Ontario's Five-Year Outlook

inFact

The Conference Board of Canada

Economy Stays Afloat as Growth Ebbs

Ontario's Five-Year Outlook

Issue briefing | April 16, 2024

Contents

Key findings

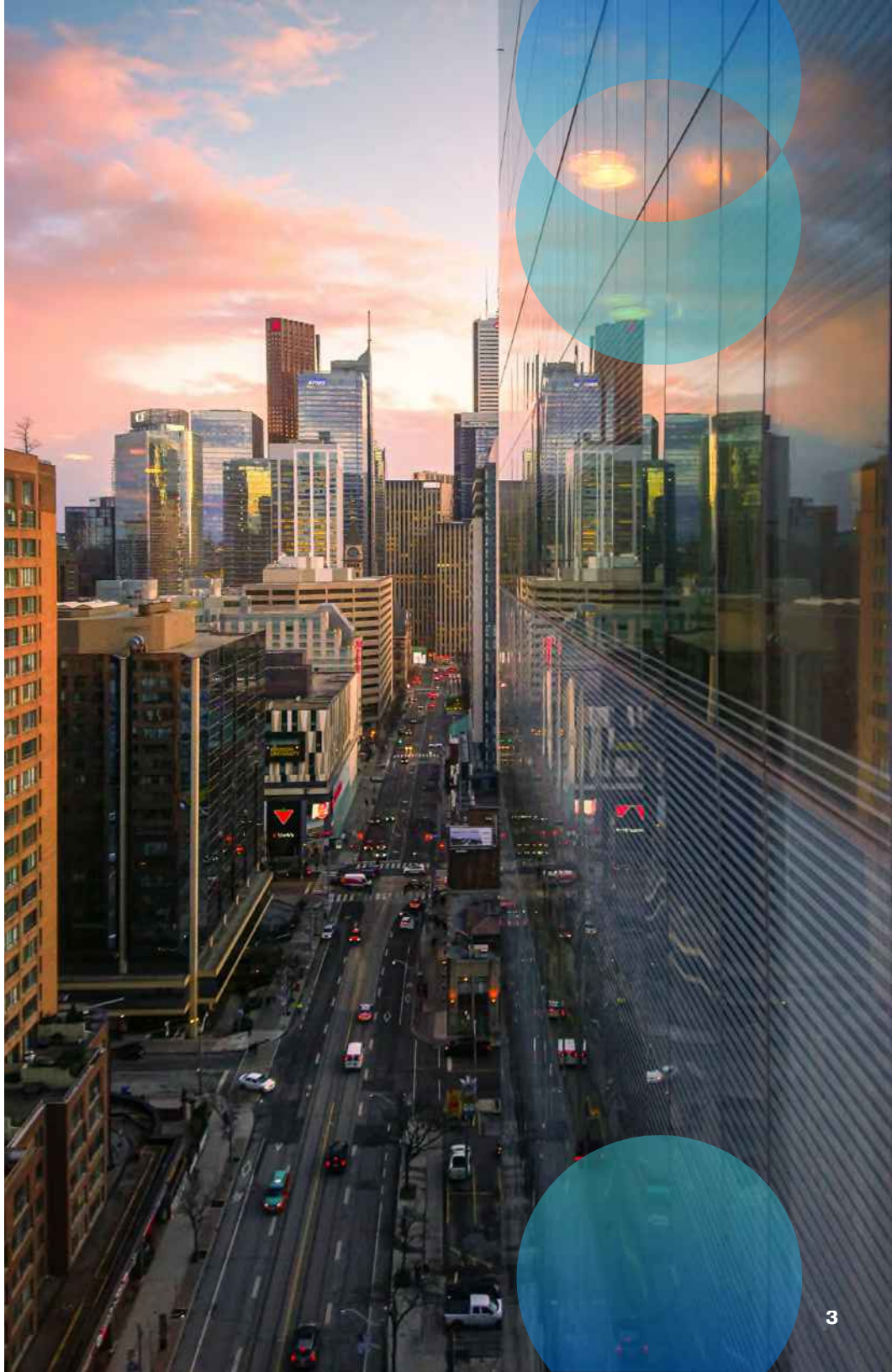
This year, GDP growth will decelerate to 0.6 per cent as tight monetary policy grips demand. Anticipated interest rate cuts, however, will support improved growth of 2.3 per cent in 2025.

Ontario's population is set to expand by 2.9 per cent in 2024, matching last year's hot rate. Strong net international migration will be the main driver of this growth.

The labour market will cool throughout 2024 before heating up again in 2025. This year, employment growth will slow, and the unemployment rate will rise to 6.5 per cent.

Elevated prices and high interest rates will continue to squeeze household budgets and growth in consumer spending will drop to a meagre 0.3 per cent in 2024.

The housing market will benefit from the anticipated interest rate cuts in the second half of the year. Housing starts will increase in 2024, rebounding after two consecutive years of declines.



Ontario snapshot

Government background and information

Premier	Doug Ford
Next election	2026
Population (2023Q4)	15,801,768
Government balance (2022–23)	–$5.9 billion

Sources: The Conference Board of Canada; Ontario Ministry of Finance; Statistics Canada.

Forecast risk

Short term
Delayed interest rate cuts could take a futher bite out of consumer and business spending and deepen the economic slowdown.

Medium term
Honda's interest in a new electric vehicle and battery facility could boost non-residential investment, construction activity, and manufacturing output.

Key economic indicators

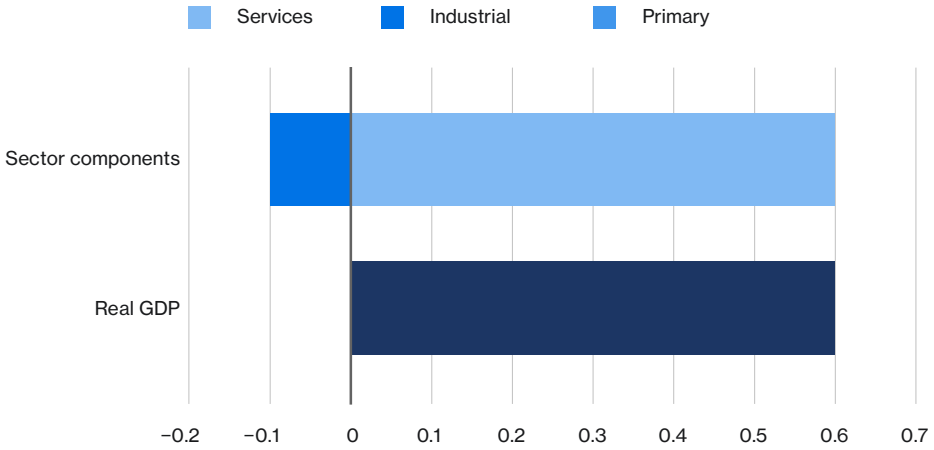
(percentage change)

	2023	2024	2025	2026	2027	2028
Real GDP	1.4	0.6	2.3	2.7	2.5	2.4
Consumer price index	3.8	2.8	2.1	2.0	2.0	2.0
Household disposable income	5.1	2.2	3.2	3.3	3.3	3.3
Employment	2.4	1.3	1.9	1.5	1.1	1.0
Unemployment rate (level)	5.7	6.5	6.1	5.9	5.7	5.6
Retail sales	0.4	1.9	3.2	3.5	3.6	3.6
Wages and salaries per employee	4.2	3.6	2.4	2.0	2.1	2.2
Population	2.9	2.9	1.8	1.5	1.2	1.0

Shaded area represents forecast data
Sources: The Conference Board of Canada; Statistics Canada.

Contributions to Ontario real GDP growth, 2024

(by industry/sector, percentage point; GDP, per cent)

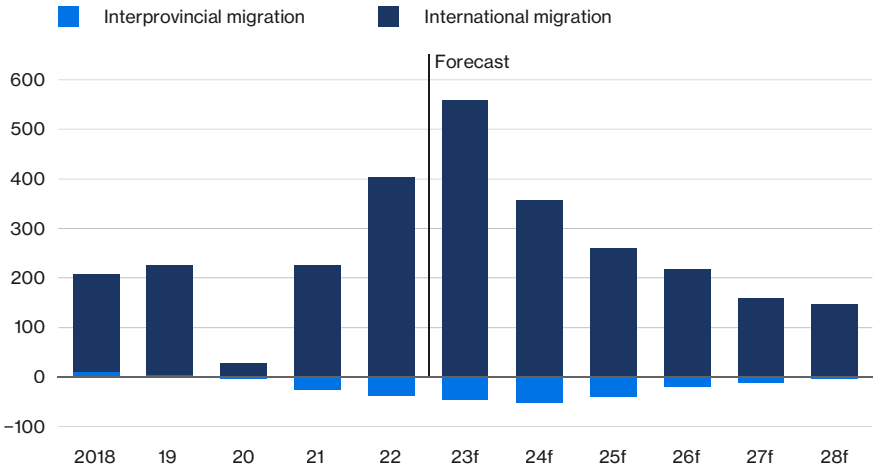


Note: "Primary" is the sum of agriculture, forestry, fishing and trapping, and mining sectors. "Industrial" is the sum of manufacturing, construction, and utilities sectors.
Sources: The Conference Board of Canada; Statistics Canada.

Ontario snapshot (cont'd)

Sources of migration

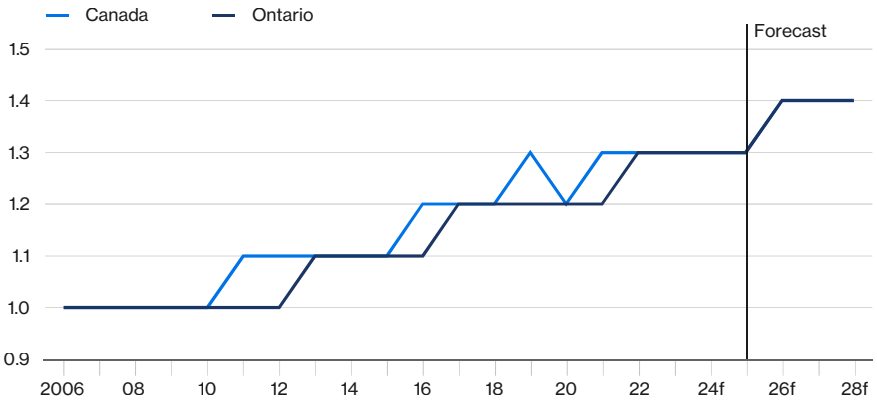
(net migration, 000s)



f = forecast
Sources: The Conference Board of Canada; Statistics Canada.

Real GDP, 2006 to 2028

(index, 2006 = 1.0)



f = forecast
Sources: The Conference Board of Canada; Statistics Canada.

Overview

Population growth will help economy stay above water

Ontario rounded out the fourth quarter of last year with an economic contraction, and a further decline in output is expected for the first quarter of 2024 as the effects of tight monetary policy continue to choke demand. The outlook improves later in the year when anticipated interest rate cuts will begin to infuse some much-needed oxygen into the economy.

The province will continue to see robust population growth this year and is set to increase by 2.9 per cent. While this will add to demand, the population boom will also create pressures in both the labour and housing markets. The main source of population growth will be from afar. Net international migration will fall from last year's record-breaking peak of over 558,000 newcomers but remain well above historical levels. That is in stark contrast to net interprovincial migration, which will continue to be negative over the next few years.

The steady strength of international immigration will fuel labour force growth, which is forecast to average 1.3 per cent annually over the next few years. Employment gains will slow this year, and the unemployment rate will rise. Both these movements will be temporary, however. In 2025, job gains will pick up again, and the unemployment rate will descend as the hindering effects of high interest rates fade. Despite this year's cooling, the labour market will remain a source of strength for the economy.

Two of Ontario's key industries, the finance and real estate sector and manufacturing, will underperform this year. The finance and real estate sector will expand by only 0.2 per cent, while manufacturing output will shrink by 0.4 per cent. Fortunately, both these sectors are forecast to improve significantly over the rest of the forecast period. Between 2025 and 2028, activity in the finance and real estate sector will increase considerably, benefiting from upcoming interest rate cuts. Over the same period, manufacturing output will rebound strongly, boosted by investments in electric vehicle and battery production.

The outlook for Ontario improves beyond the temporary slowdown this year. After modest growth of 0.6 per cent in 2024, the economy will rebound and expand by 2.3 per cent in 2025, growing to an annual average of 2.5 per cent to 2028.

Labour markets and consumption

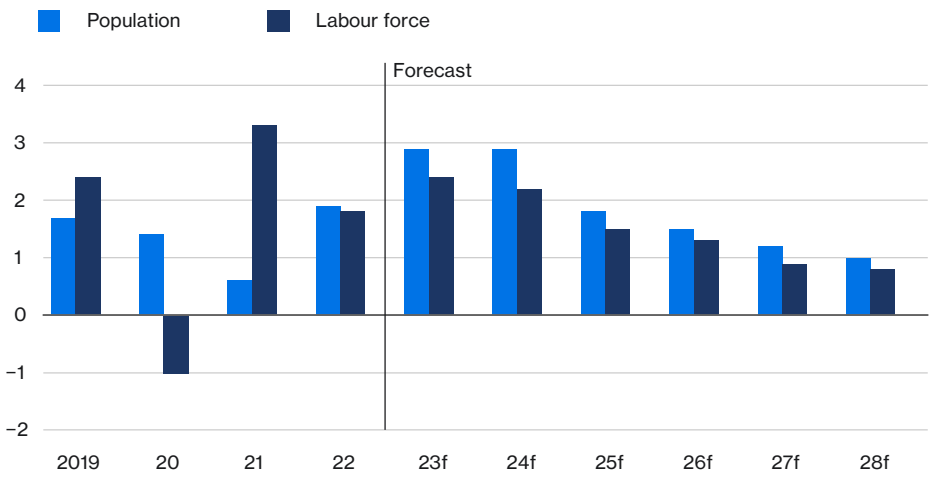
Rising supply, falling demand

Ontario's labour market ended 2023 on a sour note, shedding almost 7,000 jobs in the final quarter. Fortunately, this downturn was temporary, and the province will add jobs over the medium term. Demand for labour will weaken in 2024 but strengthen next year as the dampening effects of high interest rates fade and the economy strengthens. After employment growth of 2.4 per cent in 2023, we forecast gains will slow to 1.3 per cent in 2024 before increasing to 1.9 per cent in 2025.

The unemployment rate will jump to 6.5 per cent up from 5.7 per cent last year, as job gains scale back. As employment picks up again, it's anticipated that the rate will decrease to 6.1 per cent in 2025. Between 2026 and 2028, employment will average annual growth of 1.2 per cent and the unemployment rate will settle at an average of 5.7 per cent.

The elevated population growth from international migration will more than offset the continued negative net interprovincial migration faced by the province, and these newcomers will increase the supply of labour. The labour force is expected to increase by 2.2 per cent in 2024. As population gains slow over the medium term, so too will labour force growth. (See Chart 1.)

Chart 1
Population growth to feed labour force
(percentage change)



f = forecast
Sources: The Conference Board of Canada; Statistics Canada.

