.24**	1.97	2.31	1.95	2.20	2.00	2.38*		
(b) Stock is our “least risky” source of funds	30.58	1.76	1.93	1.52*	2.07	1.37***	1.80	1.71	1.44	1.68	1.56	1.97*	1.76	1.69	1.62	1.91		
(g) Whether our recent profits have been sufficient to fund our activities	30.40	1.76	1.91	1.54*	1.93	1.39**	1.71	1.79	1.52	1.82	1.67	1.76	1.84	1.69	1.60	1.88		
(f) Using a similar amount of equity as is used by other firms in our industry	22.95	1.45	1.33	1.63*	1.70	1.00***	1.35	1.57	1.56	1.43	1.74	1.09***	1.36	1.38	1.59	1.32		
(h) Issuing stock gives investors a better impression of our firm’s prospects than issuing debt	21.49	1.31	1.52	1.00**	1.48	0.89***	1.22	1.37	0.92	1.43**	1.10	1.46*	1.14	1.50*	1.18	1.51*		
(l) Inability to obtain funds using debt, convertibles, or other sources	15.57	1.15	1.36	0.84**	1.00	0.79	1.09	1.20	0.68	1.45***	1.03	1.19	1.03	1.22	1.16	1.21		
(d) Common stock is our cheapest source of funds	14.05	1.10	1.35	0.73***	1.02	0.97	1.26	0.96	0.68	0.68	0.93	1.28*	0.98	1.17	0.86	1.36**		
(i) The capital gains tax rates faced by our investors (relative to tax rates on dividends)	5.00	0.82	0.78	0.88	0.88	0.79	0.98	0.63**	0.80	0.92	0.80	0.77	0.75	0.92	0.81	0.88		

	% important or very important	CEO age		CEO tenure		CEO MBA		Regulated		Target debt ratio		Public corp.		Foreign sales		Fortune 500 mailing		
		Mean	> 59	Younger	Long	Short	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
(m) Earnings-per-share dilution	68.55	2.84	3.04	2.81	2.64	3.00*	2.62	2.95*	3.64	2.72***	2.69	2.97	3.18	1.48***	2.89	2.80	2.73	3.29**
(k) The amount by which our stock is undervalued or overvalued by the market	66.94	2.69	2.52	2.74	2.86	2.60	2.73	2.67	2.43	2.69	2.69	2.66	2.90	1.78***	2.96	2.58*	2.74	2.43
(a) If our stock price has recently risen, the price at which we can sell is "high"	62.60	2.53	2.54	2.55	2.51	2.56	2.45	2.56	2.64	2.50	2.47	2.57	2.70	1.83***	2.36	2.59	2.46	2.79
(c) Providing shares to employee bonus/stock option plans	53.28	2.34	2.65	2.23*	2.44	2.29	2.13	2.42	2.15	2.31	2.28	2.38	2.24	2.72**	2.50	2.29	2.24	2.74**
(e) Maintaining a target debt-to-equity ratio	51.59	2.26	1.72	2.41**	2.12	2.38	1.79	2.46***	3.14	2.11***	1.71	2.68***	2.40	1.73**	2.21	2.24	2.24	2.38
(j) Diluting the holdings of certain shareholders	50.41	2.14	2.32	2.13	2.27	2.14	2.16	2.19	2.00	2.16	2.24	2.02	2.25	1.68**	1.93	2.20	2.25	1.65**
(b) Stock is our "least risky" source of funds	30.58	1.76	1.71	1.74	1.72	1.73	1.53	1.83	1.69	1.75	1.79	1.73	1.79	1.62	1.82	1.75	1.90	1.17**
(g) Whether our recent profits have been sufficient to fund our activities	30.40	1.76	1.36	1.86**	1.84	1.73	1.42	1.91**	1.69	1.70	1.75	1.77	1.73	1.80	1.55	1.80	1.88	1.22**
(f) Using a similar amount of equity as is used by other firms in our industry	22.95	1.45	1.12	1.52*	1.41	1.47	1.13	1.58**	2.15	1.30**	1.46	1.37	1.43	1.54	1.11	1.54*	1.48	1.30
(h) Issuing stock gives investors a better impression of our firm's prospects than issuing debt	21.49	1.31	0.92	1.39**	1.32	1.30	1.11	1.41	1.23	1.28	1.24	1.36	1.29	1.33	1.21	1.35	1.41	0.91**
(l) Inability to obtain funds using debt, convertibles, or other sources	15.57	1.15	0.79	1.26*	1.32	1.10	0.76	1.35***	1.38	1.09	1.22	1.10	1.06	1.42	0.72	1.29**	1.20	0.91
(d) Common stock is our cheapest source of funds	14.05	1.10	0.88	1.12	1.00	1.12	1.16	1.05	0.69	1.15	1.32	0.92**	1.01	1.46*	1.11	1.11	1.23	0.52***
(i) The capital gains tax rates faced by our investors (relative to tax rates on dividends)	5.00	0.82	0.79	0.80	0.95	0.72	0.57	0.92**	0.38	0.81*	0.84	0.76	0.84	0.71	0.93	0.78	0.81	0.83

\* Respondents are asked to rate on a scale of 0 (not important) to 4 (very important). We report the overall mean as well as the % of respondents that answered 3 and 4 (very important). \*\*\*, \*\*, \* denotes a significant difference at the 1%, 5%, and 10% level, respectively. All table columns are defined in Table 1.

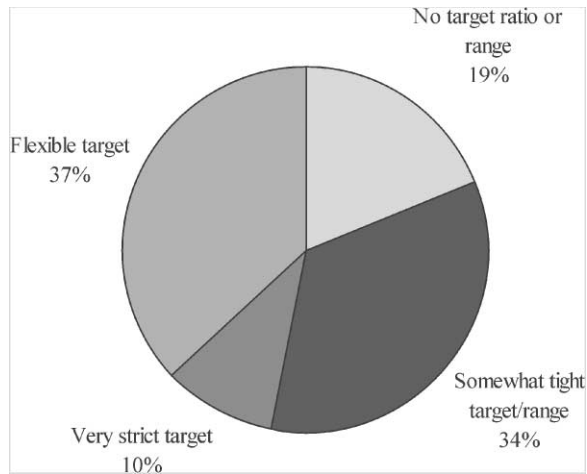


Fig. 6. Survey evidence on whether firms have optimal or target debt–equity ratios. The survey is based on the responses of 392 CFOs.

undervaluation when deciding which security to use, and whether financial flexibility is important.

The most important item affecting corporate debt decisions is management's desire for "financial flexibility," with a mean rating of 2.59 (Table 6).<sup>2</sup> Four firms write in explicitly that they remain flexible in the sense of minimizing interest obligations, so that they do not need to shrink their business in case of an economic downturn. In untabulated analysis, we find that firms that value financial flexibility are more likely to value real options in project evaluation, but the difference is not significant. Fifty-nine percent of the respondents say that flexibility is important (rating of 3) or very important (rating of 4). This finding is interesting because Graham (2000) shows that firms use their financial flexibility (i.e., preserve debt capacity) to make future expansions and acquisitions, but they appear to retain a lot of unused flexibility even after expanding. However, the importance of flexibility in the survey responses is not related to informational asymmetry (size or dividend payout) or growth options in the manner suggested by the pecking-order theory. In fact, flexibility is statistically

<sup>2</sup> Pinegar and Wilbricht (1989) survey 176 unregulated, nonfinancial Fortune 500 firms. Like us, they find that flexibility is the most important factor affecting financing decisions, and that bankruptcy costs and personal tax considerations are among the least important. Our analysis, examining a broader cross-section of theoretical hypotheses and using information on firm and executive characteristics, shows that the relative importance of these factors is robust to a more general survey design.



more important for dividend-paying firms, opposite the theoretical prediction (if dividend-paying firms have relatively little informational asymmetry). Therefore, a deeper investigation indicates that the desire for financial flexibility is not driven by the factors behind the pecking-order theory.

Having insufficient internal funds is a moderately important influence on the decision to issue debt (rating of 2.13, Row a in Table 9). This behavior is generally consistent with the pecking-order model. More small firms (rating of 2.30) than large firms (1.88) indicate that they use debt in the face of insufficient internal funds, which is consistent with the pecking-order if small firms suffer from larger asymmetric-information-related equity undervaluation. However, there is only modest evidence that firms issue equity because recent profits have been insufficient to fund activities (1.76 in Table 8), and even less indicating that firms issue equity after their ability to obtain funds from debt or convertibles is diminished (rating of 1.15 in Table 10).

Firms are reluctant to issue common stock when they perceive that it is undervalued (rating of 2.69, the most important equity issuance factor in Table 8). In a separate survey conducted one month after ours, when the Dow Jones 30 was approaching a new record of 10,000, Graham (1999b) finds that more than two-thirds of FEI executives feel that their common equity is undervalued by the market and that only 3% of CFOs think their stock is overvalued, suggesting that the preference for pecking-order-like behavior might be driven by managerial optimism (Heaton, 2000). Taken together, these findings indicate that a large percentage of companies are hesitant to issue common equity because they feel their stock is undervalued. Many firms issue convertible debt instead: equity undervaluation is the second most popular factor affecting convertible debt policy (rating of 2.34 in Table 10), a response particularly popular among growth firms (2.72).