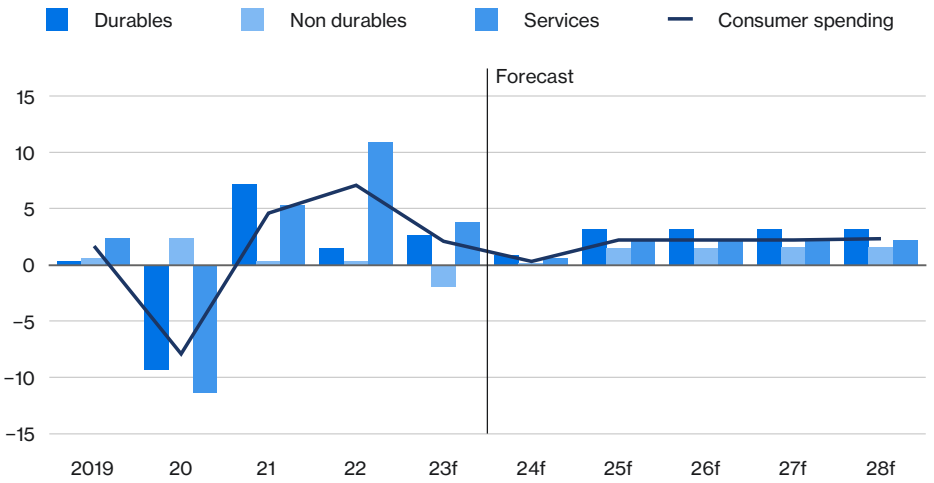
Spending freeze

Ontario consumers will tighten their purse strings this year as past interest rate hikes finally grab hold of spending. Until now, households have seemed impervious to the Bank of Canada's aggressive monetary policy, continuing to spend at a feverish pace. That spending has sustained economic growth but is untenable. Real consumer spending declined in the second half of 2023 and will continue to be weak this year. Ontario households will be hit particularly hard given the high debt burdens and elevated inflation. While consumer prices are moving in the right direction, inflation is expected to average 2.8 per cent in Ontario this year—the second highest rate in the country, after Quebec. These pressures will dampen growth in consumer spending to just 0.3 per cent in 2024.

Fortunately, relief is in sight. Inflation will continue its downward trajectory, averaging 2 per cent between 2025 and 2028, and interest rate cuts are expected to begin mid-2024. This will introduce some much-needed breathing room to household budgets later in the year and spending will rebound with 2.2 per cent growth in 2025.

The slowdown in spending this year will be driven by a mild contraction in goods consumption. Spending on goods is on track to fall by 0.1 per cent in both 2023 and 2024. The consumption of services will take a hit as well, dropping from 3.8 per cent in 2023 to 0.6 per cent in 2024. Unsurprisingly, spending on items that are sensitive to interest rates, such as durable and semi-durable goods, will suffer this year before rebounding strongly in 2025 as interest rates fall. (See Chart 2.)

Chart 2
Real consumer spending to stall
(percentage change)



f = forecast
Sources: The Conference Board of Canada; Statistics Canada.

Investment

Energy demand powering investment

Efforts made by the province to establish Ontario as the primary hub for the production of electric vehicles and batteries have led to large investments in non-residential structures in recent years. Multi-billion-dollar investments have been announced in Windsor (Stellantis-LG), Oakville (Ford), Loyalist Township (Unicore), and St. Thomas (Volkswagen). Recently, Honda also announced it is considering a $18.4-billion electric vehicle and battery facility in Ontario, possibly adding an extension to their existing plant in Alliston. A decision will be made by the end of the year. If Honda proceeds with a new facility in Ontario, this will give a healthy boost to Ontario's investment outlook.

The increased demand for energy is also spurring large investments in the refurbishment of nuclear power plants. The Darlington nuclear plant is halfway through a 10-year project that includes building a $1-billion small modular reactor (SMR) to be completed in 2028. Three additional SMRs are planned to be completed by the mid-2030s. The refurbishment of the Pickering nuclear generating station will move forward with $2 billion invested in engineering and design work. This project is also estimated to be completed by the mid 2030s.

Finally, the Independent Electricity System Operator (IESO) issued a call last December for 2,000 megawatts of non-emission emitting energy generation to meet the growing demand for electricity. Wind, solar, hydro, and bioenergy proposals will be considered. Projects will begin to be announced next year with the goal on coming online by the end of the decade.

Existing projects will support growth in non-residential investment over the medium term. After a temporary slowdown in 2024, investment in non-residential structures will grow by an average of 2.2 per cent annually till 2028. The potential significant investments in both electric vehicle manufacturing and power generation are an upside risk which could give Ontario's investment outlook a healthy boost.

Manufacturing

Auto production to drive manufacturing output

Ontario's manufacturing sector stumbled last year and will fall even further this year. After meager 0.2 per cent growth in 2023, real manufacturing output is forecast to contract by 0.4 per cent in 2024. Fortunately, the start of electric vehicle and battery production at new facilities will give the sector a much-needed boost. The Ford plant in Oakville and the Stellantis-LG facility in Windsor are both expected to be operational in 2025. The Umicore facility in Loyalist Township should be in production in 2026, and the Volkswagen battery plant, which started construction earlier this year, is expected to begin production in 2027.

The federal government's new Electric Sales Mandate may also help bolster auto manufacturing output. The mandate requires that at least 20 per cent of vehicles offered for sale by auto manufacturers much be electric by 2026. This requirement increases to 60 per cent by 2030 and 100 per cent by 2035.

Altogether, the manufacturing sector will turn a corner in 2025 and the outlook over the remainder of the medium term looks bright. Between 2025 and 2028, real output will grow at an average annual rate of 2.9 per cent. The potential addition of a Honda electric vehicle and battery production facility would accelerate this growth.

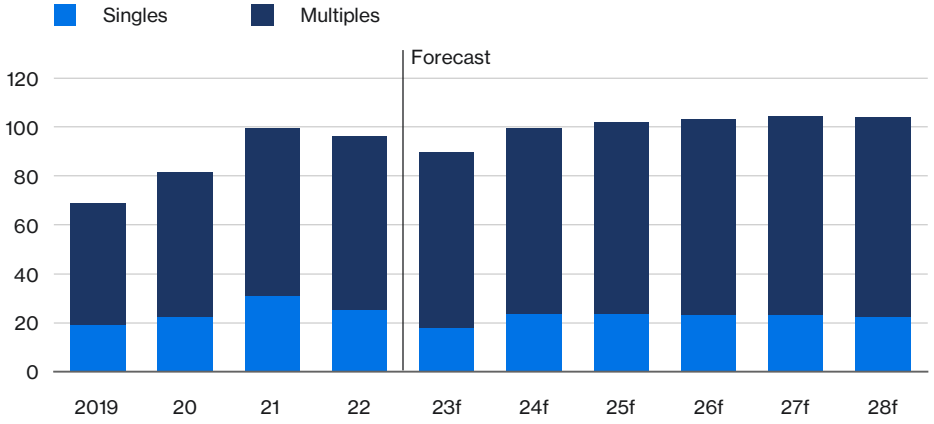
Housing

Starts rebound but housing still in short supply

High interest rates and prices have continued to grip the housing market. Both residential investment and housing starts are on track to fall for the second consecutive year in 2023. Fortunately, the booming population and interest rate relief will help reverse these trends in 2024. Anticipated interest rate cuts will give housing starts a big boost this year. Improved affordability for potential buyers will increase demand for new homes while lower interest rates and cooling inflation will ease some of the financial crunch that's been hindering home builders in recent years.

Between 2024 and 2028, we expect housing starts will average around 102,600 units per year. (See Chart 3.) Over the same period, residential investment will rebound and average annual growth of 4.3 per cent.

Chart 3
Housing starts to rebound and remain elevated
(000s)



f = forecast
Sources: The Conference Board of Canada; Statistics Canada.

Despite this progress, housing supply will remain an ongoing challenge for the province. The Ontario government is falling short of the required 150,000 housing starts per year—a number well above our forecast—to meet its target of 1.5 million new homes by 2031. Several initiatives have been introduced to encourage housing development and could provide some support to residential construction. These include the Housing-Enabling Water Systems fund, the Ontario Infrastructure Bank, and the Building Faster Fund. Several Ontario cities have also signed agreements under the federal Housing Accelerator Fund.

Government outlook

Some goods news for Ontario's fiscal outlook

The slowdown in economic growth has led to a more pessimistic outlook for Ontario's finances than what was anticipated in the 2023 spring budget. In the Fall Economic Statement, downgraded revenue projections and higher spending estimated weakened the province's fiscal position and pushed the projected deficit for the current fiscal year up to $5.6 billion—more than quadruple the $1.3 billion in the budget.

The most recent financial estimates, however, are slightly more optimistic. The province now projects a deficit of $4.5 billion for the 2023-24 fiscal year. The $1.1-billion improvement was driven by higher-than-expected revenues and lower borrowing costs.

Download forecast tables

Methodology

This issue briefing examines the economic outlook for Ontario, including gross domestic product, output by industry, and labour market conditions. The outlook is based on detailed analysis of local and regional conditions, combined with The Conference Board of Canada's proprietary macroeconometric model of the provincial economies. Updated quarterly, the model contains almost 3,000 variables and equations structured uniquely to each of the provinces. Inputs and outputs include 30 expenditure components of gross domestic product, the interaction of 25 industry sectors, detailed population and labour force conditions by age group, interprovincial trade, and pricing and investment activity.

This forecast was completed February 14, 2024.

Acknowledgements

This outlook was prepared by Meghan Eibner, Senior Economist, under the general direction of Ted Mallett, Director of Economic Forecasting. The provincial outlooks are funded by The Conference Board of Canada. The findings and conclusions of this briefing are entirely those of The Conference Board of Canada. Any errors or omissions in fact or interpretation remain the sole responsibility of The Conference Board of Canada.

Economy Stays Afloat as Growth Ebbs: Ontario's Five-Year Outlook
The Conference Board of Canada

To cite this research: Conference Board of Canada,The. Economy Stays Afloat as Growth Ebbs: Ontario's Five-Year Outlook. Ottawa: The Conference Board of Canada, 2024.

Knowledge for your future

inFact

The Conference Board of Canada

Publication 12515
Price: $705

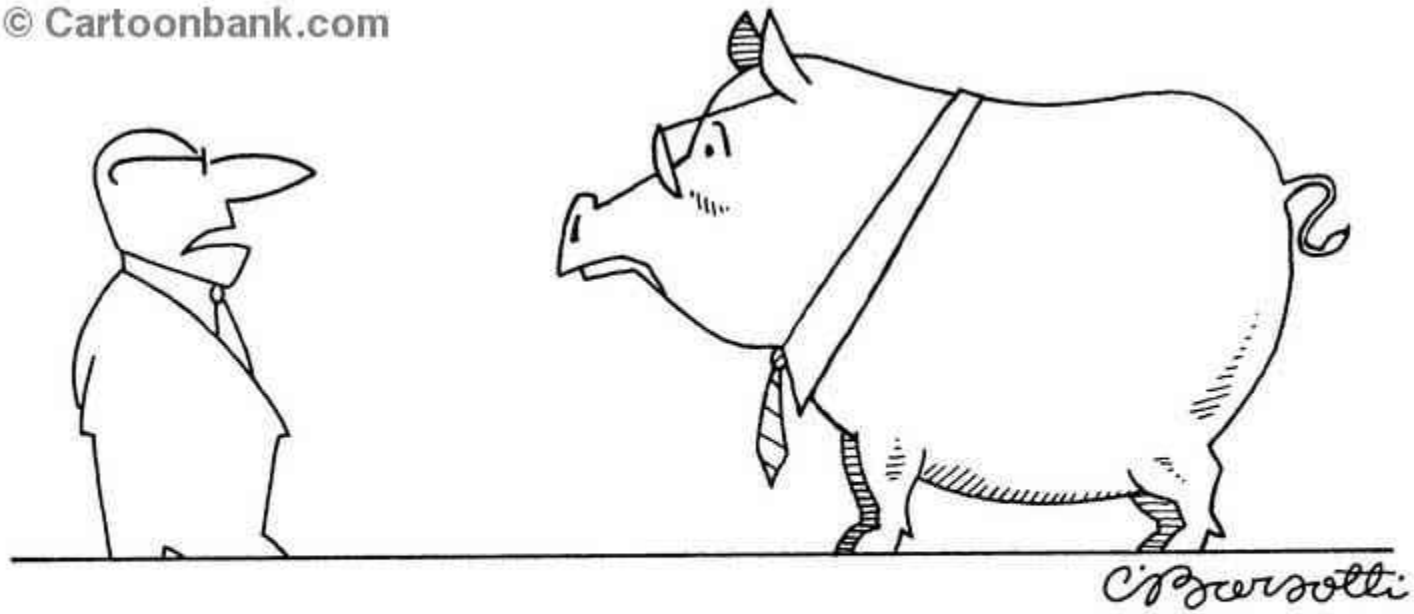
conferenceboard.ca

Robinson Valuation Methods Oct 07

Valuation Methods

Tom Robinson, Ph.D., CFA, CPA, CFP®
Head, Educational Content
CFA Institute
tom.robinson@cfainstitute.org

Value is in the eye of the beholder



"Basic economics—sometimes the parts are worth more than the whole."

Valuation Methods

- What do you think the most common valuation approaches used by analysts and portfolio managers are?

October 2007 Survey

- Invited about 13,500 CFA Institute members to participate.
- 2,369 accepted the invitation (17.6% response rate).
- 2,063 evaluate individual securities for purposes of making an investment recommendation or portfolio decision. 1,980 completed sufficient data for analysis.
- Follow securities from the Americas (about 65.9%), Europe, Middle East and Africa (22.5%), and Asia-Pacific (11.6%).
- Primarily buy-side investment analysts and portfolio managers. For those managing portfolios - fairly equally split between managing institutional and individual (private wealth) portfolios.

Valuation Approaches Used

Market Approach	1,838	92.8%
Present Discounted Value Approach (DDM, DCF, RI, etc.)	1,560	78.8%
Asset-Based Approach	1,216	61.4%
Options Approach	99	5.0%
Other	252	12.7%
Total Responses	1,980	

Valuation Approaches Used

- As can be seen from the data, analysts use multiple valuation methods. For example, analysts who say they use a market approach use it on average 68.6% of the time.
- Some approaches may work well in certain industries/economic conditions but not in others. More on this later.

Other Valuation Approaches Used

- LBO/Takeout Value
- Net Asset Value (REITs)
- Sum of the Parts
- Momentum
- Technical Analysis
- ROE/ROIC/CFROI/IRR
- Multifactor Quantitative Models

Market Approach – Ratios Used

D/P or P/D	627	35.5%
Enterprise Value Multiple	1,353	76.7%
P/B	1,042	59.0%
P/CF	1,010	57.2%
P/S	712	40.3%
P/E	1,555	88.1%
Other	205	11.6%
Total Responses	1,765	

Market Approach – P/E

- The E in P/E
  - The majority of respondents who use a P/E approach to valuation use forecast net income in the denominator (61%) followed by forecast operating income (20%).
  - Some use an average, blend or normalized earnings.

Market Approach – P/CF

- Lets review some common cash flow measures.

Free Cash Flow to the Firm

- Sometimes referred to as “debt free” model
- FCFF is the cash flow available to the company’s suppliers of capital after all operating expenses (including taxes) have been paid and operating investments have been made. The company’s suppliers of capital include debtholders and common stockholders (and occasionally preferred stockholders).

Computing FCFF

- Net Income
- + Non Cash Charges
- - Working Capital Investment
- = Operating Cash Flow
- +Interest Expense (1-tax rate)
- - Fixed Capital Investments
- = FCFF

- This computation is for use when interest paid was deducted from operating cash flow (versus financing cash flow). IFRS permits either method.

Free Cash Flow to Equity

- FCFE is free cash flow available to equity holders only. It is computed after all payments to debt holders (principal and interest).

Computing FCFE

- Can start with FCFF and make adjustments
- FCFF
- - Interest Expense (1- tax rate)
- - Debt Repayment
- +New Debt Borrowing
- =FCFE

Computing FCFE

- Operating Cash Flow
- - Fixed Capital Investment
- - Debt Repayment
- +New Debt Borrowing
- =FCFE

Market Approach – P/CF

- What cash flow measure makes the most sense?

Market Approach - P/CF

- 32% of those using a P/CF measure use P/FCFE
- 29% use P/FCFF
- 22% use P/OCF

- Why might P/OCF be justified?

Market Approach - EV

- 88% of the time EV/EBITDA used
- 21% EV/FCFF
- 19% EV/EBIT
- 17% EV/Revenue

- EBITDA versus FCFF?

Other Multiples Used

- Industry Multiples (e.g., oil reserves, AUM, NAV)
- Relative P/E, PEG
- ROE

Discount Approach

Dividend Discount Model	511	35.1%
Residual Income	298	20.5%
Discounted Free Cash Flow	1,265	86.8%
CFROI	287	19.7%
Other (discounted earnings or EBITDA)	52	3.6%
Total Responses	1,457	

Source of Required Equity Return

CAPM	979	68.2%
APT	69	4.8%
Fama-French	58	4.0%
Bond Yield Plus Risk Premium	613	42.7%
Judgmentally determined hurdle rate	682	47.5%
Other (Build up or market derived)	91	6.3%
Total Responses	1,436	

Multiple Sources of Inputs

- Once again respondents told us they use more than one input source to determine their discount rate.
- For the equity risk premium most use a historical based equity risk premium – perhaps with an adjustment. About a third of the time a forward looking equity risk premium was used.

Dividend Discount Models

- Most indicated they used a two stage or more than two stage model.
- Followed by single stage models (Gordon Growth)
- An H-Model was used by only about 10% of respondents.
- Median number of years forecast is 5 (mean about 7).

Discounted Cash Flow Models

- Similarly DCF Models in order of use were:
  - Two stage FCFF
  - More than two stage FCFF
  - More than two stage FCFE
  - Single stage FCFF
  - Two stage FCFE
- H-Models were used less than 7% of the time.
- Median number of years forecast was 5 years (mean about 8 years).

Residual Income Approach

- Used selectively.
- Majority who did use – used a two or more stage residual income to the firm.
- Most used a generic residual income model (versus a trademarked version).

Traditional Accounting Versus Residual Income

- Lets consider a company that we form by contributing $1 million dollars of equity capital by issuing 100,000 shares for $10 per share.
- Additionally we borrow $1 million at an interest rate of 8%. Terms of the loan are interest payable annually and principal payments are deferred.
- Total capital employed in our business is $2 million.
- Average Tax Rate 30%

Income Statement

Sales	$900,000
Operating Expenses	700,000
EBIT	200,000
Interest Expense	80,000
EBT	120,000
Tax Expense	36,000
Net Income	84,000

Traditional Accounting

- How did we do?
- We were profitable.
- Our Return on Assets was 4.2%
- Our Return on Equity was 8.4%

Is it Enough?

- While traditional accounting and the income statement subtracts the cost of debt capital (interest expense) in arriving at net income it ignores the cost of equity capital. Essentially it treats equity capital as being free.
- However, as investors we demand a return on our equity capital ($1 million in this case).

ROE versus the Cost of Equity

- Lets say that based on our other opportunities and the risk of this particular venture that we have a required return on our equity capital of 10%.
- Clearly the return on equity is lower than our cost of equity.
- The investment has therefore not earned enough to compensate us for the use of our capital.

Income Statement

Sales	$900,000
Operating Expenses	700,000
EBIT	200,000
Interest Expense	80,000
EBT	120,000
Tax Expense	36,000
Net Income	84,000
Equity Charge	100,000
Residual Income	(16,000)

Adding Value

- If the firm earns exactly the cost of capital, residual income will be zero.
- In order to add value for equity capital providers, the firm needs to earn more than the cost of capital. This results in positive residual income.
- Negative residual income leads to a decline in the value of the firm.

- What do you think our firm should be worth if these results were expected consistently in future years?

RI Models and P/B Multiple

$$V_0 = B_0 + \frac{\text{ROE} - r}{r - g} B_0$$

Industry/Sector Differences

- Asset based
  - Real estate, commodities and financials
- Financials
  - P/BV or BV
  - DDM
  - Residual Income
  - Not P/E or FCFF
- Firms with intangible assets
  - DCF

EB-2024-0063
Evidence of Dr. Sean Cleary, CFA
Attachment AT

Graham and Harvey 2001

Version: December 8, 1999

The theory and practice of corporate finance: Evidence from the field[1]

John R. Graham
Duke University, Durham, NC 27708 USA

Campbell R. Harvey*
Duke University, Durham, NC 27708 USA
National Bureau of Economic Research, Cambridge, MA 02912 USA

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. Firms are concerned about maintaining financial flexibility and a good credit rating when issuing debt, and earnings 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.

Key words: capital structure, cost of capital, cost of equity, capital budgeting, discount rates, project valuation, survey.

[1] 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, Michael Bradley, Alon Brav, Magnus Dahlquist, Paul Gompers, Tim Opler, Nathalie Rossiensky, Rick Ruback, David Smith, and seminar participants at the Harvard Business School/Journal of Financial Economics conference on the interplay between theoretical, empirical, and field research in finance. 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. A review of certain aspects of corporate finance was produced as part of this research and is available at www.duke.edu/~charvey/Research/indexr.htm.

* Corresponding author. Tel.: 919 660 7768; fax: 919 681 6246; e-mail: cam.harvey@duke.edu.

1. Introduction

In this paper, we analyze 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. Our survey describes the current practice of corporate finance. 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 is distinguished from previous surveys in a number of dimensions.[2] 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 a capital structure priority also are 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.

Third, we analyze the responses conditional on firm characteristics. We examine the relation between the executives' responses and firm size, P/E ratios, leverage, credit rating, dividend policy, industry, management ownership, CEO age, CEO tenure and the education of the CEO. By testing whether responses 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.

Survey-based analysis complements 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

[2] See, for example, Lintner (1956), Gitman and Forrester (1977), Moore and Reichert (1983), Stanley and Block (1984), Baker, Farrelly, and Edelman (1985), Pinegar and Wilbricht (1989), Wansley, Lane, and Sarkar (1989), Sangster (1993), Donaldson (1994), Epps and Mitchem (1994), Poterba and Summers (1995), Billingsley and Smith (1996), Shao and Shao (1996), Bodnar, Hayt, and Marston (1998), Bruner, Eades, Harris, and Higgins (1998) and Block (1999).

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 the survey indicate 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 informal rules when choosing capital structure. The most important factors affecting debt policy are maintaining financial flexibility and having 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. If respondents behave according to these deeper hypotheses, they apparently do so unknowingly. 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 present our analysis of the practice of 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 United States 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 between 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 appears in Internet Appendix A which can be accessed at http://www.duke.edu/~charvey/Research/indexr.htm.)

We sent out two different versions of the survey, with the questions reordered on each version. There are no significant differences that result from the ordering of the questions.[3]

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 hard copy 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 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 total questions) of our survey, this response rate compares favorably to the response rate for the quarterly FEI-Duke survey.[4]

2.3 Summary statistics and data issues

Figure 1 presents summary information about the firms in our sample. The companies range from very small (26% of the sample firms have sales less than $100 million) to very large (42% with 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%).

---

[3] Internet Appendix A contains a copy of the version B of the survey. Version A was similar except that questions 11-14 and questions 1-4 were 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 as 1-4 in 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.

[4] 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 CFAs -- not senior officers of particular firms.

In Appendix A, 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 firms when we analyze how investment opportunities affect corporate behavior. We refer to the remaining 40% of the respondents as non-growth 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 credit-worthiness 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.

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 Nyguen, 1995), the dividend issuance dichotomy allows us to examine whether the data support corporate theories based on informational asymmetry.

[Insert Table 1]

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 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 non-size characteristics. We split the sample in two, 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 report the findings with respect to non-size characteristics in the text only if they hold on the full sample and the two size

subsamples. We also perform a separate robustness check relative to public versus private firms and only report the characteristic-based results in the text 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 Appendix A that our sample is representative of the population from which it was drawn, fairly representative of Compustat firms, and not adversely affected by nonresponse bias.

3. Capital budgeting methods

3.1 Design

This section examines the techniques that firms use to 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% 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, Eades, Harris and Higgins (1998), who interview 27 highly regarded corporations.[5]

Our survey is distinguished from previous work in several ways. The most obvious difference is that previous work has almost exclusively focused 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 vs. 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 by-pass discounting techniques and simply use earnings multiples. 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 response represents beliefs. We have no way of verifying that the beliefs coincide with actions.

[5] See www.duke.edu/~charvey/Research/indexr.htm for a review of the capital budgeting literature.

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). 75.7% of respondents always or almost always use internal rate of return (rating of 3.09). The hurdle rate is also popular.

[Insert Table 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 non-growth firms. Highly levered firms are significantly more likely to use NPV and IRR than firms with small debt 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 they are required in the regulatory process, utilities are more likely to use IRR and NPV and perform sensitivity and simulation analyses. We 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 criteria 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). For both small and large firms, we find that mature CEOs use payback significantly more often than younger CEOs in separate examinations. 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 criteria's deficiencies by accounting for the time value of money.

It is sometime 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 (p. 405, Weston and Brigham, 1981). 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.

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 Design

We ask three questions about the cost of capital. The first determines how firms calculate the cost of equity. We explore whether firms use the capital asset pricing model (CAPM), a multibeta CAPM (with extra risk factors in addition to the market beta), average historical returns, or a dividend discount model. Second, we investigate which risk factors corporations account for when determining the cash flow and/or discount rate inputs they use in project valuation. The list of risk factors includes the fundamental factors in Fama and French (1992), momentum as defined in Jegadeesh and Titman (1993), as well as the macroeconomic factors in Chen, Roll and Ross (1986) and Ferson and Harvey (1991). Third, we explore how these models are used. In particular, we consider an example of how a firm evaluates a new project in an overseas market. We are interested in whether the CFOs consider the discount rate project specific.

[Insert Table 3]

4.2 Results

The results in Table 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).[6] 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 find that 31.2% of the participants in their survey used a version of the dividend discount model to establish their cost of capital. While the CAPM is popular, we will show later that it is not clear that the model is applied properly in practice.

The cross-sectional analysis is particularly illuminating. Large firms are much more likely to use the CAPM than are smaller firms (rating of 3.27 versus 2.49, respectively). Smaller firms are more inclined to use a cost of equity capital that is determined by "what investors tell us they require." CEOs with MBAs are more likely to use the single factor CAPM or 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

[6] Gitman and Mercurio (1982) in a survey of 177 Fortune 1000 firms find that only 29.9% of respondents use the CAPM "in some fashion". More recently, Bruner, Eades, Harris and Higgins (1998) find that 85% of their 27 best practice firms use the CAPM or a modified CAPM.

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.

[Insert Table 4]

Table 4 investigates sources of risk other than market risk, and how they are treated in project evaluation. The format of this table 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. 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 multi-beta 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 additional 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.

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 cash flows, and 32% adjust both. These figures represent the highest incidence of "adjusting something" for any type of 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; however, surprisingly, 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 non-growth firms. Manufacturing firms are more sensitive to interest rate risk than non-manufacturing firms.

[Insert Table 5]

We examine one final capital budgeting issue. Table 5 investigates the evaluation of a project in an overseas market. 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.[7] A close second, 51% of the firms said they would always or almost always use a risk-matched discount rate to evaluate this project. The reliance of many firms on a company-wide discount rate might make sense if these same firms adjust cash flows for FX risk when considering risk factors (i.e., in Table 4). However in untablulated results, we find the opposite: firms that do not adjust cash flows for FX risk are also relatively less likely (compared to firms that adjust for FX 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, who 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).

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. The Internet appendix contains a detailed security-by-security discussion of the results.

[7] 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% used the rate applicable to the project based on the risk or the nature of the project. 35% used a rate based on the division's risk.

5.1 Trade-off theory of capital structure choice

5.1.a Target debt ratios and the costs and benefits of debt

One of the longest-standing unresolved 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).[8]

[Insert Table 6]

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

[Insert Table 7]

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).

[Insert Table 8]

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 might be an indication of concern about distress costs. Among firms that have rated debt and for utilities, 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 reducing 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 Figure 1G). Another 37% have a flexible target, and 34% have a somewhat tight target or range. The remaining 10% have

[8] In this section we discuss the traditional factors in the trade-off theory: 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.

a very strict target debt ratio. 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 firms have target debt ratios is stronger among large firms: 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.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).

5.1.b 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 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. In their large-sample study of Compustat firms, Opler and Titman (1998) also find that firms issue equity after stock price increases, which they note is inconsistent with target debt ratios because it moves firms further from any such target.

[Insert Table 9]

Fisher, Heinkel and Zechner (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 the whether they *delay* issuing (rating of 1.06 in Table 9) or retiring debt (1.04) because of transactions costs, the support for the transactions cost hypothesis is weak.

5.2 Asymmetric information explanations of capital structure

5.2.a 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. Froot et al., 1993; and 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 undervaluation when deciding which security to use, and whether financial flexibility is important.

Flexibility: The most important item affecting corporate debt decisions is management's desire for "financial flexibility," with a mean rating of 2.59 (Table 6).[9] Fifty-nine percent of the respondents say that flexibility is important (rating of 3) or very important (rating of 4).[10] 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 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.[11]

Internal funds deficit: 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).

[Insert Table 10]

Equity undervaluation: 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. Taken together, these findings indicate that a large percentage of firms are hesitant to issue common equity because they feel their

[9] Four firms wrote 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 an economic downturn occurs in the future (see Internet Appendix). 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.

[10] This finding is interesting because Graham (1999a) 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.

[11] 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.

stock is undervalued. Rather than issuing equity when they feel it 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 (relative to ratings of 1.37 for both small and non-dividend-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.[12]

In sum, the importance of financial flexibility and equity undervaluation to security issuance decisions is generally consistent with the pecking-order model of financing hierarchy. However, asymmetric information does not appear to *cause* the importance of these factors, as it should if the pecking-order is the true model of capital structure choice.

5.2.b 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 of firms 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.c 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.

---

[12] Helwege and Liang (1996) find that "asymmetric information variables have no power to predict the relative use of public bonds over equity."

5.2.d Private information and convertible stock issuance

Private information about asset risk: 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: small firms (2.35) with large managerial ownership (2.47).

Private information about stock price: 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 (1992) 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).[13]

5.2.e Anticipating improvement in credit ratings

Having private information about credit quality can affect a firm's optimal debt maturity. 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; and Kale and Noe, 1990). 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 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.

[Insert Table 11]

5.2.f 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 debt issuance department.

We also find evidence that firms issue short-term debt in an effort to time market interest rates. CFOs issue 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

[13]CFOs assign a mean rating of 2.18 to using convertibles to avoid equity dilution in the short-term.

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.a Conflicts between bondholders and equityholders

Underinvestment: Myers (1977) argues that investment decisions can be affected by the presence of long-term debt in a firm's capital structure. Shareholders may "underinvest" 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 may want to limit total debt, or use short-term debt, to minimize underinvestment costs. (Froot, Scharstein, and Stein (1993) argue that firms may want to 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 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 growth options (i.e., market-to-book ratios), which those studies interpret as evidence that underinvestment costs affects debt policy.

Asset substitution: 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, Haugen, and Senbet (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 0.62 in Table 10).

5.3.b Conflicts between managers and equityholders

Jensen (1986) and others argue that when a firm has ample free cash flow, its managers may 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's (1986). 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).

5.4. Product market and industry factors

Bradley, Jarrell, and Kim (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 may go out of business, and therefore not stand behind its products, especially if the products are unique; consequently, firms that produce unique products may avoid using debt.

Brander and Lewis (1986) model another way that production and financing decisions can be intertwined. Brander and Lewis 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 may 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; and 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) and 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. Gèczy, Minton, and Schrand (1997) 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 concerns 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 in Internet Appendix B). Four firms explicitly say that they tie their scheduled principle 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.a. Debt

We ask if having debt allows firms to bargain for concessions from employees (Chang, 1992; and 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 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 WACC (see B.5 in Internet 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.b Common stock

EPS dilution: 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.[14] And yet, Brealey and Myers (1996) indicate that there is a common belief among executives that share issuance dilutes earnings per share (on page 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 concern affecting their decision (mean rating of 2.84 in Table 8).[15] The popularity of this response is intriguing. It 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!

Low cost or low risk: 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 is 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.

Miscellaneous: 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 in Internet 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.c 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

[14] Conversely, if funds are obtained by issuing debt, the number of shares remains constant and so EPS may 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.