Finding that firms avoid equity when they perceive that it is undervalued is generally consistent with the pecking order. However, when we examine more carefully how equity undervaluation affects financing decisions, the support for the pecking-order model wanes. In debt decisions, large (rating of 1.76 in Row d of Table 9), dividend-paying (1.65) firms are relatively more likely to say that equity undervaluation affects their debt policy (versus ratings of 1.37 for both small and nondividend-paying firms). In equity decisions, the relative importance of stock valuation on equity issuance is not related to informational asymmetry as indicated by small size and nondividend-paying status, though it is more important for firms with low executive ownership. In general, these findings are not consistent with the pecking-order idea that informationally induced equity undervaluation causes firms to avoid equity financing. Helwege and Liang (1996, p. 457) also find that “asymmetric information variables have no power to predict the relative use of public bonds over equity.”

In sum, the importance of financial flexibility and equity undervaluation to security issuance decisions is generally consistent with the pecking-order model

Table 9  
Survey responses to the question: what other factors affect your firm's debt policy?<sup>a</sup>

	% important or very important	Size			P/E		Leverage		Investment grade		Pay dividends			Industry			Management ownership					
		Mean	Small	Large	Growth	Non-G	Low	High	Yes	No	Yes	No	Yes	No	Manu.	Others	Low	High				
(c) We issue debt when interest rates are particularly low	46.35	2.22	2.07	2.40**	2.35	2.42	2.13	2.29	2.40	2.43	2.37	1.98***	2.25	2.16	2.39	2.02***						
(a) We issue debt when our recent profits (internal funds) are not sufficient to fund our activities	46.78	2.13	2.30	1.88***	2.09	1.86	2.10	2.12	1.81	2.28**	2.09	2.16	2.24	1.94**	2.14	2.13						
(d) We use debt when our equity is undervalued by the market	30.79	1.56	1.37	1.76***	2.14	1.85	1.52	1.72	1.56	2.17***	1.65	1.37*	1.67	1.47	1.83	1.49**						
(g) Changes in the price of our common stock	16.38	1.08	0.91	1.25***	1.45	1.38	0.96	1.27**	1.05	1.52***	1.14	0.95	1.14	1.01	1.25	1.07						
(e) We delay issuing debt because of transactions costs and fees	10.17	1.06	1.25	0.83***	1.06	0.87	1.09	1.00	0.90	0.92	0.97	1.20**	1.06	1.07	0.92	1.22**						
(f) We delay retiring debt because of recapitalization costs and fees	12.43	1.04	1.04	1.05	1.16	1.04	0.91	1.18**	1.10	1.30	1.13	0.93*	1.19	0.86***	1.05	1.02						
(b) Using debt gives investors a better impression of our firm's prospects than issuing common stock	9.83	0.96	0.85	1.05*	1.19	1.14	0.91	1.09	1.00	1.39**	1.00	0.84	1.01	0.87	1.07	0.95						
(h) We issue debt when we have accumulated substantial profits	1.14	0.53	0.50	0.55	0.61	0.55	0.46	0.54	0.57	0.60	0.55	0.50	0.58	0.45	0.61	0.52						
		CEO age			CEO tenure		CEO MBA		Regulated		Target debt ratio			Public corp.			Foreign sales			Fortune 500 mailing		
		Mean	> 59	Younger	Long	Short	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	
(c) We issue debt when interest rates are particularly low	46.35	2.22	2.13	2.26	2.24	2.21	2.36	2.15	2.19	2.20	2.30	2.12	2.39	1.90***	2.38	2.15	2.19	2.35				
(a) We issue debt when our recent profits (internal funds) are not sufficient to fund our activities	46.78	2.13	2.24	2.09	2.35	2.00**	2.09	2.18	2.00	2.14	2.21	2.00	2.01	2.33**	1.93	2.18	2.21	1.75**				
(d) We use debt when our equity is undervalued by the market	30.79	1.56	1.51	1.57	1.44	1.60	1.50	1.58	1.86	1.50	1.63	1.46	2.10	0.54***	1.89	1.41***	1.54	1.67				
(g) Changes in the price of our common stock	16.38	1.08	0.95	1.11	1.05	1.06	1.04	1.08	1.10	1.04	1.16	0.99	1.48	0.31***	1.15	1.02	1.08	1.10				
(e) We delay issuing debt because of transactions costs and fees	10.17	1.06	0.97	1.09	1.27	0.95***	1.13	1.06	0.76	1.10	1.13	0.99	1.03	1.15	1.11	1.05	1.17	0.57***				
(f) We delay retiring debt because of recapitalization costs and fees	12.43	1.04	1.08	1.01	1.20	0.93**	1.10	0.98	1.05	1.06	1.07	0.99	1.14	0.87**	1.22	0.97	1.07	0.89				
(b) Using debt gives investors a better impression of our firm's prospects than issuing common stock	9.83	0.96	1.10	0.90	0.94	0.95	0.79	1.04**	1.10	0.91	1.01	0.91	1.18	0.51***	1.00	0.92	0.92	1.14				
(h) We issue debt when we have accumulated substantial profits	1.14	0.53	0.51	0.53	0.61	0.46*	0.45	0.58	0.71	0.52	0.56	0.50	0.56	0.47	0.57	0.51	0.52	0.55				

<sup>a</sup> Respondents are asked to rate on a scale of 0 (not important) to 4 (very important). We report the overall mean as well as the % of respondents that answered 3 and 4 (very important). \*\*\*, \*\*, \* denotes a significant difference at the 1%, 5%, and 10% level, respectively. All table columns are defined in Table 1.

Table 10  
 Survey responses to the question: has your firm seriously considered issuing convertible debt? If “yes”, what factors affect your firm’s decisions about issuing convertible debt?<sup>a</sup>

	% important or very important	Size			P/E		Growth			Leverage			Investment grade		Pay dividends			Industry			Management ownership		
		Mean	Small	Large	Non-G	Low	High	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Manu.	Others	Low	High	Low	High
(a) Convertibles are an inexpensive way to issue “delayed” common stock	58.11	2.49	2.54	2.43	2.67	2.50	2.38	2.60	2.73	2.42	2.59	2.43	2.40	2.57	2.42	2.52							
(f) Our stock is currently undervalued	50.68	2.34	2.26	2.44	2.72	2.19*	2.21	2.52	2.40	2.64	2.25	2.46	2.41	2.43	2.28	2.42							
(g) Ability to “call” or force conversion of convertible debt if/when we need to	47.95	2.29	2.28	2.29	2.58	2.56	2.32	2.20	2.21	2.65	2.42	2.17	2.26	2.33	2.08	2.52*							
(e) Avoiding short-term equity dilution	45.83	2.18	2.03	2.35	2.45	2.19	2.15	2.28	2.47	2.38	2.44	1.97*	2.23	2.14	2.05	2.33							
(h) To attract investors unsure about the riskiness of our company	43.84	2.07	2.35	1.73**	1.88	1.88	2.02	2.10	1.36	1.88*	1.83	2.31*	2.00	2.13	1.82	2.47**							
(c) Convertibles are less expensive than straight debt	41.67	1.85	2.08	1.58*	1.56	2.31**	1.80	1.83	1.43	1.80	1.57	2.14**	1.58	2.10*	1.71	2.00							
(d) Other firms in our industry successfully use convertibles	12.50	1.10	1.12	1.06	1.22	0.69*	1.29	0.83**	0.93	1.25	0.86	1.21*	0.92	1.30*	1.05	1.06							
(b) Protecting bondholders against unfavorable actions by managers or stockholders	1.41	0.62	0.61	0.64	0.72	0.31**	0.57	0.66	0.43	0.64	0.54	0.71	0.58	0.72	0.61	0.67							
	% important	Mean	> 59	Ynger	CEO age	CEO tenure	CEO MBA	Regulated	Regulated	Target debt ratio	Public corp.	Foreign sales	Fortune 500 mailing										
	or very important																						
(a) Convertibles are an inexpensive way to issue “delayed” common stock	58.11	2.49	2.79	2.46	2.74	2.42	2.61	2.47	2.78	2.51	2.36	2.68	2.54	2.27	2.52	2.41							
(f) Our stock is currently undervalued	50.68	2.34	2.00	2.45	2.28	2.42	1.87	2.57**	2.78	2.27	2.30	2.32	2.45	1.93*	2.48	2.25							
(g) Ability to “call” or force conversion of convertible debt if/when we need to	47.95	2.29	2.64	2.21	2.42	2.22	1.91	2.39*	2.25	2.28	2.23	2.37	2.29	2.27	2.48	2.20							
(e) Avoiding short-term equity dilution	45.83	2.18	2.00	2.25	2.28	2.16	2.00	2.24	3.11	2.10**	2.05	2.37	2.21	2.07	2.24	2.12							
(h) To attract investors unsure about the riskiness of our company	43.84	2.07	2.29	2.00	2.00	2.08	1.57	2.33***	1.88	2.12	2.32	1.63**	1.77	3.07***	2.00	2.10							
(c) Convertibles are less expensive than straight debt	41.67	1.85	2.50	1.70**	1.94	1.76	2.04	1.78	1.38	1.93	2.07	1.44**	1.81	2.00	1.81	1.86							
(d) Other firms in our industry successfully use convertibles	12.50	1.10	1.00	1.11	0.72	1.25**	0.57	1.33***	1.50	0.95*	1.33	0.78**	1.09	1.00	1.33	1.00							
(b) Protecting bondholders against unfavorable actions by managers or stockholders	1.41	0.62	1.08	0.53***	0.61	0.66	0.48	0.73*	0.62	0.59	0.60	0.67	0.61	0.67	0.62	0.62							

<sup>a</sup> Respondents are asked to rate on a scale of 0 (not important) to 4 (very important). We report the overall mean as well as the % of respondents that answered 3 and 4 (very important). \*\*\*, \*\*, \* denotes a significant difference at the 1%, 5%, and 10% level, respectively. All table columns are defined in Table 1.

of financing hierarchy. However, asymmetric information does not appear to *cause* the importance of these factors, as it should if the pecking-order model is the true model of capital structure choice.