[15] If we consider public firms only, the mean response is 3.18. We consider any firm that seriously considered issuing common equity, rather than just public firms, to get a full representation of factors that discourage, as well as encourage, stock issuance.

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).

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).

Other survey evidence: 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. 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 Billingsley and Smith is that they request a response relative to a specific offering among firms that actually issue convertible debt. We condition only on whether a firm seriously considered issuing convertibles.

5.8.d 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 in Internet Appendix B). Few firms indicate that foreign regulations require them to issue abroad (rating of 0.61 in Table 7).

5.9. Summary of capital structure results

We find moderate support for the trade-off and pecking-order theories of capital structure choice. The support weakens as we probe more deeply into the assumptions and implications of the theories. We find mixed or little evidence that signaling, transactions costs, underinvestment costs, asset substitution, corporate control, bargaining with employees, free cash flow considerations, and product market concerns affect capital structure choice.

According to our survey, the most important factors affecting capital structure decisions are credit ratings, EPS dilution, the desire for financial flexibility, recent changes in stock price, maturity matching, hedging foreign operations, and practical cash management. Table 12 summarizes the capital structure findings.

[Insert Table 12]

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 ten or twenty 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 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 are 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.

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 many 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 teaching capital structure. Moreover, perhaps the NPV and 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.

APPENDIX A. 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 non-response 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 8 (13) of these 88 questions at a 5% (10%) level.

Because the answers are correlated across different questions, we also perform multivariate χ^2 tests comparing the early and late responses. We calculate multivariate test statistics for each set of subquestions, grouped by main question. (That is, one χ^2 is calculated for the twelve subquestions related to the first question on the survey, another χ^2 for the six subquestions related to the second survey question, etc.) Out of the ten multivariate χ^2s comparing the means for the early and late responses, none (two) are significantly different at a 5% (10%) level.[16] Finally, a single multivariate χ^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 χ^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 vs. non-manufacturing breakdown that we use in most of our analysis 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

[16] 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.

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, one 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.[17] 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.

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 (1000 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 may not elicit the appropriate information.

---

[17] 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) 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 zero or something else if they had negative earnings.

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 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. Kent, Gail E. Farrelly, and Richard B. Edelman, 1985, A survey of management views on dividend policy, Financial Management 14, 78-84.

Barclay, Michael J., and Clifford W. Smith, 1995a, The maturity structure of corporate debt, Journal of Finance 50, 609-631.

Barclay, Michael J., and Clifford W. Smith, 1995b, The priority structure of corporate liabilities, Journal of Finance 50, 899-917.

Bierman, Harold J., 1993, Capital budgeting in 1992: A survey. Financial Management 22, 24.

Billingsley, Randall S., Robert E. Lamy, M. Wayne Marr, and G. Rodney Thompson, 1985, Explaining yield savings on new convertible bond issues. Quarterly Journal of Business and Economics, 92-104.

Billingsley, Randall S., and David M. Smith, 1996, Why do firms issue convertible debt? Financial Management 25, 93-99.

Block, Stanley B., 1999, A study of financial analysts: Practice and theory, Financial Analysts Journal, July/August, 86-95.

Bodnar, Gordon M., Gregory S. Hayt, and Richard C. Marston, 1998, 1998 Wharton survey of financial risk management by U.S. non-financial firms. Financial Management 27, 70-91.

Brander, James A., and Tracy R. Lewis, 1986, Oligopoly and financial structure: The limited liability effect. American Economic Review 76, 956-970.

Bradley, Michael, Gregg A. Jarrell, and E. Han Kim, 1984, On the existence of an optimal capital structure. Journal of Finance 39, 899-917.

Brealey, Richard A., and Stewart C. Myers, 1996, Principles of corporate finance, fifth edition (McGraw-Hill, New York, NY).

Brennan, Michael J., and Alan Kraus, 1987, Efficient financing under asymmetric information. Journal of Finance 42, 1225-1243.

Brennan, Michael J., and Eduardo S. Schwartz, 1988, The case for convertibles, Journal of Applied Corporate Finance 1, 55-64.

Bruner, Robert F., Kenneth M. Eades, Robert S. Harris and Robert C. Higgins, 1998, Best practices in estimating the cost of capital: Survey and synthesis, Financial Management 27, 13-28.

Castanias, Richard, 1983, Bankruptcy risk and optimal capital structure. Journal of Finance 38, 1617-1635.

Chang, Chun, 1992, Capital structure as an optimal contract between employees and investors. Journal of Finance 47, 1141-1158.

Chen, Nai-fu, Richard Roll, and Stephen A. Ross, 1986, Economic forces and the stock market, Journal of Business 59, 383-404.

Desai, Mihir A., 1998, A multinational perspective on capital structure choice and internal capital markets. Working Paper, Harvard Business School.

Donaldson, Gordon, 1994, Corporate restructuring: Managing the change process from within, Boston: Harvard University Press.

Epps, Ruth W., and Cheryl E. Mitchem, 1994, A comparison of capital budgeting techniques with those used in Japan and Korea,. Advances in International Accounting 7, 205-214.

Fama, Eugene F., and Kenneth R. French, 1992, The cross-section of expected stock returns. Journal of Finance 47, 427-465.

Ferson, Wayne E., and Campbell R. Harvey, 1991, The variation of economic risk premiums. Journal of Political Economy 99, 285-315.

Ferson, Wayne E., and Campbell R. Harvey, 1993, The risk and predictability of international equity returns. Review of Financial Studies 6, 527-566.

Fisher, Edwin O., Robert Heinkel, and Josef Zechner, 1989, Dynamic capital structure choice: theory and tests. Journal of Finance 44, 19-40.

Flannery, Mark J., 1986, Asymmetric information and risky debt maturity choice. Journal of Finance 41, 19-37.

Friedman, Milton, 1953, Essays in positive economics, Chicago: University of Chicago Press.

Froot, Kenneth A., Scharfstein, David S., Stein, Jeremy C., 1993, Risk management: coordinating corporate investment and financing policies, Journal of Finance 48, 1629-1658.

Géczy, Christopher, Bernadette A. Minton, and Catherine Schrand, 1997, Why firms use currency derivatives. Journal of Finance 52, 1323-1354.

Gilson, Stuart C., 1997, Transactions costs and capital structure choice: Evidence from financially distressed firms. Journal of Finance 52, 111-133.

Gitman, Lawrence J. and John R. Forrester, Jr., 1977, A survey of capital budgeting techniques used by major U.S. firms. Financial Management 6, 66-71

Gitman, Lawrence J. and Vincent Mercurio, 1982, Cost of capital techniques used by major U.S. firms: Survey and analysis of Fortune's 1000. Financial Management 14, 21-29.

Graham, John R., 1999a, How big are the tax benefits of debt? Journal of Finance, forthcoming.

Graham, John R., 1999b, Quarter 2, 1999 FEI Survey, www.duke.edu/~jgraham.

Green, Richard, 1984, Investment incentives debt and warrants, Journal of Financial Economics 13, 115-136.

Grinblatt, Mark, and Sheridan Titman, 1998, *Financial Markets and Corporate Strategy*. Irwin McGraw-Hill, Boston, MA.

Hanka, Gordon, 1998, Debt and the terms of employment, Journal of Financial Economics 48, 245-282.

Helwege, Jean, and Nellie Liang, 1996, Is there a pecking order? Evidence from a panel of IPO firms. Journal of Financial Economics 40, 429-458.

Jegadeesh, Narasimhan, and Sheridan Titman, 1993, Returns to buying winners and selling losers: Implications for stock market efficiency. Journal of Finance 48, 65-91.

Jensen, Michael C., 1986, Agency costs of free cash flow, corporate finance, and takeovers. American Economic Review 76, 323-339.

Kale, Jayant R., and Thomas H. Noe, 1990, Risky debt maturity choice in a sequential game equilibrium. Journal of Financial Research 13, 155-165.

Leland, Hayne E., 1994, Corporate debt value, bond covenants, and optimal capital structure. Journal of Finance 49, 1213-1252.

Leland, Hayne E., and David H. Pyle, 1977, Informational asymmetries, financial structure, and financial intermediation, Journal of Finance 32, 371-387.

Leland, Hayne E., and Klaus B. Toft, 1996, Optimal capital structure, endogenous bankruptcy, and the term structure of credit spreads. Journal of Finance 51, 987-1019.

Lewis, Craig M., Richard J. Rogalski, and James K. Seward, 1998, Agency problems, information asymmetries, and convertible debt security design. Working Paper, Vanderbilt University.

Lintner, John, 1956, Distribution of incomes of corporations among dividends, retained earnings, and taxes, American Economic Review, 97-113.

Loughran, Tim, and Jay R. Ritter, 1995, The new issues puzzle, Journal of Finance 50, 23-52.

Lucas, Deborah J., and Robert L. McDonald, 1990, Equity issues and stock price dynamics. Journal of Finance 45, 1019-1043.

Miller, Merton H., 1977, Debt and taxes. Journal of Finance 32, 261-275.

Modigliani, Franco, and Merton H. Miller, 1963, Corporate income taxes and the cost of capital: A correction, American Economic Review 53, 433-443.

Moore, James S., and Alan K. Reichert, 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, Stewart C., 1977, Determinants of corporate borrowing. Journal of Financial Economics 5, 147-175.

Myers, Stewart C., 1984, The capital structure puzzle. Journal of Finance 39, 575-592.

Myers, Stewart C., and Nicholas S. Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics 13, 187-224.

Opler, Tim, Lee Pinkowitz, René Stulz, and Rohan Williamson, 1999, The determinants and implications of corporate cash holdings, *Journal of Financial Economics* 52, 3-46.

Opler, Tim C., and Sheridan Titman, 1998, The debt-equity choice, Working paper, Ohio State University.

Pinegar, J. Michael and Lisa Wilbricht, 1989, What managers think of capital structure theory: A survey. Financial Management 18, 82-91.

Poterba, James and L. Summers, 1995, A CEO survey of U.S. companies' time horizon and hurdle rates, Sloan Management Review, Fall, 43-53.

Ross, Stephen A., 1977, The determination of financial structure: The incentive signaling approach, Bell Journal of Economics 8, 1-32.

Sangster, Alan, 1993, Capital investment appraisal techniques: A survey of current usage. Journal of Business Finance and Accounting 20, 307-332.

Scott, James H., 1976, A theory of optimal capital structure. Bell Journal of Economics 7 (1), 33-54.

Shao, Lawrence P., and Alan T. Shao, 1996, Risk analysis and capital budgeting techniques of U.S. multinational enterprises. Managerial Finance 22, 41-57.

Sharpe, Steven. A., and Hien. H. Nguyen, 1995, Capital market imperfection and the incentive to lease, Journal of Financial Economics 39, 271-294.

Stanley, Marjorie T., and Stanley B. Block, 1984, A survey of multinational capital budgeting. The Financial Review 19, 36-54.

Stein, Jeremy C., 1992, Convertible bonds as backdoor equity financing, Journal of Financial Economics 32, 3-21.

Stigler, George J., 1966, *The theory of price*, 3rd ed., Macmillan Company, New York.

Titman, Sheridan, 1984, The effect of capital structure on a firm's liquidation decision, Journal of Financial Economics 13, 137-151.

Titman, Sheridan, and Roberto Wessels, 1988, The determinants of capital structure choice. Journal of Finance 43, 1-19.

Trahan, Emery A. and Lawerence J. Gitman, 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., and C. Mellor, 1988, Nonresponse bias in mail accounting surveys: A pedagogical note,. British Accounting Review 20, 131-139.

Wansley, James W., William R. Lane, and Salil Sarkar, 1989, Management's view on share repurchase and tender offer premiums. Financial Management 18, 97-110.

Weston, J. Fred, and Eugene Brigham, 1981, Managerial Finance, seventh edition (Holt, Rinehart, and Winston, Hinsdale, IL).

Williamson, Oliver E., 1988, Corporate finance and corporate governance. Journal of Finance 43, 567-591.

Zwiebel, Jeffrey, 1996, Dynamic capital structure under managerial entrenchment. American Economic Review 86, 1197-1215.

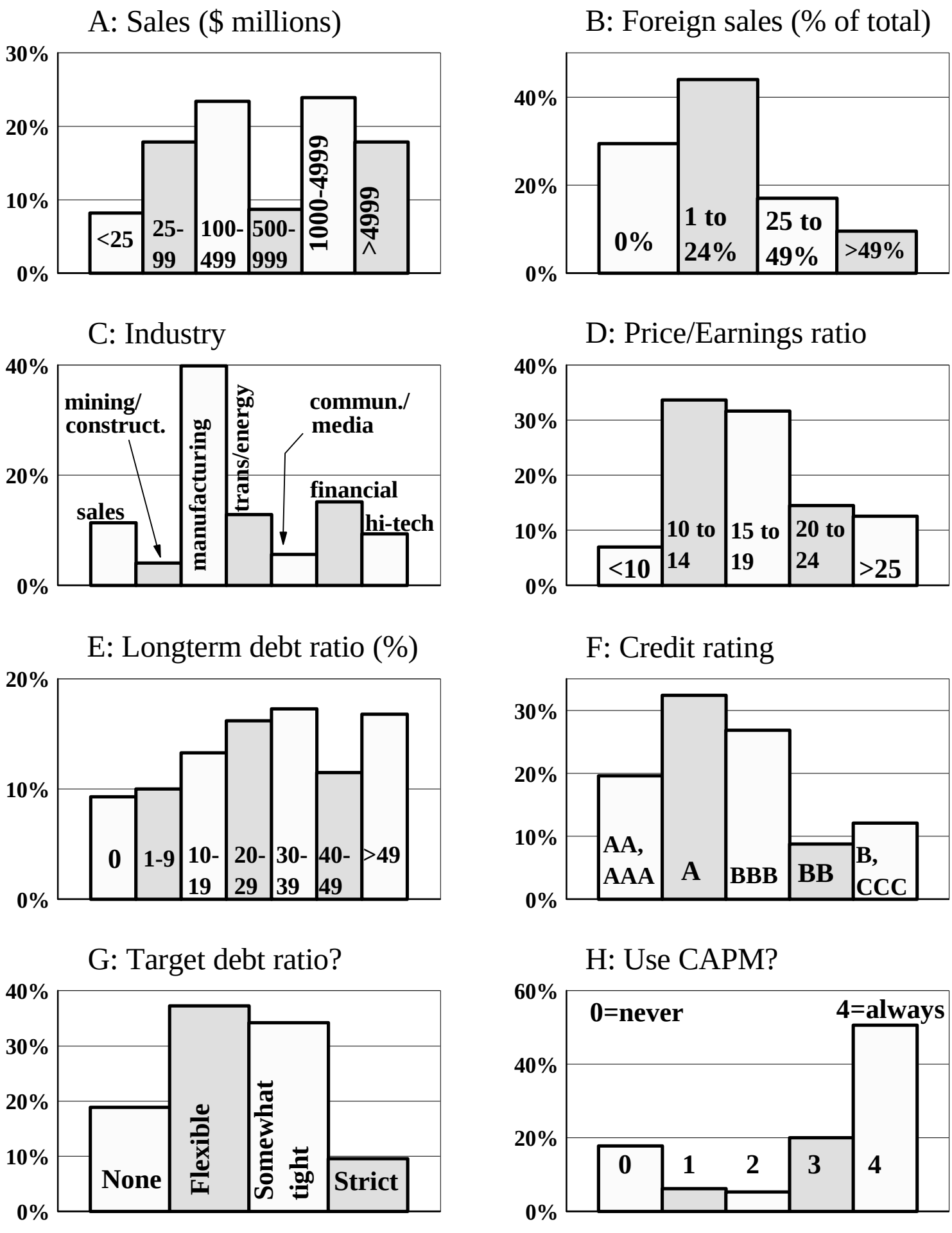


Figure 1: Sample Characterstics

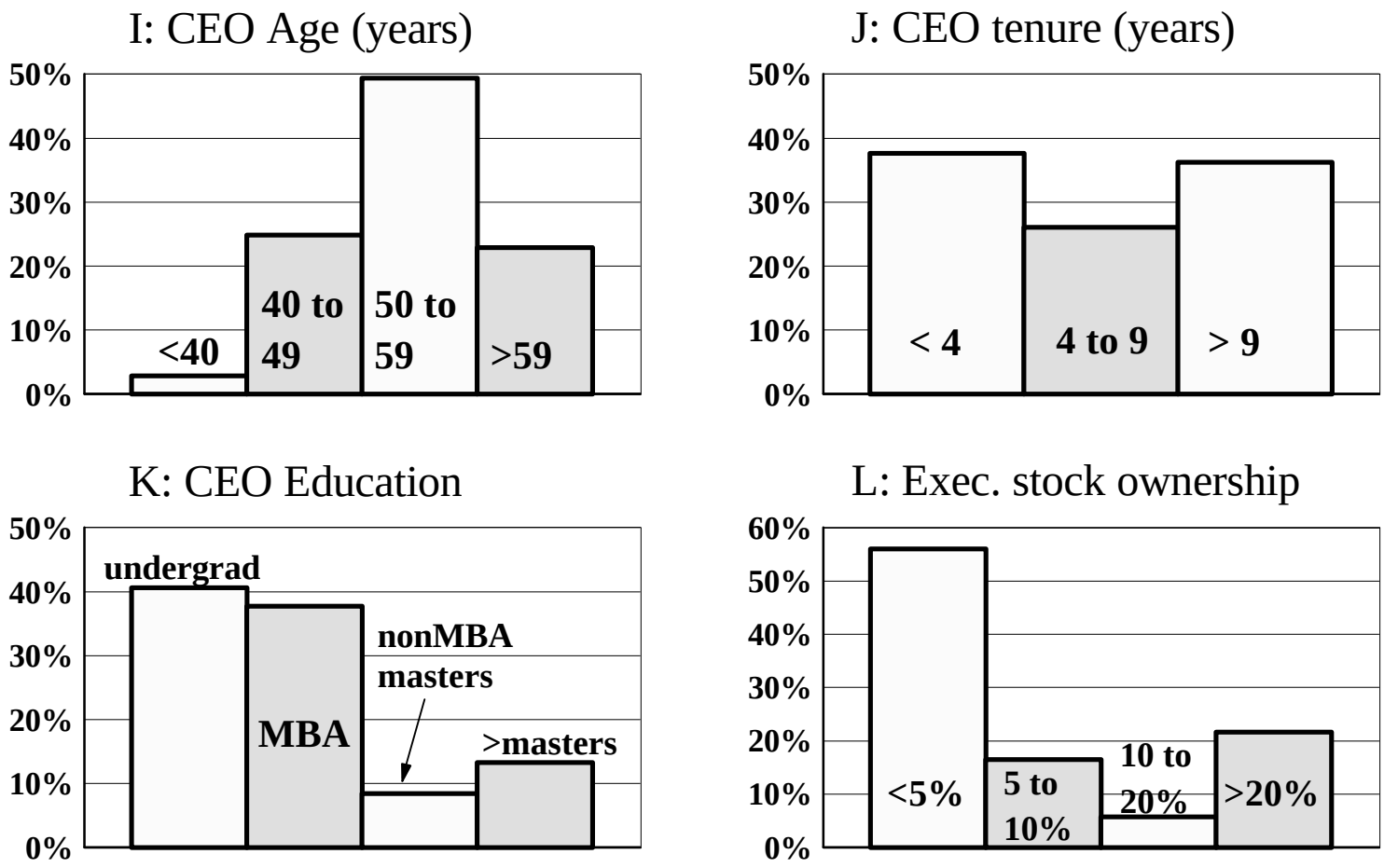


Figure 1, continued: Sample Characterstics

Table 1
Demographic correlations of control variables*

	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

*Index of mean square contingency or ϕ 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 .3), investment grade (yes has debt rated BBB or above), whether firm pays dividends, industry (manufacturing/energy/transportation versus all others), amount of management ownership (high is greater than 5%), age (older than 59 versus younger than 60), CEO tenure (long is 9 or more years on the job), whether the CEO has an MBA, whether firms are regulated, whether 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 significant difference at the 1%, 5% and 10% level, respectively.

Table 2

How frequently does your firm use the following techniques when deciding which projects or acquisitions to pursue?[a]

	%always or almost always	Mean	Size			P/E			Leverage			Investment grade			Pay dividends			Industry			Management own.		
			Small	Large		Growth	Non-G		Low	High		Yes	No		Yes	No		Manu.	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	***
j) 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	*
l) 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	.

	%always or almost always	Mean	CEO age			CEO tenure			CEO MBA			Regulated			Target debt ratio			Public corp.			Foreign sales			Fortune 500 mail		
			>59	Ynger		Long	Short		Yes	No		Yes	No		No	Yes		Yes	No		Yes	No		No	Yes	
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	***
j) 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	*
l) 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	.

[a] 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.

Table 3

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?[a]

	%always or almost always	Mean	Size			P/E			Leverage			Investment grade			Pay dividends			Industry			Management own.		
			Small	Large		Growth	Non-G		Low	High		Yes	No		Yes	No		Manu.	Others		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./(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	.

	%always or almost always	Mean	CEO age			CEO tenure			CEO MBA			Regulated			Target debt ratio			Public corp.			Foreign sales			Fortune 500 mail		
			>59	Ynger		Long	Short		Yes	No		Yes	No		No	Yes		Yes	No		Yes	No		No	Yes	
b) using the Capital Asset Pricing Model (CAPM, the "beta" approach)	73.49	2.92	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	39.41	1.72	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”	34.29	1.56	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./(cost of cap. – growth)	15.74	0.91	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	13.93	0.86	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	7.04	0.44	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	**

[a] 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.

Table 4

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[a]

	Overall				Size								P/E							
					Discount rate		Cash Flow		Both		Neither		Discount rate		Cash Flow		Both		Neither	
	Disc. rate	Cash flow	Both	Neither	Small	Large	Small	Large	Small	Large	Small	Large	Growth	Non-G	Growth	Non-G	Growth	Non-G	Growth	Non-G
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 ·
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 **
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 *
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 ·
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 ·
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 ·
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 ·
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 ·
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 ·
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 ·

	Leverage							
	Discount rate		Cash Flow		Both		Neither	
	Low	High	Low	High	Low	High	Low	High
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 ·
f) foreign exchange risk	12.88	7.09	12.88	18.44	17.18	21.99	57.06	52.48 ·
d) GDP or business cycle risk	6.83	4.96	13.66	28.37	16.15	24.82	63.35	41.84 ***
a) risk of unexpected inflation	13.94	10.71	10.91	16.43	8.48	13.57	66.67	59.29 ·
h) size (small firms being riskier)	10.37	15.60	6.71	5.67	17.68	9.93	65.24	68.09 ·
e) commodity price risk	1.24	4.32	14.29	26.62	12.42	8.63	72.05	60.43 **
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 ·
g) distress risk (probability of bankruptcy)	4.82	8.45	6.63	6.34	4.82	4.23	83.73	80.99 ·
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 ·
j) momentum (recent stock price performance).	3.68	3.55	2.45	3.55	4.91	4.26	88.96	88.65 ·

Table 4 (continued)
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).

	Pay dividends								Industry							
	Discount rate		Cash Flow		Both		Neither		Discount rate		Cash Flow		Both		Neither	
	Yes	No	Yes	No	Yes	No	Yes	No	Man.	Other	Man.	Other	Man.	Other	Man.	Other
b) interest rate risk (change in general level of interest rates)	12.11	19.75	10.53	6.37	22.11	27.39	55.26	46.50 ·	13.92	17.56	6.70	12.21	22.16	27.48	57.22	42.75 **
f) foreign exchange risk	14.89	6.37	16.49	14.01	20.21	16.56	48.40	63.06 ***	11.52	11.28	17.80	13.53	23.04	15.79	47.64	59.40 **
d) GDP or business cycle risk	5.91	8.23	25.27	10.76	18.28	19.62	50.54	61.39 **	5.18	9.85	23.83	12.88	20.21	17.42	50.78	59.85 ·
a) risk of unexpected inflation	9.57	15.19	19.15	9.49	11.70	12.66	59.57	62.66 ·	10.77	13.74	17.44	9.16	12.31	11.45	59.49	65.65 ·
h) size (small firms being riskier)	15.59	13.29	6.45	5.70	10.75	16.46	66.67	63.92 ·	12.50	17.29	6.25	6.02	13.02	14.29	68.23	60.90 ·
e) commodity price risk	4.32	1.25	23.24	13.75	12.43	9.38	60.00	75.62 ***	2.09	3.79	26.18	11.36	13.09	9.09	58.64	75.76 ***
c) term structure risk (change in the long-term vs. short term interest rate)	6.45	11.46	3.76	3.18	12.37	12.74	77.42	72.61 ·	5.73	11.54	3.12	5.38	9.90	16.15	81.25	66.92 ***
g) distress risk (probability of bankruptcy)	9.57	5.10	6.91	5.10	4.26	5.73	78.72	84.08 ·	7.69	7.75	3.59	10.08	6.15	3.88	82.56	77.52 ·
i) “market-to-book” ratio (ratio of market value of firm to book value of assets)	4.28	3.80	2.67	1.27	7.49	6.96	85.56	87.97 ·	3.09	5.34	2.58	1.53	5.15	9.92	89.18	83.21 ·
j) momentum (recent stock price performance).	3.23	3.82	4.30	1.27	3.76	6.37	88.71	88.54 ·	1.55	6.15	2.59	3.08	2.59	7.69	93.26	83.08 ***

	Management ownership								CEO age							
	Discount rate		Cash Flow		Both		Neither		Discount rate		Cash Flow		Both		Neither	
	Low	High	Low	High	Low	High	Low	High	Mature	Young	Mature	Young	Mature	Young	Mature	Young
b) interest rate risk (change in general level of interest rates)	16.17	14.50	8.98	6.87	16.17	32.06	58.68	46.56 **	11.84	16.54	10.53	8.27	26.32	23.68	51.32	51.50 ·
f) foreign exchange risk	15.98	5.47	18.34	10.94	20.71	19.53	44.97	64.06 ***	8.00	11.28	13.33	16.54	25.33	16.54	53.33	55.64 ·
d) GDP or business cycle risk	9.52	3.91	23.81	14.84	15.48	23.44	51.19	57.81 ·	9.46	6.02	17.57	19.55	18.92	19.55	54.05	54.89 ·
a) risk of unexpected inflation	13.94	12.98	16.36	9.92	8.48	12.21	61.21	64.89 ·	13.16	11.65	18.42	13.53	14.47	10.53	53.95	64.29 ·
h) size (small firms being riskier)	17.26	11.54	4.17	10.00	7.74	19.23	70.24	58.46 **	14.29	15.15	5.19	5.68	16.88	12.50	63.64	65.91 ·
e) commodity price risk	4.24	2.29	21.82	16.03	9.09	12.98	64.85	68.70 ·	1.33	3.41	16.00	20.08	18.67	9.09	64.00	67.42 ·
c) term structure risk (change in the long-term vs. short term interest rate)	6.67	11.45	3.03	4.58	13.33	11.45	76.97	72.52 ·	1.35	10.90	5.41	3.38	10.81	12.41	82.43	73.31 ·
g) distress risk (probability of bankruptcy)	8.98	6.92	6.59	6.92	3.59	6.15	80.24	80.00 ·	10.39	6.44	1.30	7.95	2.60	5.30	85.71	79.92 ·
i) “market-to-book” ratio (ratio of market value of firm to book value of assets)	5.39	3.08	2.40	1.54	4.79	8.46	87.43	86.92 ·	6.58	3.40	n/a	2.64	9.21	6.42	84.21	87.55 ·
j) momentum (recent stock price performance).	3.59	3.88	3.59	2.33	2.40	7.75	90.42	86.05 ·	5.56	3.00	1.39	3.37	8.33	3.75	84.72	89.89 ·

Table 4 (continued)
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).

	CEO tenure								CEO MBA							
	Discount rate		Cash Flow		Both		Neither		Discount rate		Cash Flow		Both		Neither	
	Long	Short	Long	Short	Long	Short	Long	Short	Yes	No	Yes	No	Yes	No	Yes	No
b) interest rate risk (change in general level of interest rates)	14.88	15.53	10.74	7.76	30.58	20.09	43.80	56.62 **	15.50	15.58	10.85	7.54	23.26	24.62	50.39	52.26 ·
f) foreign exchange risk	13.22	8.72	9.92	19.27	19.01	18.35	57.85	53.67 ·	12.60	9.45	20.47	11.94	20.47	16.92	46.46	61.69 ***
d) GDP or business cycle risk	5.83	7.31	21.67	18.26	19.17	18.72	53.33	55.71 ·	7.94	6.44	19.05	18.32	21.43	19.31	51.59	55.94 ·
a) risk of unexpected inflation	11.67	12.22	16.67	13.57	16.67	8.60	55.00	65.61 *	10.08	12.00	17.83	12.00	10.85	12.00	61.24	64.00 ·
h) size (small firms being riskier)	14.88	15.14	6.61	5.05	13.22	13.30	65.29	65.60 ·	17.19	12.38	6.25	5.45	14.06	12.87	62.50	68.32 ·
e) commodity price risk	0.83	4.17	16.53	20.37	10.74	11.57	71.90	63.89 ·	3.94	2.50	18.90	18.50	11.81	11.00	65.35	68.00 ·
c) term structure risk (change in the long-term vs. short term interest rate)	7.56	9.59	2.52	4.57	10.92	12.33	78.99	73.52 ·	11.72	7.50	3.12	4.00	13.28	11.00	71.88	77.50 ·
g) distress risk (probability of bankruptcy)	10.00	5.94	8.33	5.48	3.33	5.48	78.33	82.65 ·	8.59	6.47	6.25	6.47	3.91	5.47	81.25	81.09 ·
i) “market-to-book” ratio (ratio of market value of firm to book value of assets)	2.48	5.05	1.65	2.29	6.61	7.34	89.26	85.32 ·	5.56	3.45	0.79	2.46	4.76	7.88	88.89	86.21 ·
j) momentum (recent stock price performance).	1.69	4.57	0.85	4.11	4.24	5.02	93.22	86.30 *	3.97	2.99	0.79	4.48	6.35	3.48	88.89	89.05 ·

	Regulated								Target debt ratio							
	Discount rate		Cash Flow		Both		Neither		Discount rate		Cash Flow		Both		Neither	
	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	No	Yes	No	Yes	No	Yes
b) interest rate risk (change in general level of interest rates)	14.29	16.12	9.52	8.22	23.81	23.03	52.38	52.63 ·	17.84	11.64	7.57	8.22	23.78	27.40	50.81	52.74 ·
f) foreign exchange risk	9.52	11.84	9.52	15.13	14.29	19.08	66.67	53.95 ·	12.90	7.69	14.52	16.78	17.20	20.28	55.38	55.24 ·
d) GDP or business cycle risk	4.76	7.26	9.52	18.48	14.29	18.48	71.43	55.78 ·	8.56	3.55	20.32	17.73	18.72	17.02	52.41	61.70 *
a) risk of unexpected inflation	4.76	13.20	38.10	12.87	4.76	11.88	52.38	62.05 ·	14.52	6.90	12.90	15.86	8.60	15.86	63.98	61.38 ·
h) size (small firms being riskier)	20.00	14.80	5.00	5.26	n/a	14.14	75.00	65.13 ·	14.89	13.29	6.38	5.59	13.83	13.99	64.36	66.43 ·
e) commodity price risk	4.76	2.95	42.86	17.05	9.52	9.84	42.86	70.16 ***	2.17	4.17	20.11	18.06	10.33	11.81	67.39	65.97 ·
c) term structure risk (change in the long-term vs. short term interest rate)	4.76	9.24	9.52	2.64	9.52	12.54	76.19	75.58 ·	11.70	4.90	3.72	3.50	9.57	16.08	75.00	75.52 ·
g) distress risk (probability of bankruptcy)	5.00	7.57	n/a	6.25	n/a	5.26	95.00	80.59 ·	5.85	9.86	6.38	7.04	5.32	4.23	82.45	78.17 ·
i) “market-to-book” ratio (ratio of market value of firm to book value of assets)	n/a	3.93	4.76	1.64	n/a	7.21	95.24	87.21 ·	4.23	4.26	1.06	3.55	5.29	8.51	89.42	83.69 ·
j) momentum (recent stock price performance).	n/a	3.62	4.76	2.63	4.76	4.61	90.48	89.14 ·	3.23	4.23	2.69	3.52	3.76	5.63	90.32	86.62 ·

Table 4 (continued)
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).