#### 5.2.2. *Recent increase in price of common stock*

We investigate whether firms issue stock during a “window of opportunity” that arises because their stock price has recently increased, as argued by Loughran and Ritter (1995). Lucas and McDonald (1990) put an informational asymmetry spin on the desire to issue equity after stock price increases: If a firm’s stock price is undervalued due to informational asymmetry, it delays issuing until after an informational release (of good news) and the ensuing increase in stock price.

Recent stock price performance is the third most popular factor affecting equity-issuance decisions (rating of 2.53 in Table 8), in support of the “window of opportunity”. Consistent with Lucas and McDonald (1990), the window of opportunity is most important for firms suffering from informational asymmetries (i.e., not paying dividends).

#### 5.2.3. *Signaling private information with debt and equity*

Ross (1977) and Leland and Pyle (1977) argue that firms use capital structure to signal their quality or future prospects. However, very few firms indicate that their debt policy is affected by factors consistent with signaling (rating of 0.96 in Table 9). In addition to small absolute importance, companies more likely to suffer from informational asymmetries, such as small, private (0.51) firms, are relatively unlikely to use debt to signal future prospects (see Row b in Table 9). We also find little evidence that firms issue equity to give the market a positive impression of their prospects (rating of 1.31 in Table 8). Sending a positive signal via equity issuance is relatively more popular among speculative, nondividend-paying firms.

#### 5.2.4. *Private information and convertible stock issuance*

Brennan and Kraus (1987) and Brennan and Schwartz (1988) argue that the call or conversion feature makes convertible debt relatively insensitive to asymmetric information (between management and investors) about the risk of the firm. We find moderate support for this argument. Firms use convertible debt to attract investors unsure about the riskiness of the company (rating of 2.07 in Table 10). This response is relatively more popular among firms for which outside investors are likely to know less than management about firm risk, i.e., small firms (2.35) with large managerial ownership (2.47).

Stein (1992) argues that if firms privately know that their stock is undervalued, they prefer to avoid issuing equity. At the same time, they want to minimize the distress costs that come with debt issuance. Convertible debt is “delayed” common stock that has lower distress costs than debt and smaller

undervaluation than equity. We find strong evidence consistent with Stein's argument that convertibles are "back-door equity." Among firms that issue convertible debt, the most popular factor is that convertibles are an inexpensive way to issue delayed common stock (rating of 2.49 in Table 10).

#### 5.2.5. *Anticipating improvement in credit ratings*

Having private information about credit quality can affect a firm's optimal debt maturity. In theory, if firms privately know they are high quality but are currently assigned a low credit rating, they issue short-term debt because they expect their rating to improve (Flannery, 1986; Kale and Noe, 1990). In practice, the evidence that firms time their credit worthiness is weak. The mean response is only 0.85 (Row e, Table 11) that companies borrow short-term because they expect their credit rating to improve. This response receives more support from companies with speculative grade debt (1.18) and those that do not pay dividends (0.99). Though not of large absolute magnitude, this last answer is consistent with firms timing their credit ratings when they are subject to large informational asymmetries.

#### 5.2.6. *Timing market interest rates*

Although relatively few executives time changes in their credit ratings (something about which they might reasonably have private information), we find surprising indications that they try to time the market in other ways. We inquire whether executives attempt to time interest rates by issuing debt when they feel that market interest rates are particularly low. The rating of 2.22 in Table 6 provides moderately strong evidence that firms try to time the market in this sense. Market timing is especially important for large firms (2.40), which implies that companies are more likely to time interest rates when they have a large or sophisticated treasury department.

We also find evidence that firms issue short-term debt in an effort to time market interest rates. CFOs borrow short-term when they feel that short rates are low relative to long rates (1.89 in Table 11) or when they expect long-term rates to decline (1.78). Finally, we check if firms use foreign debt because foreign interest rates are lower than domestic rates. There is moderate evidence that relatively low foreign interest rates affect the decision to issue abroad (rating of 2.19). Though insignificant, small (2.33) growth (2.27) firms are more likely to make this claim. If covered interest rate parity holds, it is not clear to us why firms pursue this strategy.

### 5.3. *Agency costs*

#### 5.3.1. *Conflicts between bondholders and equityholders*

Myers (1977) argues that investment decisions can be affected by the presence of long-term debt in a firm's capital structure. Shareholders might "underinvest"

Table 11  
Survey responses to the question: what factors affect your firm's choice between short- and long-term debt?<sup>a</sup>

	% important or very important	Size			P/E			Leverage		Investment grade		Pay dividends			Industry		Management ownership	
		Mean	Small	Large	Growth	Non-G	Low	High	Yes	No	Yes	No	Manu.	Others	Low	High		
(b) Matching the maturity of our debt with the life of our assets	63.25	2.60	2.69	2.46**	2.70	2.46*	2.57	2.63	2.60	2.45	2.53	2.67	2.51	2.72*	2.54	2.62		
(g) We issue long-term debt to minimize the risk of having to refinance in "bad times"	48.83	2.15	2.05	2.29*	2.31	2.03*	1.95	2.55***	2.26	2.51*	2.22	2.05	2.39	1.79***	2.18	2.10		
(a) We issue short-term when short-term interest rates are low compared to long-term rates	35.94	1.89	1.79	2.01**	1.97	2.11	1.82	1.93	2.22	2.05	2.00	1.74**	2.03	1.77**	1.95	1.67**		
(c) We issue short-term when we are waiting for long-term market interest rates to decline	28.70	1.78	1.66	1.93**	2.01	1.82	1.67	1.90**	2.00	2.02	1.91	1.61***	1.90	1.65**	1.82	1.67		
(d) We borrow short-term so that returns from new projects can be captured more fully by shareholders, rather than committing to pay long-term profits as interest to debtholders	9.48	0.94	1.03	0.80**	0.87	0.89	1.01	0.85*	0.84	0.77	0.98	0.87	1.05	0.81**	0.89	0.97		
(e) We expect our credit rating to improve, so we borrow short-term until it does	8.99	0.85	0.86	0.84	0.87	0.68*	0.79	0.99*	0.66	1.18***	0.73	0.99**	0.89	0.85	0.89	0.87		
(f) Borrowing short-term reduces the chance that our firm will want to take on risky projects	4.02	0.53	0.62	0.40***	0.54	0.32**	0.56	0.49	0.36	0.56**	0.47	0.59*	0.53	0.51	0.40	0.70***		

	% important or very important	CEO age		CEO tenure		CEO MBA		Regulated		Target debt ratio		Public corp.		Foreign sales		Fortune 500 mailing		
		Mean	>59	Ynger	Long	Short	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
(b) Matching the maturity of our debt with the life of our assets	63.25	2.60	2.28	2.69***	2.69	2.53	2.59	2.64	2.81	2.60	2.53	2.66	2.47	2.85***	2.33	2.69***	2.65	2.39*
(g) We issue long-term debt to minimize the risk of having to refinance in "bad times"	48.83	2.15	2.09	2.20	2.25	2.12	2.20	2.15	2.48	2.15	2.00	2.36***	2.23	2.02*	2.40	2.06**	2.11	2.31
(a) We issue short-term when short-term interest rates are low compared to long-term rates	35.94	1.89	1.78	1.93	1.87	1.90	1.98	1.87	1.95	1.86	1.93	1.85	2.00	1.72**	2.11	1.80**	1.86	2.03
(e) We issue short-term when we are waiting for long-term market interest rates to decline	28.70	1.78	1.68	1.80	1.79	1.78	1.74	1.79	2.40	1.71***	1.72	1.87	1.93	1.50***	2.00	1.69**	1.74	1.94
(d) We borrow short-term so that returns from new projects can be captured more fully by shareholders, rather than committing to pay long-term profits as interest to debtholders	9.48	0.94	0.86	0.95	0.98	0.90	0.99	0.89	0.90	0.93	0.96	0.90	0.87	1.07**	0.95	0.93	0.99	0.70**
(e) We expect our credit rating to improve, so we borrow short-term until it does	8.99	0.85	0.79	0.87	0.89	0.82	0.84	0.87	0.90	0.85	0.98	0.65***	0.88	0.82	0.89	0.85	0.89	0.70*
(f) Borrowing short-term reduces the chance that our firm will want to take on risky projects	4.02	0.53	0.51	0.53	0.66	0.44***	0.45	0.56	0.43	0.54	0.55	0.51	0.46	0.67**	0.44	0.57*	0.59	0.29***

\* Respondents are asked to rate on a scale of 0 (not important) to 4 (very important). We report the overall mean as well as the % of respondents that answered 3 and 4 (very important). \*\*\*, \*\*, \*, \* denotes a significant difference at the 1%, 5%, and 10% level, respectively. All table columns are defined in Table 1.

and pass up positive NPV projects if they perceive that the profits will be used to pay off existing debtholders. This cost is most acute among growth firms. Myers (1977) argues that firms can limit total debt, or use short-term debt, to minimize underinvestment costs. Froot, Scharfstein, and Stein (1993) argue that firms can hedge or otherwise maintain financial flexibility to avoid these costs of underinvestment.