	Public corporation									Foreign sales							
	Discount rate		Cash Flow		Both		Neither			Discount rate		Cash Flow		Both		Neither	
	Yes	No	Yes	No	Yes	No	Yes	No		Yes	No	Yes	No	Yes	No	Yes	No
b) interest rate risk (change in general level of interest rates)	11.84	21.01	10.09	5.88	21.49	31.09	56.58	42.02	***	13.54	15.94	8.33	8.76	19.79	26.29	58.33	49.00 ·
f) foreign exchange risk	13.00	7.32	18.39	10.57	23.32	11.38	45.29	70.73	***	13.83	9.52	22.34	12.30	31.91	13.49	31.91	64.68 ***
d) GDP or business cycle risk	7.11	6.61	21.78	13.22	19.56	17.36	51.56	62.81	**	6.45	7.14	26.88	15.87	16.13	19.44	50.54	57.54 ·
a) risk of unexpected inflation	12.78	10.83	15.42	10.83	9.69	15.83	62.11	62.50	·	7.29	13.55	19.79	12.75	13.54	11.55	59.38	62.15 ·
h) size (small firms being riskier)	14.60	14.17	5.75	6.67	11.50	17.50	67.26	61.67	·	12.77	15.02	7.45	5.53	11.70	14.23	68.09	64.43 ·
e) commodity price risk	3.59	1.64	22.87	11.48	10.31	10.66	63.23	76.23	**	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)	7.56	10.08	4.89	1.68	11.56	15.13	76.00	73.11	·	6.45	9.52	4.30	3.57	13.98	12.30	75.27	74.60 ·
g) distress risk (probability of bankruptcy)	9.73	3.33	7.52	4.17	3.98	6.67	78.32	85.83	·	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)	5.33	1.65	2.67	0.83	4.44	12.40	87.56	85.12	·	4.26	3.95	5.32	0.79	5.32	7.91	85.11	87.35 ·
j) momentum (recent stock price performance).	4.48	1.65	2.69	3.31	2.69	9.09	90.13	85.95	·	4.26	3.19	3.19	2.79	4.26	5.18	88.30	88.84 ·

	Fortune 500 (using smaller sample)							
	Discount rate		Cash Flow		Both		Neither	
	No	Yes	No	Yes	No	Yes	No	Yes
b) interest rate risk (change in general level of interest rates)	16.60	9.50	8.30	11.10	25.50	20.60	49.70	58.70
f) foreign exchange risk	9.30	17.50	13.80	22.20	17.30	25.40	59.50	34.90 ***
d) GDP or business cycle risk	6.80	6.80	16.80	28.80	20.50	10.20	55.80	54.20
a) risk of unexpected inflation	12.70	8.20	12.30	24.60	11.60	13.10	63.40	54.10
h) size (small firms being riskier)	13.40	19.70	6.50	3.30	15.80	1.60	64.30	72.10 *
e) commodity price risk	2.80	3.30	15.60	34.40	10.70	11.50	70.90	50.80 ***
c) term structure risk (change in the long-term vs. short term interest rate)	8.70	8.20	3.50	4.90	12.80	11.50	75.10	75.40
g) distress risk (probability of bankruptcy)	6.10	13.60	6.10	6.80	5.80		81.90	78.00 *
i) “market-to-book” ratio (ratio of market value of firm to book value of assets)	4.10	3.20	1.40	4.80	8.30	1.60	86.20	90.30
j) momentum (recent stock price performance).	3.10	5.00	2.40	5.00	5.50	1.70	89.00	88.30

[a] 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

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[a]…

	%always or almost always	Mean	Size		P/E		Leverage		Investment grade		Pay dividends		Industry		Management own.	
			Small	Large	Growth	Non-G	Low	High	Yes	No	Yes	No	Manu.	Others	Low	High
a) The discount rate for our entire company	58.79	2.50	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	2.36 ***	2.20	2.26 .	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	1.82 **	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	1.04 .	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 cashflow 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	Mean	CEO age		CEO tenure		CEO MBA		Regulated		Target debt ratio		Public corp.		Foreign sales		Fortune 500 mail	
			>59	Ynger	Long	Short	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No	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	2.20 **
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	2.61 ***
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	1.92 *
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	1.17 *
e) A different discount rate for each component cashflow 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	0.46 *

[a] 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.

Table 6

What factors affect how you choose the appropriate amount of debt for your firm?[a]

	%important or very important	Mean	Size		P/E		Leverage		Investment grade		Pay dividends		Industry		Management own.	
			Small	Large	Growth	Non-G	Low	High	Yes	No	Yes	No	Manu.	Others	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 .
i) 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 .

Table 6 (continued)
What factors affect how you choose the appropriate amount of debt for your firm?

	%important or very important	Mean	CEO age		CEO tenure		CEO MBA		Regulated		Target debt ratio		Public corp.		Foreign sales		Fortune 500 mail	
			>59	Ynger	Long	Short	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No	No	Yes
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 .

[a] 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

Has your firm seriously considered issuing debt in foreign countries? (if “no”, please go to the next question) If "yes", what factors affect your firm's decisions about issuing foreign debt?[a]

	%important or very important	Mean	Size		P/E		Leverage		Investment grade		Pay dividends		Industry		Management own.	
			Small	Large	Growth	Non-G	Low	High	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	CEO age		CEO tenure		CEO MBA		Regulated		Target debt ratio		Public corp.		Foreign sales		Fortune 500 mail	
			>59	Ynger	Long	Short	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No	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 .

[a] 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 8

Has your firm seriously considered issuing common stock? (if “no”, please go to the next question) If "yes", what factors affect your firm's decisions about issuing common stock?[a]

	%important or very important	Mean	Size		P/E		Leverage		Investment grade		Pay dividends		Industry		Management own.	
			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 .

Table 8 (continued)
Has your firm seriously considered issuing common stock? (if “no”, please go to the next question) If "yes", what factors affect your firm's decisions about issuing common stock?

	%important or very important	Mean	CEO age		CEO tenure		CEO MBA		Regulated		Target debt ratio		Public corp.		Foreign sales		Fortune 500 mail	
			>59	Ynger	Long	Short	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No	No	Yes
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 .

[a] 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 9

What other factors affect your firm's debt policy?[a]

	%important or very important	Mean	Size			P/E			Leverage			Investment grade			Pay dividends			Industry			Management own.		
			Small	Large		Growth	Non-G		Low	High		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	.

	%important or very important	Mean	CEO age			CEO tenure			CEO MBA			Regulated			Target debt ratio			Public corp.			Foreign sales			Fortune 500 mail		
			>59	Ynger		Long	Short		Yes	No		Yes	No		No	Yes		Yes	No		Yes	No		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	.

[a] 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

Has your firm seriously considered issuing convertible debt? (if “no”, please go to the next question) If "yes", what factors affect your firm's decisions about issuing convertible debt?[a]

	%important or very important	Mean	Size		P/E		Leverage		Investment grade		Pay dividends		Industry		Management own.	
			Small	Large	Growth	Non-G	Low	High	Yes	No	Yes	No	Manu.	Others	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 or very important	Mean	CEO age		CEO tenure		CEO MBA		Regulated		Target debt ratio		Public corp.		Foreign sales		Fortune 500 mail	
			>59	Ynger	Long	Short	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No	No	Yes
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 .	2.51	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 .	2.30	2.47 .
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 .	2.28	2.31 .
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 .	2.05	2.59 *
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 .	2.16	1.75 .
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 .	2.02	1.25 **
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 .	1.18	0.80 .
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 .	0.64	0.56 .

[a] 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 11

What factors affect your firm's choice between short- and long-term debt?[a]

	%important or very important	Mean	Size			P/E			Leverage			Investment grade			Pay dividends			Industry			Management own.		
			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	Mean	CEO age			CEO tenure			CEO MBA			Regulated			Target debt ratio			Public corp.			Foreign sales			Fortune 500 mail		
			>59	Ynger		Long	Short		Yes	No		Yes	No		No	Yes		Yes	No		Yes	No		No	Yes	
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	.
c) 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	***

[a] 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 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 ✓ (**x**) 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. Div stands for dividend.

Theory or concept	Survey evidence
Trade-off theory of choosing optimal debt policy 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).	✔corporate interest deductions moderately important. ✔foreign tax treatment moderately important. ✔cash flow volatility important. ✖expected distress/bankruptcy costs not important. ✔maintaining financial flexibility important (⇒ E(distress costs) low). **x** unrelated to whether firm has target debt ratio. ✖personal taxes not important to debt or equity decision.
Firms have target debt ratios A static version of the trade-off theory implies that firms have an optimal, target debt ratio.	✔44% have strict or somewhat strict target/range. ✔target D/E moderately important for equity issuance decision. ✖37% have flexible and 19% have no target/range. ✖issue equity after stock price increase. ✖changes in stock price not important to debt decision. ✖execs say same-industry debt ratios are not important. ✓there are industry patterns in reported debt ratios.
The effect of transactions costs on debt ratios: T. costs can affect the cost of external funds. Firms may avoid or delay issuing or retiring security because of issuance/recapitalization cost (Fisher, Heinkel, and Zechner, 1989)	✔transactions costs affect debt policy. ✓more important for small firms. ✖absolute importance of T. costs in delaying debt issue is small. ✓T. costs relatively important for small, no div firms. ✖T. costs do not cause firms to delay debt retirement.
Pecking-order theory of financing hierarchy: 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. To avoid need for external funds, firms may prefer to store excess cash (Myers and Majluf, 1984).	✔firms value financial flexibility. **x** desire for flexibility is unrelated to degree of informational asymmetry (size) or growth status. **x** flexibility less important for no-dividend firms. ✔issue debt when internal funds are insufficient. ✓more important for small firms. **x** no relation to growth or dividend status. ✔issue equity when internal funds insufficient. ✓relatively important for small firms. ✔equity issuance decision affected by equity undervaluation. **x** no relation to size, dividend status, executive ownership. ✖equity issuance decision unaffected by ability to obtain funds from debt, convertibles, or other sources. ✖debt issuance unaffected by equity valuation. **x** even less important for small, growth, no-div firms.
Stock price: Recent increase in stock price presents a "window of opportunity" to issue equity (Loughran and Ritter, 1998). If stock undervalued due to informational asymmetry, issue after information release and ensuing stock price increase (Lucas and MacDonald, 1990)	✔issue equity when stock price has risen ✓recent price increase most important for firms that do not pay dividends (significant) and small firms (not significant).
Credit ratings: firms issue short-term if they expect their credit rating to improve (Flannery, 1986).	✔In general, rating is very important to debt decision. ✖short-term debt not used to time rating improvement.
Interest rates: do absolute coupon rates or relative rates between long- and short-term debt affect when debt is issued?	✔issue debt when interest rates low. ✔short-term debt used only moderately to time the level of interest rates or because of yield curve slope.

Table 12 (continued)

Theory or concept	Survey evidence
Underinvestment: firm may pass up NPV>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)	✖low absolute importance of limiting the use of debt, or borrowing short-term, to avoid underinvestment. x growth status has no effect on relative use of short-term debt. ✓growth status affects relative importance of overall debt policy.
Asset substitution: 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.	✖neither convertible debt nor short-term debt is used to protect bondholders from the firm/shareholders taking on risky or unfavorable projects.
Free Cash Flow can lead to overinvestment or inefficiency: Fixed commitments like debt payments commit free cash so management works hard and efficiently (Jensen, 1986).	✖debt is not used with intent of commiting free cash flows.
Product Market and Industry Influences: Debt policy credibly signals production decisions (Brander and Lewis, 1986).	✖debt policy is not used to signal production intentions.
Sensitive firms use less debt so customers/suppliers do not worry about firm entering distress (Titman, 1984)	✖absolute importance of this explanation is low. x not important for high-tech firms. ✓relatively important for growth firms.
Debt ratios are industry-specific (Bradley et al., 1984).	✖firms report that the debt, equity, and convertibles usage of same-industry firms does not affect financing decisions. ✓debt ratios differ systematically across industries.
Corporate Control: 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).	✔equity issued to dilute holdings of particular shareholders. x dilution strategy unrelated to managerial share ownership. ✖takeover threat does not affect debt decisions.
Risk Management: finance foreign operations with foreign debt as a means of hedging FX risk.	✔foreign debt is frequently viewed as a natural hedge.
Maturity-matching: match maturity between assets and liabilities.	✔important to choice between short- and long-term debt.
Cash Management: match cash outflows to cash inflows.	✔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.
Employee stock/bonus plans: shares of stock needed to implement employee compensation plans.	✔when funding employee plans, firms avoid issuing shares, which would dilute the holdings of existing shareholders.
Bargaining with employees: high debt allows effective bargaining with employees (Chang, 1992).	✖debt policy is not used as bargaining device.
Earnings per share dilution	✔important to equity issuance decision.

Baker et al 2011
– Corp Finance Practices in Canada

Corporate Finance Practices in Canada: Where Do We Stand?

H. Kent Baker*
American University, USA

Shantanu Dutta
University of Ontario Institute of Technology, Canada

Samir Saadi
Queen's University, Canada

This study investigates the financial practices of Canadian firms involving capital budgeting, cost of capital estimation, capital structure, and real options. Survey respondents express a strong preference for net present value followed by internal rate of return and payback methods. The least popular capital budgeting technique is real options. Unlike their U.S. and European counterparts, Canadian firms rely more on subjective risk assessments in adjusting their discount rate. The use of subjective judgment by Canadian managers also applies to risk analysis, forecasting project cash flows, and estimating the cost of equity capital. This finding differs markedly from the widespread use of the capital asset pricing model by U.S. and European firms. In examining capital structure choice, the results show support for trade-off theory relative to pecking order theory. Finally, firm size and the education of the chief executive officer influence corporate finance decisions. (JEL: G35)

Keywords: Capital budgeting, cost of capital, risk analysis, real options.

I. Introduction

This study presents survey results from a large sample of Canadian firms designed to investigate practices involving capital budgeting, cost of equity estimation, capital structure preferences, and real options. For

* Corresponding author. The authors thank the anonymous reviewer as well as Alfred Davis and Fodil Adjaoud for helpful comments and suggestions.

(*Multinational Finance Journal*, 2011, vol. 15, no. 3/4, pp. 157–192)

decades these topics have received much attention from both the academic and professional community with Istvan (1961) providing one of the earliest empirical studies. More recent studies conclude that corporate finance practices have become more aligned with finance theory over time. For instance, Gitman and Vandenberg (2000), who examine cost of capital estimation techniques in large U.S. firms using the same survey instrument as in their earlier 1980 study (Gitman and Mercurio, 1982), find an increase in the popularity of the capital asset pricing model (CAPM).

Most studies of corporate finance practices focus on large U.S. firms. Few researchers except Jog and Srivastava (1995) examine the Canadian market. However, they only investigate large firms and use a survey covering few capital budgeting, risk assessment, and cost of capital techniques. For instance, these authors investigate only four capital budgeting techniques: accounting rate of return (ARR), payback period (PBP), internal rate of return (IRR), and net present value (NPV). By contrast, the current survey covers nine capital budgeting techniques including real options, and uses a sample nearly twice that of Jog and Srivastava. Moreover, while the current study surveys all Canadian public firms, Jog and Srivastava examine only large firms. This limitation reduces the scope of their study and prevents possible generalization of their findings to the entire Canadian context. In contrast, the non-response bias analysis, which is discussed in Section III, suggests that the sample is representative of the population of Canadian public firms with respect to size but also to several other dimensions. Further, unlike Jog and Srivastava (1995), survey responses from the current study are examined conditional on firm size and CEO education as in Graham and Harvey (2001). Finally, given that Jog and Srivastava conducted their survey in 1991 and the growing interest in corporate finance practices in the academic literature, a need exists for a current and more comprehensive study on Canadian finance practices.