We ask firms if their choice between short- and long-term debt, or their overall debt policy, is related to their desire to pay long-term profits to shareholders, not debtholders. The absolute number of firms indicating that their debt policy is affected by underinvestment concerns is small (rating of 1.01 in Table 6). However, more growth (1.09) than nongrowth firms (0.69) are likely to indicate that underinvestment problems are a concern, which is consistent with the theory. We find little support for the idea that short-term debt is used to alleviate the underinvestment problem. The mean response is only 0.94 (Row d in Table 11) that short-term borrowing is used to allow returns from new projects to be captured by long-term shareholders, and there is no statistical difference in the response between growth and nongrowth firms.

Overall, support for the underinvestment argument is weak. This is interesting because it contrasts with the finding in many large sample studies that debt usage is inversely related to variables measuring growth options (i.e., market-to-book ratios), which those studies interpret as evidence that underinvestment costs affects debt policy (e.g., Graham, 1996).

Stockholders capture investment returns above those required to service debt payments and other liabilities, and at the same time have limited liability when returns are insufficient to fully pay debtholders. Therefore, stockholders prefer high-risk projects, in conflict with bondholder preferences. Leland and Toft (1996) argue that using short-term debt reduces this agency conflict (see also Barnea et al., 1980).

In contrast to this hypothesis, however, we find little evidence that executives issue short-term debt to minimize asset substitution problems. The mean response is only 0.53 (Table 11) that executives feel that short-term borrowing reduces the chance that shareholders will want to take on risky projects.

Green (1984) argues that convertible debt can circumvent the asset substitution problem that arises when firms accept projects that are riskier than bondholders would prefer. However, we find little evidence that firms use convertibles to protect bondholders against unfavorable actions by managers or stockholders (rating of 0.62 in Table 10).

### 5.3.2. *Conflicts between managers and equityholders*

Jensen (1986) and others argue that when a firm has ample free cash flow, its managers can squander the cash by consuming perquisites or making inefficient investment decisions. We inquire whether firms use debt to commit to pay out free cash flows and thereby discipline management into working efficiently



along the lines suggested by Jensen. We find very little evidence that firms discipline managers in this way (mean rating of 0.33, the second lowest rating among all factors affecting debt policy in Table 6). It is important to note, however, that 1) managers might be unwilling to admit to using debt in this manner, or 2) perhaps a low rating on this question reflects an unwillingness of firms to adopt Jensen's solution more than a weakness in Jensen's argument.

#### 5.4. Product market and industry factors

Bradley et al. (1984) find that debt ratios differ markedly across industries. One explanation for this pattern is that the product market environment or nature of competition varies across industries in a way that affects optimal debt policy. For example, Titman (1984) suggests that customers avoid purchasing a firm's products if they think that the firm might go out of business (and therefore not stand behind its products), especially if the products are unique; consequently, firms that produce unique products might avoid using debt. Brander and Lewis (1986) model another way that production and financing decisions can be intertwined. They hypothesize that, by using substantial debt, a firm can provide a credible threat to rivals that it will not reduce production.

We find little evidence that product market factors affect debt decisions. Executives assign a mean rating of 1.24 to the proposition that debt should be limited so that a firm's customers or suppliers do not become concerned that the firm might go out of business (Table 6). Moreover, high-tech firms (which we assume produce unique products) are *less* likely than other firms to limit debt for this reason, contrary to Titman's prediction. We do find that, in comparison to nongrowth firms (1.00), relatively many growth firms (1.43) claim that customers might not purchase their products if they are worried that debt usage might cause the firm to go out of business. This is consistent with Titman's theory if growth firms produce unique products. Finally, there is no evidence supporting the Brander and Lewis hypothesis that debt provides a credible production threat (rating of 0.40).

Though we do not find much evidence that product market factors drive industry differences in debt ratios, we ask executives whether their capital structure decisions are affected by the financing policy of other firms in their industries. This is important because some papers define a firm's target debt ratio as the industry-wide ratio (e.g., Opler and Titman, 1998; Gilson, 1997).

We find only modest evidence that managers are concerned about the debt levels of their competitors (rating of 1.49 in Table 6). Recall, however, that credit ratings are important to debt decisions and note that industry debt ratios are an important input for bond ratings. Rival debt ratios are relatively important for regulated companies (2.32), Fortune 500 firms (1.86), public firms (rating of 1.63 versus 1.27 for private firms), and firms that target their debt ratio (1.60). Moreover, equity issuance decisions are not influenced greatly by the equity

policies of other firms in a given industry (rating of 1.45 in Table 8). Finally, we find even less evidence that firms use convertibles because other firms in their industry do so (1.10 in Table 10).

### 5.5. *Control contests*

Capital structure can be used to influence, or can be affected by, corporate control contests and managerial share ownership (e.g., Harris and Raviv, 1988; Stulz, 1988). We find moderate evidence that firms issue equity to dilute the stock holdings of certain shareholders (rating of 2.14 in Table 8). This tactic is popular among speculative-grade companies (2.24); however, it is not related to the number of shares held by managers. We also ask if firms use debt to reduce the likelihood that the firm will become a takeover target. We find little support for this hypothesis (rating of 0.73 in Table 6).

### 5.6. *Risk management*

Capital structure can be used to manage risk. Géczy et al. (1997, p. 1331) note that “foreign denominated debt can act as a natural hedge of foreign revenues” and displace the need to hedge with currency derivatives. We ask whether firms use foreign debt because it acts as a natural hedge, and separately how important it is to keep the source close to the use of funds. Among the 31% of respondents who seriously considered issuing foreign debt, the most popular reason they did so is to provide a natural hedge against foreign currency devaluation (mean rating of 3.15 in Table 7). Providing a natural hedge is most important for public firms (3.21) with large foreign exposure (3.34). The second most important factor affecting the use of foreign debt is keeping the source close to the use of funds (rating of 2.67), especially for small (3.09), manufacturing firms (2.92).

Risk-management practices can also explain why firms match the maturity of assets and liabilities. If asset and liability duration are not aligned, interest rate fluctuations can affect the amount of funds available for investment and day-to-day operations. We ask firms how they choose debt maturity. The most popular explanation of how firms choose between short- and long-term debt is that they match debt maturity with asset life (rating of 2.60 in Table 11). Maturity-matching is most important for small (2.69), private (2.85) firms.

### 5.7. *Practical, cash management considerations*

Liquidity and cash management affect corporate financial decisions, often in ways that are not as “deep” as the factors driving academic models. For example, many companies issue long-term so that they do not have to refinance in “bad times” (rating of 2.15 in Table 11). This is especially important for highly

levered (2.55), manufacturing (2.37) firms. The CFOs also say that equity is often issued simply to provide shares to bonus/option plans (2.34 in Table 8), particularly among investment-grade firms (2.77) with a young CEO (2.65).

The hand-written responses indicate that practical considerations affect the maturity structure of borrowing (see B.7 on the Internet site, Appendix B). Four firms explicitly say that they tie their scheduled principal repayments to their projected ability to repay. Another six diversify debt maturity to limit the magnitude of their refinancing activity in any given year. Other firms borrow for the length of time they think they will need funds, or borrow short-term until sufficient debt has accumulated to justify borrowing long-term.

### *5.8. Other factors affecting capital structure*

#### *5.8.1. Debt*

We ask if having debt allows firms to bargain for concessions from employees (Chang, 1992; Hanka, 1998). We find no indication that this is the case (mean rating of 0.16 in Table 6, the lowest rating for any question on the survey). Not a single respondent said that debt is important or very important as a bargaining device (rating of 3 or 4). We also check if firms issue debt after recently accumulating substantial profits (Opler and Titman, 1998). The executives do not recognize this as an important factor affecting debt policy (rating 0.53 in Table 9).

Fourteen firms write that they choose debt to minimize their weighted average cost of capital (see B.5 on the Internet site, Appendix B). Ten write, essentially, that they borrow to fund projects or growth, but only as needed. Five indicate that bond or bank covenants affect their debt policy.

#### *5.8.2. Common stock*

We investigate whether concern about earnings dilution affects equity issuance decisions. The textbook view is that earnings are not diluted if a firm earns the required return on the new equity. Conversely, if funds are obtained by issuing debt, the number of shares remains constant and so EPS can increase. However, the equity is levered and therefore more risky, so Modigliani and Miller's "conservation of value" tells us that the stock price will not increase due to higher EPS. Nonetheless, Brealey and Myers (1996) indicate that there is a common belief among executives that share issuance dilutes earnings per share (on p. 396, Brealey and Myers call this view a "fallacy"). To investigate this issue, we ask if earnings per share concerns affect decisions about issuing common stock.

Among the 38% of firms that seriously considered issuing common equity during the sample period, earnings dilution is the most important factor affecting their decision (mean rating of 2.84 in Table 8 and a mean rating of 3.18 among public firms). The popularity of this response is intriguing (see Fig. 7). It

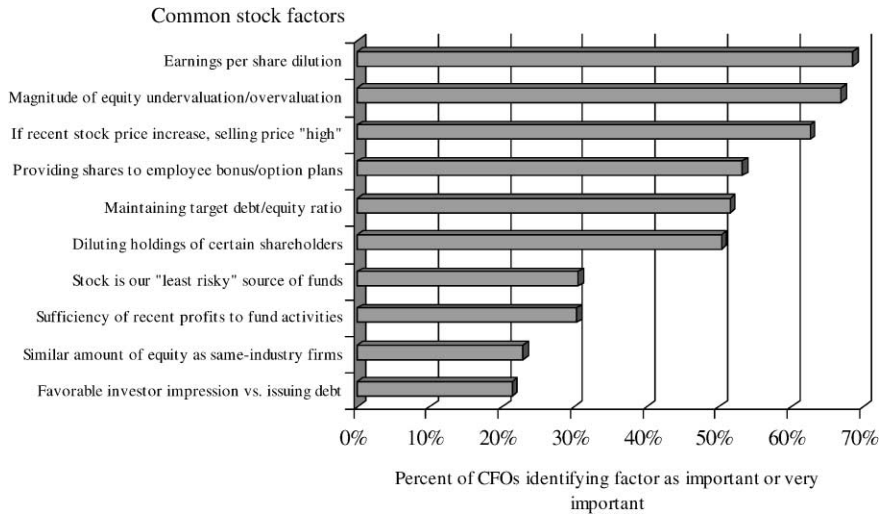


Fig. 7. Survey evidence on some of the factors that affect the decision to issue common stock. The survey is based on the responses of 392 CFOs.

either indicates that executives focus more than they should on earnings dilution (if the standard textbook view is correct), or that the standard textbook treatment misses an important aspect of earnings dilution. EPS dilution is a big concern among regulated companies (3.60), even though in many cases the regulatory process ensures that utilities earn their required cost of capital, implying that EPS dilution should not affect share price. Concern about EPS dilution is strong among large (3.12), dividend-paying firms (3.06). EPS dilution is less important when the CEO has an MBA (2.62) than when he or she does not (2.95), perhaps because the executive has read Brealey and Myers!

We inquire whether common stock is a firm's least risky or cheapest source of funds. Williamson (1988) argues that equity is a cheap source of funds with which to finance low-specificity assets. A modest number of the executives state that they use equity because it is the least risky source of funds (rating of 1.76 in Table 8). The idea that equity has low risk is more popular among firms with the characteristics of a new or start-up firm: small (1.93) with growth options (2.07). The idea that common stock is the cheapest source of funds is less popular (rating of 1.10), although firms with start-up characteristics are more likely to have this belief. Unreported analysis indicates that there is a positive correlation between believing that equity is the cheapest and that it is the least risky source of funds.

Nine companies indicate that they issue common stock because it is the "preferred currency" for making acquisitions, especially for the pooling method of accounting (see B.9 on the Internet site, Appendix B). Two firms write that

they issue stock because it is the natural form of financing for them in their current stage of corporate development.

5.8.3. Convertible debt

We ask the executives whether the ability to call or force conversion is an important feature affecting convertible debt policy. Among the one-in-five firms that seriously considered issuing convertible debt, there is moderate evidence that executives like convertibles because of the ability to call or force conversion (rating of 2.29 in Table 10). Though not a direct test, the popularity of the call/conversion feature is consistent with Mayers' (1998) hypothesis that convertible debt allows funding of profitable future projects but attenuates overinvestment incentives. The factors used in decisions to issue convertible debt are presented in Fig. 8.

Billingsley et al. (1985) document that convertibles cost on average 50 basis points less than straight debt. However, relatively few CFOs indicate that they use convertible debt because it is less expensive than straight debt (rating of 1.85). Companies run by mature executives are more likely to issue convertibles because they are less costly than straight debt (2.50).

Billingsley and Smith (1996) also find that convertibles are favored as delayed equity and because management feels that common equity is undervalued. Contrary to our results, Billingsley and Smith find fairly strong evidence that firms are influenced by the convertible use of other firms in their industry. Also in contrast to our results, they find that the most important factor affecting the use of convertibles is the lower cash costs/coupon rate versus straight debt. One difference between our study and theirs is that they request a response relative to

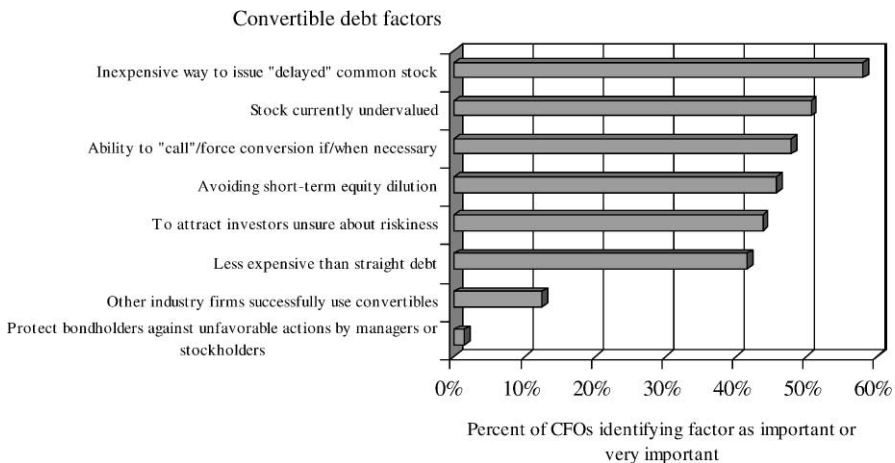


Fig. 8. Survey evidence on the factors that affect the decision to issue convertible debt. The survey is based on the responses of 392 CFOs.

a specific offering among firms that actually issue convertible debt. We condition only on whether a firm seriously considered issuing convertibles.

#### 5.8.4. *Foreign debt*

Grinblatt and Titman (1998) note that capital markets have become increasingly global in recent decades and that U.S. firms frequently raise funds overseas. We indicate above that firms issue foreign debt in response to tax incentives, to keep the source close to the use of funds, and in an attempt to take advantage of low foreign interest rates. Five firms write that they borrow overseas to broaden their sources of financing (see B.8 on the Internet site, Appendix B). Few firms indicate that foreign regulations require them to issue abroad (rating of 0.61 in Table 7).

## 6. Conclusions

Our survey of the practice of corporate finance is both reassuring and puzzling. For example, it is reassuring that NPV is dramatically more important now as a project evaluation method than, as indicated in past surveys, it was 10 or 20 years ago. The CAPM is also widely used. However, it is surprising that more than half of the respondents would use their firm's overall discount rate to evaluate a project in an overseas market, even though the project likely has different risk attributes than the overall firm. This indicates that practitioners might not apply the CAPM or NPV rule correctly. It is also interesting that CFOs pay very little attention to risk factors based on momentum and book-to-market value.

We identify fundamental differences between small and large firms. Our research suggests that small firms are less sophisticated when it comes to evaluating risky projects. Small firms are significantly less likely to use the NPV criterion or the capital asset pricing model and its variants. Perhaps these and our other findings about the effect of firm size will help academics understand the pervasive relation between size and corporate practices. Further, the fact that the practice of corporate finance differs based on firm size could be an underlying cause of size-related asset pricing anomalies.

In our analysis of capital structure, we find that informal criteria such as financial flexibility and credit ratings are the most important debt policy factors. Other informal criteria such as EPS dilution and recent stock price appreciation are the most important factors influencing equity issuance. The degree of stock undervaluation is also important to equity issuance, and we know from other surveys that most executives feel their stock is undervalued.

We find moderate support that firms follow the trade-off theory and target their debt ratio. Other results, such as the importance of equity undervaluation and financial flexibility, are generally consistent with the pecking-order view. However, the evidence in favor of these theories does not hold up as well under

closer scrutiny (e.g., the evidence is generally not consistent with informational asymmetry causing pecking-order-like behavior), and is weaker still for more subtle theories. We find mixed or little evidence that signaling, transactions costs, underinvestment costs, asset substitution, bargaining with employees, free cash flow considerations, and product market concerns affect capital structure choice. Table 12 summarizes our capital structure findings.