Athanassakos (2007) uses a sample of large Canadian public firms to examine the use of value-based management (VMB) methods and how they influence a firm's stock performance. He also identifies characteristics of both firms and management that increase the likelihood of employing VMB methods. Although this study is not directly comparable to the stream of capital budgeting studies that use a survey approach, it provides good insights on how corporate finance practices influence shareholders' wealth.

Graham and Harvey (2001) survey U.S. and Canadian executives who are members of the Financial Executive Institute (FEI) but they do

not specify the percentage of Canadian managers responding to their survey. The results show that their findings reflect mainly the United States view and are similar to previous U.S. surveys. For example, Graham and Harvey report that most chief executive officers (CEOs) use CAPM to compute the cost of equity. Yet, the results show that the majority of responding Canadian firms use subjective judgment with a substantially lower percentage using CAPM. One possibility for this difference is that the low proportion of Canadian executives included in the Graham and Harvey study dilutes the Canadian view.

Other studies (Chew, 1997; La Porta et al., 1998; Rajan and Zingales, 2003; Lasfer and Alzahrani, 2009; Aggarwal et al., 2009) stress the importance of country-level variables in shaping a firm's corporate decisions. For example, Brounen, De Jong, and Koedijk (2004) find that capital budgeting practices in Europe tend to vary by country of origin. As Baker et al. (2009) observe, several major differences exist between the United States and Canadian contexts that could affect corporate finance practices. For example, Canadian firms are smaller in size, have more concentrated ownership structure and weaker corporate governance than their U.S. counterparts (Morck, Stangeland, and Yeung, 2001; King and Segal, 2003; Bris, 2005; Leung, Meh, and Terajima, 2008). Section V provides a discussion of how these differences help explain the discrepancies between U.S. and the Canadian survey results. Thus, combining the views of U.S. and Canadian executives could distort the results reported by Graham and Harvey (2001).

Capital budgeting surveys typically share the same main goal of assessing whether firm practices conform to finance theory. With the notable exception of Graham and Harvey (2001) and Brounen, De Jong, and Koedijk (2004), these studies focus mainly on the popularity of traditional capital budgeting techniques. Although finance theory favors discounted cash flow (DCF) techniques to less conceptually correct methods, DCF techniques have limitations. For instance, DCF methods often fail to provide sound valuation when the business environment is uncertain and ignore the value created by flexibility in management decisions (Brealey, Myers, and Allen, 2007). Using a real options approach can help to overcome these limitations and to provide more accurate valuation than the static DCF approaches (Brennan and Schwartz, 1985; Paddock, Siegel, and Smith, 1988; Pindyck, 1991; Ingersoll and Ross, 1992; Trigeorgis, 1993).

In practice, top managers do not appear to share the increasing interest in real options from academicians and financial professionals

with similar enthusiasm. As Chance and Peterson (2002, p. 95) note, "Empirical research has provided some, but very limited, support for the real-world applicability of real options models." According to the Canadian survey results, the real options approach is the least popular of the nine capital budgeting techniques presented in the survey with only 17% of participants indicating using them. Graham and Harvey (2001) and Block (2007) document this relatively weak support for real options in the United States, while Brounen, De Jong, and Koedijk (2004) find similar results in Europe. These surveys, however, provide little rationale for the low popularity of real options because they simply report the percentage of responding firms using real options. While Triantis and Borison (2001) ask firms why they use real options, they examine only 35 companies that are already using or considering real options. Hence, survey evidence on why firms do not use real options is largely absent from the literature. This study attempts to uncover some reasons or obstacles inhibiting firms from using real options. Specifically, the study provides evidence about the importance that respondents attach to eight reasons for not using real options such as a lack of expertise or knowledge and the complexity of applying real options in practice. Identifying these reasons may help both academicians and financial professionals become aware of factors limiting the use of real options.

This study contributes to the literature on corporate finance practices in several ways. First, although many surveys examine corporate finance practices, few report evidence from Canadian firms. This study provides the most comprehensive examination of Canadian firms regarding capital budgeting techniques, cost of capital estimation, and capital structure to date and permits determining whether such practices have evolved over time. Baker, Singleton, and Veit (2011) provide for a synthesis of the survey-based literature on corporate finance practices. Second, this approach permits examining the extent to which corporate finance practices documented from numerous U.S. studies hold in Canada. Third, this investigation of real options provides new insights about why managers use and do not use real options when making capital budgeting decisions. Fourth, the study provides a basis for examining the level of support for two competing capital structure theories – the static trade-off theory and pecking order theory. Finally, the study examines how firm characteristics and CEO education may affect finance practices in Canada. Graham and Harvey (2001), for instance, find that firm size and whether the CEO holds an MBA degree shape corporate finance practices of U.S. firms. Given the differences

between the United States and Canada, determining whether these two dimensions affect Canadian finance practices is important.

Survey-based research offers several benefits. The main point of conducting a survey is to get information that is otherwise unavailable. Thus, the survey approach can provide unique information that complements the results obtained from traditional large-sample analysis. As Graham and Harvey (2001) note, large-sample studies often have weaknesses related to variable specification and the inability to ask qualitative questions. Surveys also offer considerable versatility and flexibility in asking a wide variety of questions. Additionally, surveys provide a direct way for outsiders to understand how companies operate. Thus, they permit identifying where theoretical concepts fall short in addressing practical issues in corporate decision making, which in turn helps identify future research opportunities. Finally, using a survey enables researchers to choose the volume of data to collect and the degree of complexity depending on the scope of information requirements and resource availability.

As Chu and Partington (2001, p. 166) note, "the availability of large computerized databases has been a boon to researchers by freeing them from much of the tedium of data collection and management." Yet, such availability of data has caused researchers to become distanced from their data and accept it without question. The risk of uncritical acceptance of data may lead the researcher to erroneous conclusions. Chu and Partington further note that this problem is compounded in multi-country studies because a single researcher is unlikely to have the knowledge across all countries of conditions and institutional detail that helps identify anomalous data and results.

Several important results emerge from this survey-based study. In line with finance theory, the evidence shows a strong preference for NPV followed by IRR and PBP. By contrast, Jog and Srivastava (1995) report in their 1991 survey that IRR and PBP dominate the NPV method. The results also differ from studies showing that IRR in the United States and PBP in Europe are the most popular capital budgeting techniques. Among the capital budgeting techniques, the survey results show that using real options is even less popular in Canada than in the United States and Europe. Canadian managers indicate that the main reason for not using real options is the lack of expertise or knowledge. Clearly this finding is contrary to the optimistic predictions from the academic and professional community about the prospective widespread use of real options as a powerful capital budgeting and management tool.

Regarding risk analysis, the study documents that Canadian managers rely mainly on subjective judgment, which is inconsistent with theory. Subjectivity also applies when adjusting the discount rate for risk, forecasting project cash flows and estimating the cost of equity capital. These findings diverge markedly from the approaches used by U.S. and European financial managers when dealing with risk in capital budgeting.

In examining capital structure choice, the results of the survey provide support for trade-off theory relative to pecking order theory. Further, Canadian managers exhibit tighter target capital structure than their U.S. and European counterparts. Finally, the results indicate that firm size and CEO education influence corporate finance decisions.

The remainder of the paper proceeds as follows. Section II discusses the research methodology and describes the survey sample. Section III discusses potential limitations of the survey approach while Section IV presents and discusses the main findings. Section V provides an explanation of the differences between U.S. and Canadian survey results regarding corporate finance practices. Finally, Section VI provides a summary and conclusions.

II. Research Methodology and Sample Selection

A. Survey Design

A mail survey serves as the major means of gathering data. The survey is available from the authors upon request. Previous survey studies especially Graham and Harvey (2001) provide the inspiration for the current study. The current survey contains two groups of questions. The first group focuses on capital budgeting methods, cost of capital, and capital rationing and the second group consists of questions on real options. The questionnaire concludes by inquiring about the backgrounds of respondents including their involvement in their firm's capital budgeting process and current position. Survey recipients are also asked whether the company's CEO holds an MBA degree.

For most questions in the first group, survey recipients are asked to indicate how frequently they use each of the capital budgeting and cost of capital techniques provided in the survey using a five-point Likert scale where 0 = never, 1 = rarely, 2 = sometimes, 3 = often, and 4 = always. A t-test is used for the null hypothesis that the mean response for each method equals 0 (never).

The section on real options contains six questions: The first two questions ask respondents to indicate the reason(s) underlying their use of real options. The first question asks whether their company uses real options in making capital budgeting decisions. The second question provides six reasons and asks respondents to indicate the level of importance of each reason on a four-point scale where 1 = none, 2 = low, 3 = moderate, and 4 = high. The third question is an open-ended question asking respondents to state the most important reason for their firm using real options.

The section on real options ends with two questions on why their company does not use real options. In one question, eight reasons are provided and respondents are asked to choose one or more based on the four-point importance scale where 1 = none, 2 = low, 3 = moderate, and 4 = high. The last question is an open-ended question asking respondents to specify the most important reason for not using real options.

B. Sample Description

The initial survey sample consisted of all 847 Canadian firms listed on Toronto Stock Exchange (TSX) at the beginning of 2006. To be included in the final survey sample, each firm had to have the following data available from the Stock-Guide database: (1) revenues, (2) debt-to-equity ratio, and (3) price-to-book ratio. Instead of using Worldscope and Compustat, Stock-Guide is used because this specialized database provides more comprehensive coverage of Canadian public firms and leads to a larger sample size. Such data is used to test for differences between responding and non-responding firms. Deleting firms with missing data resulted in a final sample of 762 firms.

On February 5, 2006, a personalized cover letter requesting participation in this study along with a stamped self-addressed return envelope and the two-page survey instrument was mailed to the chief financial officer (CFO) of each of the 762 firms. The names and addresses of the CFOs were obtained from each company's website. The cover letter stated that if recipients are not actively involved in determining their firm's capital budgeting decision, they should give the survey to someone in their company who is involved. The survey contained a code number to avoid potentially including duplicate responses in the analysis.

The cover letter informed potential respondents that the results

TABLE 1. Characteristics of Survey Respondents and Non-Respondents for TSX-Listed Firms

	Market Value of Equity (Cdn$ millions)	Total Assets (Cdn$ millions)	Revenues (Cdn$ millions)	Beta	Ownership (%)	Voting (%)	Debt-to-Equity Ratio	Price-to-Book Ratio
Mean								
Respondents	1954.20	3514.73	973.37	0.78	32.95	37.01	0.28	2.82
Non-respondents	1838.36	4009.56	1145.20	0.87	28.32	33.76	0.34	2.78
Median								
Respondents	438.85	358.82	214.95	0.70	26.40	31.60	0.21	2.35
Non-respondents	205.86	290.20	80.12	0.78	24.45	28.85	0.19	2.02
Standard deviation								
Respondents	4799.24	6945.33	1965.50	0.41	25.29	29.03	0.39	2.09
Non-respondents	5965.61	8759.94	3288.55	0.54	24.66	27.70	1.08	2.83
Number of respondents	211	214	214	199	189	189	214	214
Number of non-respondents	542	548	548	501	476	476	548	548
t-test for the equality of means								
Equality of variances (assumed)	0.19	–0.85	–0.71	–1.20	1.63	1.13	–0.60	0.13
Equality of variances (not assumed)	0.23	–1.52	–1.17	–1.59	1.60	1.06	–1.18	0.17
Wilcoxon test	16989.5	18808.5	14832.3	9349.4	10156.2	10345.4	9322.1	19351.6

(*Continued*)

TABLE 1. (Continued)

Note: For the TSX-listed firms surveyed, this table provides descriptive statistics for 214 responding and 548 non-responding firms on eight characteristics. The Stock-Guide database serves as the source for obtaining the following data on each of the two groups for year 2005: (1) market value of equity, (2) total assets, (3) revenues, (4) beta, (5) ownership, (6) voting, (7) debt-to-equity ratio, and (8) price-to-book ratio. Market value of equity, total assets and revenues are in millions Canadian dollar (Cdn$ millions). Ownership is the total percentage of equity interest held as a group by the company's directors and by other individuals or companies that own more than 10% of the company's equity shares. Voting is the total percentage of votes attached to the company's voting shares held by the company's directors and by other individuals or companies that own more than 10% of the equity shares of the company, and/or exercise control over more than 10% of all voting rights. The voting right refers to the right of a common stockholder to vote, in person or by proxy, for members of the board of directors and other matters of corporate policy. To determine if the responding and non-responding firms differ significantly on each characteristic, a t-test is used to test for the equality of means assuming equal variances and non-equal variances. The non-parametric Wilcoxon test is also used. The number of respondents and non-respondents is less than full survey sample (762) because of missing observations. No statistically significant differences exist between respondent and non-respondent firms on any characteristic at the 0.05 level.

would be in summary form and would not be disclose any information about individual companies. Although including a code number may have reduced the response rate and/or introduced a response bias, having the ability to identify duplicate responses outweighs this potential limitation. A second copy of the survey was mailed to non-respondents on March 31, 2006 to increase the response rate and thereby to reduce potential non-response bias. As an inducement to increase the response rate, an executive summary of the results was offered to all interested parties.

By the end of April 2006, 214 usable responses (a 28.1% response rate), consisting of 159 responses from the first mailing and 55 responses from the second mailing, were received. A usable response was defined as one in which a participant answered at least 90% of the questions. The response rate is considerably higher than similar survey-based studies including Trahan and Gitman (1995), Jog and Srivastava (1995), Graham and Harvey (2001), and Brounen, De Jong, and Koedijk (2004) with 12%, 23%, 9%, and 5% response rates, respectively.

Of the respondents, 89.5% report being actively involved in their firm's capital budgeting process. The most common positions or titles of the respondents are CFO (87.3%), vice president of finance (3.9%), and corporate controller (3.6%). The remaining respondents belong to one of the following categories, where no category amounts to more than 3% of the responses: CEO, corporate secretary, and president. In summary, the sample represents high ranking and knowledgeable corporate executives. Of the participants, 20.6% indicate that their company's CEO holds an MBA degree.

The responses to the survey come from managers of firms in the following business sectors: manufacturing (44%), retail and wholesale sales (24%), and mining (14%). The remaining business sectors (financial, high-tech, and utility) each represent less than 10% of the responses. Thus, the sample includes a wide range of industries.

Table 1 provides descriptive statistics for respondent and non-respondent firms. The data suggest that the firm characteristics of the two groups are similar. The difference in means test, which is discussed in the next section, supports this assertion. The mean firm size of respondent (non-respondent) firms, measured in terms of market value of equity is about 1,954 (1,838) million Canadian dollars. Firm beta is about 0.78 and 0.87 for the respondent and non-respondent firms, respectively. Both groups exhibit a high level of ownership concentrations with an average around 30%. A similar observation

applies to the leverage (debt-to-equity) ratio. Finally, both respondent and non-respondent firms have an average price-to-book ratio of about 2.8.