In summary, executives use the mainline techniques that business schools have taught for years, NPV and CAPM, to value projects and to estimate the cost of equity. Interestingly, financial executives are much less likely to follow the academically proscribed factors and theories when determining capital structure. This last finding raises possibilities that require additional thought and research. Perhaps the relatively weak support for many capital structure theories indicates that it is time to critically reevaluate the assumptions and implications of these mainline theories. Alternatively, perhaps the theories are valid descriptions of what firms should do—but corporations ignore the theoretical advice. One explanation for this last possibility is that business schools might be better at teaching capital budgeting and the cost of capital than at teaching capital structure. Moreover, perhaps NPV and the CAPM are more widely understood than capital structure theories because they make more precise predictions and have been accepted as mainstream views for longer. Additional research is needed to investigate these issues.

Table 12  
Summary of the relation between survey evidence and capital structure theories

A capital structure theory or concept is listed in the first column, followed by the related survey evidence in the right column. ✓ (×) indicates that the evidence drawn from the unconditional responses to a survey question supports (does not support) the idea in the first column. An indented ✓ (×) indicates whether the survey evidence supports (does not support) the idea conditional on firm characteristics or other detailed analysis. The conditional (i.e., indented) evidence usually qualifies the unconditional result it lies directly below.

Theory or concept	Survey evidence
<i>Trade-off theory of choosing optimal debt policy</i>	✓corporate interest deductions moderately important.
Trade-off benefits and costs of debt (Scott, 1976). Often tax benefits are traded off with expected distress costs or personal tax costs (Miller, 1977).	✓foreign tax treatment moderately important. ✓cash flow volatility important. × expected distress/bankruptcy costs not important. ✓maintaining financial flexibility important (expected distress costs low). × unrelated to whether firm has target debt ratio. × personal taxes not important to debt or equity decision.

Table 12 (continued)

Theory or concept	Survey evidence
<p><i>Firms have target debt ratios</i></p> <p>A static version of the trade-off theory implies that firms have an optimal, target debt ratio.</p>	<p>✓44% have strict or somewhat strict target/range.</p> <p>✓64% of investment-grade firms have somewhat strict target/range.</p> <p>✓target <i>D/E</i> moderately important for equity issuance decision.</p> <p>× 37% have flexible and 19% have no target/range.</p> <p>× issue equity after stock price increase.</p> <p>× changes in stock price not important to debt decision.</p> <p>× execs say same-industry debt ratios are not important.</p> <p>✓there are industry patterns in reported debt ratios.</p>
<p><i>The effect of transactions costs on debt ratios:</i></p> <p>Transactions costs can affect the cost of external funds.</p> <p>Firms avoid or delay issuing or retiring security because of issuance/recapitalization cost (Fisher et al., 1989)</p>	<p>✓transactions costs affect debt policy.</p> <p>✓more important for small firms.</p> <p>× absolute importance is small for transactions costs delaying debt issue.</p> <p>✓transactions costs relatively important for small, no-dividend firms.</p> <p>× transactions costs do not cause firms to delay debt retirement.</p>
<p><i>Pecking-order theory of financing hierarchy:</i></p> <p>Financial securities can be undervalued due to informational asymmetry between managers and investors. Firms should use securities in reverse order of asymmetry: use internal funds first, debt second, convertible security third, equity last</p>	<p>✓firms value financial flexibility.</p> <p>× desire for flexibility is unrelated to degree of informational asymmetry (size) or growth status.</p> <p>× flexibility less important for no-dividend firms.</p> <p>✓issue debt when internal funds are insufficient.</p> <p>✓more important for small firms.</p> <p>× no relation to growth or dividend status.</p> <p>✓issue equity when internal funds insufficient.</p> <p>✓relatively important for small firms.</p> <p>✓equity issuance decision affected by equity undervaluation.</p> <p>× no relation to size, dividend status, or executive ownership.</p>
<p>To avoid need for external funds, firms may prefer to store excess cash (Myers and Majluf, 1984).</p>	



Table 12 (continued)

Theory or concept	Survey evidence
	<ul style="list-style-type: none"> <li>× equity issuance decision unaffected by ability to obtain funds from debt, convertibles, or other sources.</li> <li>× debt issuance unaffected by equity valuation.</li> <li>× even less important for small, growth, no-dividend firms.</li> </ul>
<p><i>Stock price:</i> Recent increase in stock price presents a “window of opportunity” to issue equity (Loughran and Ritter, 1995). If stock undervalued due to informational asymmetry, issue after information release and ensuing stock price increase (Lucas and McDonald, 1990)</p>	<ul style="list-style-type: none"> <li>✓ issue equity when stock price has risen</li> <li>✓ recent price increase most important for firms that do not pay dividends (significant) and small firms (not significant).</li> </ul>
<p><i>Credit ratings:</i> firms issue short-term if they expect their credit rating to improve (Flannery, 1986).</p>	<ul style="list-style-type: none"> <li>✓ In general, rating is very important to debt decision.</li> <li>× short-term debt not used to time rating improvement.</li> </ul>
<p><i>Interest rates:</i> do absolute coupon rates or relative rates between long- and short-term debt affect when debt is issued?</p>	<ul style="list-style-type: none"> <li>✓ issue debt when interest rates low.</li> <li>✓ short-term debt used only moderately to time the level of interest rates or because of yield curve slope.</li> </ul>
<p><i>Underinvestment:</i> firm may pass up NPV &gt; 0 project because profits flow to existing bondholders. Can attenuate by limiting debt or using short-term debt. Most severe for growth firms (Myers, 1977).</p>	<ul style="list-style-type: none"> <li>× low absolute importance of limiting the use of debt, or borrowing short-term, to avoid underinvestment.</li> <li>× growth status has no effect on relative use of short-term debt.</li> <li>✓ growth status affects relative importance of limiting total debt.</li> </ul>
<p><i>Asset substitution:</i> shareholders take on risky projects to expropriate wealth from bondholders (Jensen and Meckling, 1976). Using convertible debt (Green, 1984) or short-term debt (Myers, 1977) attenuates asset substitution, relative to using long-term debt.</p>	<ul style="list-style-type: none"> <li>× neither convertible debt nor short-term debt is used to protect bondholders from the firm/shareholders taking on risky or unfavorable projects.</li> </ul>

Table 12 (continued)

Theory or concept	Survey evidence
<p><i>Free cash flow can lead to overinvestment or inefficiency:</i> Fixed commitments like debt payments commit free cash so management works hard and efficiently (Jensen, 1986).</p>	<p>× debt is not used with intent of committing free cash flows.</p>
<p><i>Product market and industry influences:</i></p>	
<p>Debt policy credibly signals production decisions (Brander and Lewis, 1986). Sensitive-product firms use less debt so customers and suppliers do not worry about firm entering distress (Titman, 1984).</p>	<p>× debt policy is not used to signal production intentions. × absolute importance of this explanation is low. × not important for high-tech firms. ✓relatively important for growth firms.</p>
<p>Debt ratios are industry-specific (Bradley et al., 1984).</p>	<p>× firms report that the debt, equity, and convertibles usage of same-industry firms does not affect financing decisions. ✓empirical debt ratios differ systematically across industries.</p>
<p><i>Corporate control:</i> Capital structure can be used to affect the likelihood of success for a takeover bid/control contest. Managers may issue debt to increase their effective ownership (Harris and Raviv, 1988; Stulz, 1988).</p>	<p>✓equity issued to dilute holdings of particular shareholders. × dilution strategy unrelated to managerial share ownership.  × takeover threat does not affect debt decisions.</p>
<p><i>Risk management:</i> finance foreign operations with foreign debt as a means of hedging FX risk.</p>	<p>✓foreign debt is frequently viewed as a natural hedge.</p>
<p><i>Maturity-matching:</i> match maturity between assets and liabilities.</p>	<p>✓important to choice between short- and long-term debt.</p>
<p><i>Cash management:</i> match cash outflows to cash inflows.</p>	<p>✓long-term debt reduces the need to refinance in bad times. ✓spread out required principal repayments or link principal repayment to expected ability to repay.</p>
<p><i>Employee stock/bonus plans:</i> shares of stock needed to implement employee compensation plans.</p>	<p>✓when funding employee plans, firms avoid issuing shares, which would dilute the holdings of existing shareholders.</p>
<p><i>Bargaining with employees:</i> high debt allows effective bargaining with employees (Chang, 1992).</p>	<p>× debt policy is not used as bargaining device</p>
<p><i>Earnings per share dilution</i></p>	<p>✓most important factor affecting equity issuance decision.</p>

### Appendix. Nonresponse bias and other issues related to survey data

We perform several experiments to investigate whether nonresponse bias might affect our results. The first experiment, suggested by Wallace and Mellor (1988), compares the responses for firms that returned the survey on time (i.e., by February 23) to those that did not return the survey until February 24, 1999 or later. The firms that did not respond on time can be thought of as a sample from the nonresponse group, in the sense that they did not return the survey until we pestered them further. We first test, for each question, whether the mean response for the early respondents differs from the mean for the late respondents. There are 88 questions not related to firm characteristics. The mean answers for the early and late respondents are statistically different for only eight (13) of these 88 questions at a 5% (10%) level.

Because the answers are correlated across different questions, we also perform multivariate  $\chi^2$  tests comparing the early and late responses. We calculate multivariate test statistics for each set of subquestions, grouped by the main question. (That is, one  $\chi^2$  is calculated for the 12 subquestions related to the first question on the survey, another  $\chi^2$  for the six subquestions related to the second survey question, etc.) Out of the 10 multivariate  $\chi^2$ s comparing the means for the early and late responses, none (two) are significantly different at a 5% (10%) level. Following the order of the tables as they appear in the text, the multivariate analysis of variance  $p$ -values for each of the ten questions are 0.209, 0.063, 0.085, 0.892, 0.124, 0.705, 0.335, 0.922, 0.259, and 0.282. A low  $p$ -value indicates significant differences between the early and late responses. Finally, a single multivariate  $\chi^2$  across all 88 subquestions does not detect significant differences between the early and late responses ( $p$ -value of 0.254). The rationale of Wallace and Mellor suggests that because the responses for these two groups of firms are similar, non-response bias is not a major problem.

The second set of experiments, suggested by Moore and Reichert (1983), investigates possible non-response bias by comparing characteristics of responding firms to characteristics for the population at large. If the characteristics between the two groups match, then the sample can be thought of as representing the population. This task is somewhat challenging because we have only limited information about the FEI population of firms. (Given that most Fortune 500 firms are also in the FEI population, we focus on FEI characteristics. We ignore any differences in population characteristics that may be attributable to the 187 firms that are in the Fortune 500 but not in FEI.) We have reliable information on three characteristics for the population of firms that belong to FEI: general industry classification, public versus private ownership, and number of employees.

We first use  $\chi^2$  goodness-of-fit analysis to determine whether the responses represent the industry groupings in roughly the same proportion as that found in the FEI population. Sixty-three percent of FEI members are from heavy

manufacturing industries (manufacturing, energy, and transportation), as are 62% of the respondents. These percentages are not significantly different at the 5% level. Therefore, the heavy manufacturing versus non-manufacturing breakdown that we use in the tables is representative of the FEI population. We also examine public versus private ownership. Sixty percent of FEI firms are publicly owned, as are 64% of the sample firms. Again, these numbers are not statistically different, suggesting that our numbers represent the FEI population, and also that our public versus private analysis is appropriate.

Although we do not have reliable information about the dividend policies, *P/E* ratios, sales revenue, or debt ratios for the FEI population, our analysis relies heavily on these variables, so we perform Monte Carlo simulations to determine the representativeness of our sample. Specifically, we take a random sample of 392 firms from the Compustat database, stratifying on the number of employees in FEI firms. That is, we sample from Compustat so that 15.4% of the draws are from firms with at least 20,000 employees, 24.7% are from firms with between 5,000 and 19,999 employees, etc., because these are the percentages for the FEI population. We then calculate the mean debt ratio, sales revenue, and *P/E* ratio (ignoring firms with negative earnings), and the percentage of firms that pay dividends for the randomly drawn firms. We repeat this process 1,000 times to determine an empirical distribution of mean values for each variable. We then compare the mean values for our sample to the empirical distribution. If, for example, the mean debt ratio for the responding firms is larger than 950 of the mean debt ratios in the Monte Carlo simulation, we would conclude that there is statistical evidence that respondent firms are more highly levered than are firms in the overall population.

The sample values for sales revenue and debt ratios fall comfortably near the middle of the empirical distributions, indicating that the sample is representative for these two characteristics. The mean *P/E* ratio of 17 for the sample is statistically smaller than the mean for the Compustat sample (overall mean of approximately 20). Fifty-four percent of the sample firms pay dividends, compared to approximately 45% in the stratified Compustat sample. Although the sample and population differ statistically for these last two traits, the economic differences are small enough to indicate that our sample is representative of the population from which it is drawn. There are at least three reasons why our Monte Carlo experiment might indicate statistical differences, even if our sample firms are actually representative of the FEI population: (1) there are systematic differences between the Compustat and FEI populations not controlled for with the stratification based on number of employees, (2) the stratification is based on FEI firms only, although the survey “oversamples” Fortune 500 firms, and (3) we deleted firms with negative *P/E* ratios in the Monte Carlo simulations, although survey respondents might have entered a *P/E* ratio of zero or something else if they had negative earnings.

Finally, given that much corporate finance research analyzes Compustat firms, we repeat the Monte Carlo experiment without stratifying by number of employees. That is, we randomly draw 392 firms (1,000 times) from Compustat without conditioning on the number of employees. This experiment tells us whether our sample firms adequately represent Compustat firms, to provide an indication of how directly our survey results can be compared to Compustat-based research. The mean debt ratio, sales revenue, and *P/E* ratios are not statistically different from the means in the Compustat data; however, the percentage of firms paying dividends is smaller than for the overall Compustat sample. Aside from dividend payout, the firms that responded to our survey are similar to Compustat firms.

If one accepts that nonresponse bias is small, there are still concerns about survey data. For one thing, the respondents might not answer truthfully. Given that the survey is anonymous, we feel this problem is minimal. Moreover, our assessment from the phone conversations is that the executives would not take the time to fill out a survey if their intent was to be untruthful.

Another potential problem with survey data is that the questions, no matter how carefully crafted, either might not be properly understood or might not elicit the appropriate information. For example, Stigler (1966) asks managers if their firms maximize profits. The general response is that, no, they take care of their employees, are responsible corporate citizens, etc. However, when Stigler asks whether the firms could increase profits by increasing or decreasing prices, the answer is again no. Observations such as these can be used to argue that there is some sort of “economic Darwinism”, in which the firms that survive must be doing the proper things, even if unintentionally. Or, as Milton Friedman (1953) notes, a good pool player has the skill to knock the billiards balls into one another just right, even if he or she can not solve a differential equation. Finally, Cliff Smith tells about a chef who, after tasting the unfinished product, always knew exactly which ingredient to add to perfect the day’s recipe, but could never write down the proper list of ingredients after the meal was complete. These examples suggest that managers might use the proper techniques, or at least take the correct actions, even if their answers to a survey do not indicate so. If other firms copy the actions of successful firms, then it is possible that many firms take appropriate actions without thinking within the box of an academic model.

This set of critiques is impossible to completely refute. We have attempted to be very careful when designing the questions on the survey. We also feel that by contrasting the answers conditional on firm characteristics, we should be able to detect patterns in the responses that shed light on the importance of different theories, even if the questions are not perfect in every dimension. Ultimately, however, the analysis we perform and conclusions we reach must be interpreted keeping in mind that our data are from a survey. Having said this, we feel that these data are representative and provide much unique information that

complements what we can learn from traditional large-sample analysis and clinical studies.

## References

- Baker, H.K., Farrelly, G.E., Edelman, R.B., 1985. A survey of management views on dividend policy. *Financial Management* 14, 78–84.
- Barnea, A., Haugen, R., Senbet, L., 1980. A rationale for debt maturity structure and call provisions in the agency theoretic framework. *Journal of Finance* 35, 1223–1234.
- Bierman, H.J., 1993. Capital budgeting in 1992: a survey. *Financial Management* 22, 24.
- Billingsley, R.S., Lamy, R.E., Marr, M.W., Thompson, G.R., 1985. Explaining yield savings on new convertible bond issues. *Quarterly Journal of Business and Economics*, 92–104.
- Billingsley, R.S., Smith, D.M., 1996. Why do firms issue convertible debt? *Financial Management* 25, 93–99.
- Block, S.B., 1999. A study of financial analysts: practice and theory. *Financial Analysts Journal*, 86–95.
- Bodnar, G.M., Hayt, G.S., Marston, R.C., 1998. Wharton survey of financial risk management by US non-financial firms. *Financial Management* 27, 70–91.
- Bradley, M., Jarrell, G.A., Kim, E.H., 1984. On the existence of an optimal capital structure. *Journal of Finance* 39, 899–917.
- Brander, J.A., Lewis, T.R., 1986. Oligopoly and financial structure: the limited liability effect. *American Economic Review* 76, 956–970.
- Brealey, R.A., Myers, S.C., 1996. *Principles of Corporate Finance*, 5th Edition. McGraw-Hill, New York.
- Brennan, M.J., Kraus, A., 1987. Efficient financing under asymmetric information. *Journal of Finance* 42, 1225–1243.
- Brennan, M.J., Schwartz, E.S., 1988. The case for convertibles. *Journal of Applied Corporate Finance* 1, 55–64.
- Bruner, R.F., Eades, K.M., Harris, R., Higgins, R.C., 1998. Best practices in estimating the cost of capital: survey and synthesis. *Financial Practice and Education* 8, 13–28.
- Castanias, R., 1983. Bankruptcy risk and optimal capital structure. *Journal of Finance* 38, 1617–1635.
- Chang, C., 1992. Capital structure as an optimal contract between employees and investors. *Journal of Finance* 47, 1141–1158.
- Chen, N.-f., Roll, R., Ross, S.A., 1986. Economic forces and the stock market. *Journal of Business* 59, 383–404.
- Desai, M.A., 1998. A multinational perspective on capital structure choice and internal capital markets. Unpublished Working Paper, Harvard Business School.
- Donaldson, G., 1994. *Corporate Restructuring: Managing the Change Process from Within*. Harvard University Press, Boston.
- Epps, R.W., Mitchem, C.E., 1994. A comparison of capital budgeting techniques with those used in Japan and Korea. *Advances in International Accounting* 7, 205–214.
- Fama, E.F., French, K.R., 1992. The cross-section of expected stock returns. *Journal of Finance* 47, 427–465.
- Ferson, W.E., Harvey, C.R., 1991. The variation of economic risk premiums. *Journal of Political Economy* 99, 285–315.
- Ferson, W.E., Harvey, C.R., 1993. The risk and predictability of international equity returns. *Review of Financial Studies* 6, 527–566.
- Fisher, E.O., Heinkel, R., Zechner, J., 1989. Dynamic capital structure choice: theory and tests. *Journal of Finance* 44, 19–40.

- Flannery, M.J., 1986. Asymmetric information and risky debt maturity choice. *Journal of Finance* 41, 19–37.
- Friedman, M., 1953. *Essays in Positive Economics*. University of Chicago Press, Chicago.
- Froot, K.A., Scharfstein, D.S., Stein, J.C., 1993. Risk management: coordinating corporate investment and financing policies. *Journal of Finance* 48, 1629–1658.
- Géczy, C., Minton, B.A., Schrand, C., 1997. Why firms use currency derivatives. *Journal of Finance* 52, 1323–1354.
- Gilson, S.C., 1997. Transactions costs and capital structure choice: evidence from financially distressed firms. *Journal of Finance* 52, 111–133.
- Gitman, L.J., Forrester Jr., J.R., 1977. A survey of capital budgeting techniques used by major U.S. firms. *Financial Management* 6, 66–71.
- Gitman, L.J., Mercurio, V., 1982. Cost of capital techniques used by major U. S. firms: survey and analysis of Fortune's 1000. *Financial Management* 14, 21–29.
- Graham, J.R., 1996. Debt and the marginal tax rate. *Journal of Financial Economics* 41, 41–73.
- Graham, J.R., 1999a. Do personal taxes affect corporate financing decisions? *Journal of Public Economics* 73, 147–185.
- Graham, J.R., 1999b. Quarter 2, 1999 FEI Survey. <http://www.duke.edu/~jgraham>.
- Graham, J.R., 2000. How big are the tax benefits of debt? *Journal of Finance* 55, 1901–1941.
- Green, R., 1984. Investment incentives debt and warrants. *Journal of Financial Economics* 13, 115–136.
- Grinblatt, M., Titman, S., 1998. *Financial Markets and Corporate Strategy*. Irwin McGraw-Hill, Boston.
- Hanka, G., 1998. Debt and the terms of employment. *Journal of Financial Economics* 48, 245–282.
- Harris, M., Raviv, A., 1988. Corporate control contests and capital structure. *Journal of Financial Economics* 20, 55–86.
- Heaton, J.B., 2000. Managerial optimism and corporate finance. Unpublished Working Paper, University of Chicago.
- Helwege, J., Liang, N., 1996. Is there a pecking order? Evidence from a panel of IPO firms. *Journal of Financial Economics* 40, 429–458.
- Jagannathan, R., Kubota, K., Takehara, H., 1998. Relationship between labor income risk and average return: empirical evidence from the Japanese stock market. *Journal of Business*, 71, 319–348.
- Jagannathan, R., Wang, Z., 1996. The conditional CAPM and the cross-section of expected returns. *Journal of Finance*, 51, 3–53.
- Jegadeesh, N., Titman, S., 1993. Returns to buying winners and selling losers: implications for stock market efficiency. *Journal of Finance* 48, 65–91.
- Jensen, M.C., 1986. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review* 76, 323–339.
- Jensen, M.C., Meckling, W., 1976. Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3, 305–360.
- Kale, J.R., Noe, T.H., 1990. Risky debt maturity choice in a sequential game equilibrium. *Journal of Financial Research* 13, 155–165.
- Leland, H.E., Pyle, D.H., 1977. Informational asymmetries, financial structure, and financial intermediation. *Journal of Finance* 32, 371–387.
- Leland, H.E., Toft, K.B., 1996. Optimal capital structure, endogenous bankruptcy, and the term structure of credit spreads. *Journal of Finance* 51, 987–1019.
- Lintner, J., 1956. Distribution of incomes of corporations among dividends, retained earnings, and taxes. *American Economic Review* 97–113.
- Loughran, T., Ritter, J.R., 1995. The new issues puzzle. *Journal of Finance* 50, 23–52.

- Lucas, D.J., McDonald, R.L., 1990. Equity issues and stock price dynamics. *Journal of Finance* 45, 1019–1043.
- Mayers, D., 1998. Why firms issue convertible bonds: the matching of financial and real investment options. *Journal of Financial Economics* 47, 83–102.
- McDonald, R.L., 1998. Real options and rules of thumb in capital budgeting. In: Brennan, M.J., Trigeorgis, L. (Eds.), *Innovation, Infrastructure, and Strategic Options*. Oxford University Press, London.
- Miller, M.H., 1977. Debt and taxes. *Journal of Finance* 32, 261–275.
- Modigliani, F., Miller, M.H., 1963. Corporate income taxes and the cost of capital: a correction. *American Economic Review* 53, 433–443.
- Moore, J.S., Reichert, A.K., 1983. An analysis of the financial management techniques currently employed by large U.S. corporations. *Journal of Business Finance and Accounting* 10, 623–645.
- Myers, S.C., 1977. Determinants of corporate borrowing. *Journal of Financial Economics* 5, 147–175.
- Myers, S.C., 1984. The capital structure puzzle. *Journal of Finance* 39, 575–592.
- Myers, S.C., Majluf, N., 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* 13, 187–224.
- Opler, T.C., Pinkowitz, L., Stulz, R., Williamson, R., 1999. The determinants and implications of corporate cash holdings. *Journal of Financial Economics* 52, 3–46.
- Opler, T.C., Titman, S., 1998. The debt–equity choice, Unpublished Working Paper, Ohio State University.
- Pinegar, J.M., Wilbricht, L., 1989. What managers think of capital structure theory: a survey. *Financial Management* 18, 82–91.
- Poterba, J., Summers, L., 1995. A CEO survey of U.S. companies' time horizon and hurdle rates. *Sloan Management Review*, Fall, 43–53.
- Ross, S.A., 1977. The determination of financial structure: the incentive signaling approach. *Bell Journal of Economics* 8, 1–32.
- Sangster, A., 1993. Capital investment appraisal techniques: a survey of current usage. *Journal of Business Finance and Accounting* 20, 307–332.
- Scott, J.H., 1976. A theory of optimal capital structure. *Bell Journal of Economics* 7 (1), 33–54.
- Shao, L.P., Shao, A.T., 1996. Risk analysis and capital budgeting techniques of U. S. multinational enterprises. *Managerial Finance* 22, 41–57.
- Sharpe, S.A., Nguyen, H.H., 1995. Capital market imperfection and the incentive to lease. *Journal of Financial Economics* 39, 271–294.
- Stanley, M.T., Block, S.B., 1984. A survey of multinational capital budgeting. *The Financial Review* 19, 36–54.
- Stein, J.C., 1992. Convertible bonds as backdoor equity financing. *Journal of Financial Economics* 32, 3–21.
- Stigler, G.J., 1966. *The Theory of Price*, 3rd Edition. Macmillan, New York.
- Stulz, R., 1988. Managerial control of voting rights: financing policies and the market for corporate control. *Journal of Financial Economics* 20, 25–54.
- Titman, S., 1984. The effect of capital structure on a firm's liquidation decision. *Journal of Financial Economics* 13, 137–151.
- Titman, S., Wessels, R., 1988. The determinants of capital structure choice. *Journal of Finance* 43, 1–19.
- Trahan, E.A., Gitman, L.J., 1995. Bridging the theory–practice gap in corporate finance: a survey of chief financial officers. *Quarterly Review of Economics and Finance* 35, 73–87.
- Wallace, R., Mellor, C., 1988. Nonresponse bias in mail accounting surveys: a pedagogical note. *British Accounting Review* 20, 131–139.



- Wansley, J.W., Lane, W.R., Sarkar, S., 1989. Management's view on share repurchase and tender offer premiums. *Financial Management* 18, 97–110.
- Weston, J.F., Brigham, E., 1981. *Managerial Finance*, 7th Edition. Holt, Rinehart & Winston, Hinsdale, IL.
- Williamson, O.E., 1988. Corporate finance and corporate governance. *Journal of Finance* 43, 567–591.