III. Potential Limitations of the Survey Approach

As with any survey, this study has several potential limitations. First, non-response bias could affect the results despite taking several steps to reduce this bias such as using multiple mailings, assuring respondents of confidentiality, and making the survey reasonably short and easy to complete. The high response rate relative to other recent surveys lessens this concern. Nevertheless, the study examines non-response bias by testing whether the means of eight firm characteristics of the 214 responding firms differ significantly from those of the 548 non-responding firms. The firm characteristics are: (1) market value of equity, (2) total assets, (3) revenues, (4) beta, (5) ownership, (6) voting, (7) debt-to-equity ratio, and (8) price-to-book ratio. A t-test is used to determine whether a significant difference exists between the means of the respondents and non-respondents on each firm characteristic. Because the standard t-test assumes equality of variances, which may not be the case, a t-test that does not assume equality of variances is also used. Because t-tests assume a normal distribution, which also may not be the case, a further test for non-response bias using a non-parametric test, specifically the Wilcoxon test, is used. The results for equality of means, reported in table 1, show that no significant difference exists between firms of respondents and non-respondents on any of the eight characteristics at conventional levels.

As suggested by Wallace and Mellor (1988), the responses from the 159 firms that returned the survey after the first mailing are compared to those responses from the 55 firms after the second mailing. To perform the chi-square tests and to reduce the potential problem associated with small cell size, the five-point scale is collapsed to three categories – (1) never and rarely, (2) sometimes, and (3) often and always – and the four-point importance scale to two categories – (1) none and low and (2) moderate and high. The chi-square tests (not reported here but available from the authors upon request) show no significant differences between the responses to the first and second mailing at normal levels.

Besides non-response bias, the survey questionnaire may be the

source of other potential limitations. Did respondents answer each question truthfully? Did respondents properly understand the questions? Do the responses to each question depend on the question's location in the survey? There is no evidence that respondents answered untruthfully or misunderstood the questions. Because all statements appear in one section on a single page, any potential bias based on question location appears small. The literature contains many instances of order having no effect on response rates such as Graham and Harvey (2001).

IV. Results and Discussion

A. Capital Budgeting Techniques

The study begins by examining whether Canadian public firms use DCF methods to evaluate investment opportunities. Consistent with theory, the vast majority (84%) of the respondents indicate that they use DCF techniques. Results presented in figure 1 also show that 58% use DCF techniques as a primary tool while about 26% use them as a secondary tool. Not surprisingly, DCF methods are more popular among larger firms and firms managed by CEOs with an MBA.

As table 2 shows, firms use DCF techniques mainly to help in deciding whether to expand in terms of new operations. The second and third most popular situations in which firms tend to use DCF techniques are mergers and acquisitions (M&As) and expansion of existing operations. The results from the chi-square tests suggest that firm size and CEO education affect the popularity of DCF techniques. Consistent with figure 1, larger firms are more likely to use DCF methods in four of the seven situations presented in table 2, except expansion (new and existing operations) and M&As where the chi-square test is not statistically significant. Approaches using DCF are also more popular in firms managed by CEOs with an MBA when such firms face decisions involving the expansion of existing operations, project replacement, and foreign operations.

Managers of Canadian firms generally appear to assess the riskiness of capital projects consistent with financial theory. First, the results from Panel A of figure 2 show that 84% of the respondents indicate that they differentiate between the riskiness of capital projects. This tendency is more pronounced in firms managed by CEOs with an MBA but does not seem to be influenced by firm size. Second, the results

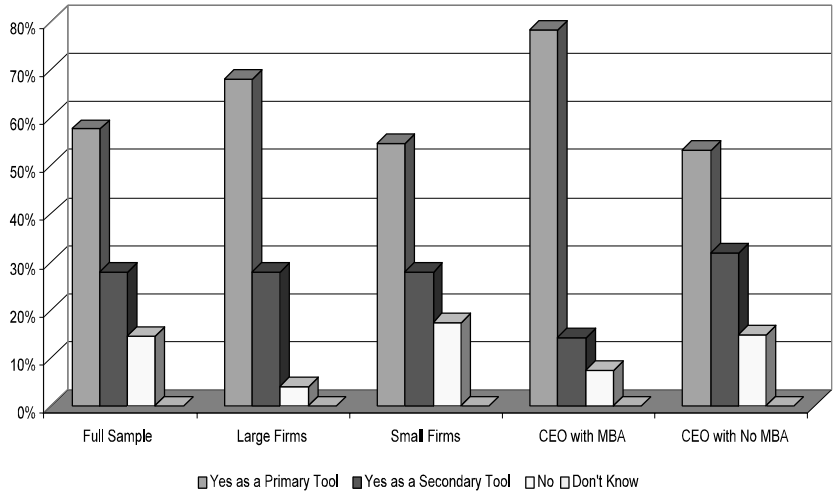


FIGURE 1.— Use of Discounted Cash Flow Techniques to Evaluate Investment Opportunities

Note: This figure provides the responses by managers of Canadian firms on whether their firms use DCF techniques to evaluate investment opportunities. The participants chose one answer among the following choices: (1) Yes as a primary tool, (2) Yes as a secondary tool, (3) No, and (4) Don't know. The figure partitions the sample by firm size (large and small) and by whether or not the firm's CEO holds an MBA.

from Panel B show that nearly 83% of respondents indicate that they measure project risk individually, while only 16% specify that they group projects into risk classes. This view is more pronounced for small firms (i.e., firms that have sales less than 100 million Canadian dollars) and firms managed by CEOs without an MBA. As Panel C shows, 44% of the responding managers indicate that they adjust the discount rate, 23% adjust the cash flow, and 26% adjust both the discount rate and the cash flow to account for the project riskiness. Firms managed by CEOs with an MBA are more likely to adjust the discount rate or cash flow than firms managed by CEOs without an MBA. The latter are more likely to adjust both.

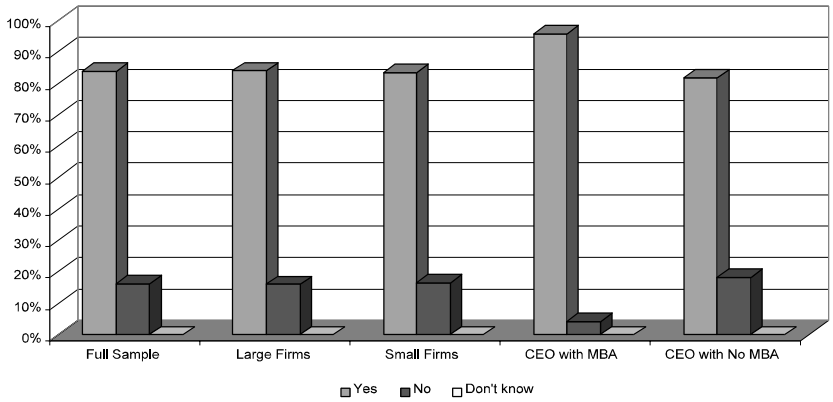
In a 1991 survey of large Canadian firms, Jog and Srivastava (1995) report that the four most popular DCF techniques are IRR, NPV, PBP, and ARR. Their survey results suggest that IRR (in most cases) and PBP (in several cases) dominate the NPV method. The three other techniques (NPV, IRR, and PBP) always dominate the ARR. As table 3 shows, the

TABLE 2. Use of DCF Techniques in Various Situations

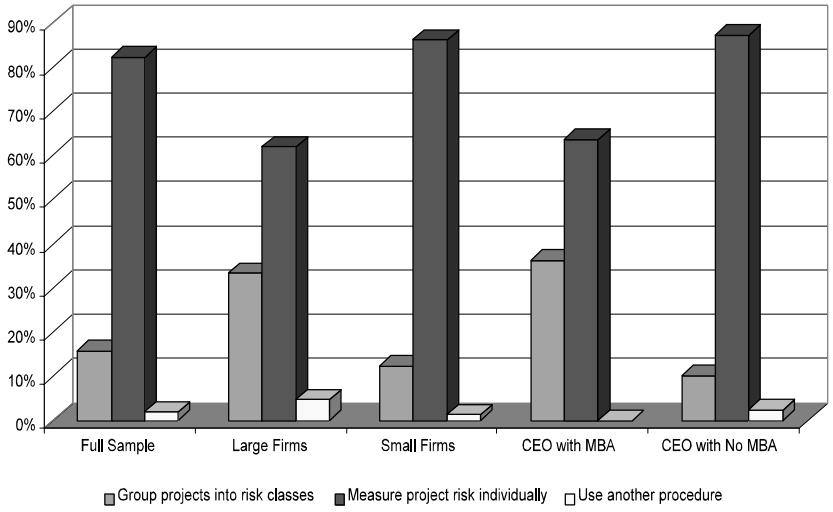
			Response Mean				
				Firm Size		CEO with an MBA	
S#	Statement	% of Often or Always	Full Sample	Large	Small	Yes	No
3	Expansion – new operations	89.9	3.45	3.95	3.11	3.95	3.33
4	Mergers and acquisitions	88.8	3.51	3.75	3.39	3.95	3.45
2	Expansion – existing operations	81.8	3.24	3.63	3.01	3.99	2.98*
1	Replacement projects	54.5	2.45	3.23	2.13**	3.31	2.17*
7	Leasing	49.4	2.16	2.97	1.83*	2.84	1.99
6	Abandonment	41.8	1.85	2.96	1.45**	2.84	1.55
5	Foreign operations	43.9	1.78	2.68	1.47*	2.68	1.58*

Note: This table provides the responses by managers of Canadian firms on whether their firms often or always use DCF techniques in seven different situations. Respondents indicate the frequency level based on a five-point scale where 0 = never, 1 = rarely, 2 = sometimes, 3 = often, and 4 = always. The table partitions the sample by firm size (large and small) and by whether or not the firm's CEO holds an MBA. *, ** indicate significance at the 0.05 and 0.01 levels, respectively.

A. Survey responses on whether their firms differentiate between the riskiness of capital projects



B. Survey responses on whether firms group projects into risk classes, measure project risk individually, or use another procedure



C. Percent of respondents using different approaches to adjust for project riskiness

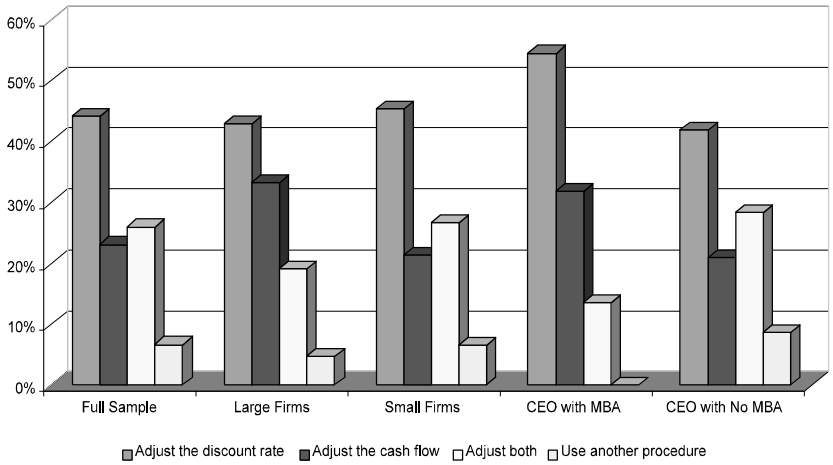


FIGURE 2.— Assessing Risk of Capital Budgeting Projects by Canadian Firms

Note: This figure provides the responses on how Canadian managers assess the riskiness of capital projects. Each figure partitions the sample by firm size (large and small) and by whether or not the firm's CEO holds an MBA.

updated survey, which includes both small and large firms, provides new insights on the capital budgeting techniques used by Canadian firms. Although, IRR, NPV, PBP, and ARR remain the most popular techniques, the evidence shows that consistent with finance theory NPV is the most popular method. In fact, nearly 75% of respondents indicate that they often or always use NPV, while about 68% and 67% often or always use IRR and PBP, respectively. Slightly less than 40% claim to use ARR often or always. While firm size or CEO education does not appear to influence the frequency of using NPV, IRR seems to be more popular in large firms. Hence, Jog and Srivastava's evidence reflects mainly the capital budgeting practices of large firms and should not be generalized to all Canadian firms.

The results also differ from recent U.S. and European evidence where IRR seems to be the most popular technique in the United States (Graham and Harvey, 2001) and PBP is the most frequently used capital budgeting technique in France, Germany, the Netherlands, and the

TABLE 3. Capital Budgeting Techniques Used by Canadian Firms When Deciding which Projects or Acquisitions to Pursue

			Response Mean				
				Firm Size		CEO with an MBA	
S#	Statement	% of Often or Always	Full Sample	Large	Small	Yes	No
4	Net present value	74.6	2.93	2.92	2.95	3.04	2.88
7	Internal rate of return	68.4	2.81	3.40	2.52**	3.14	2.70
2	Payback period	67.2	2.78	3.04	2.73	2.63	2.98*
1	Accounting rate of return	39.7	1.76	2.04	1.67	1.36	1.82
3	Discounted payback	24.8	1.18	0.61	1.34*	0.68	1.29*
5	Adjusted present value	17.2	0.90	1.04	0.88	0.82	0.91
6	Profitability index	11.2	0.53	0.32	0.60	0.29	0.60
8	Modified internal rate of return	12.0	0.52	0.40	0.53	0.01	0.72**
9	Real options	10.4	0.47	0.68	0.35*	0.11	0.63*

Note: This table presents the responses by managers of Canadian firms on which capital budgeting techniques their firms use when deciding which projects or acquisitions to pursue. Respondents indicate the frequency level based on a five-point scale where 0 = never, 1 = rarely, 2 = sometimes, 3 = often, and 4 = always. The table partitions the sample by firm size (large and small) and by whether or not the firm's CEO holds an MBA. *, ** indicate significance at the 0.05 and 0.01 levels, respectively.

TABLE 4. Risk Analysis Techniques Used by Canadian Firms When Deciding the Projects or Acquisitions to Pursue

			Response Mean				
				Firm Size		CEO with an MBA	
S#	Statement	% of Often or Always	Full Sample	Large	Small	Yes	No
4	Judgment	76.9	3.11	3.36	3.00	3.22	3.11
1	Sensitivity analysis	73.5	2.90	3.08	2.88	3.14	2.88
2	Scenario analysis/Decision trees	31.9	1.56	1.72	1.55	1.36	1.61
8	Change the required return	27.5	1.29	1.86	1.11*	1.59	1.25
3	Simulation analysis	12.9	0.84	1.00	0.77	0.68	0.86
9	Measure risk in a portfolio context	13.1	0.76	1.08	0.67	0.95	0.73
6	Adjust the payback period	8.6	0.66	0.43	0.72*	0.36	0.72
5	Mathematical programming	4.3	0.40	0.55	0.28**	0.14	0.47
7	Certainty equivalents	0.9	0.22	0.20	0.23	0.09	0.24

Note: This table presents the responses of managers of Canadian firms on which risk analysis techniques their firms use when deciding which projects or acquisitions to pursue. Respondents indicate the frequency level based on a five-point scale where 0 = never, 1 = rarely, 2 = sometimes, 3 = often, and 4 = always. The table partitions the sample by firm size (large and small) and by whether or not the firm's CEO holds an MBA. *, ** indicate significance at the 0.05 and 0.01 levels, respectively.

United Kingdom (Brounen, De Jong, and Koedijk (2004). Although the popularity of PBP has decreased over time, the method still enjoys wide usage especially among firms whose CEO does not hold an MBA. For example, consistent with Graham and Harvey, the results of the current study find that the use of payback is more popular in firms managed by CEOs who do not hold an MBA.

Of the nine capital budgeting techniques used by Canadian firms, the use of real options is the least popular technique. As table 3 shows, only 10.4% of the respondents report using real options often or always. Yet, larger firms and those managed by CEOs without an MBA appear to use real options more frequently. Although the latter finding appears counterintuitive, a potential explanation is that because MBA programs often focus more on traditional techniques with less coverage of real options, CEOs holding an MBA may be more likely to favor traditional approaches. Jagannathan and Meier (2002) link this behavior to the social desirability hypothesis developed in the psychology literature.

Table 4 presents survey responses regarding nine risk analysis techniques used by Canadian firms when deciding which projects or acquisitions to pursue. Contrary to finance theory, the most common is judgment, which 76.9% of the respondents report using often or always, followed closely by sensitivity analysis (73.5%), and scenario analysis/decision-tree analysis (31.9%). Not surprisingly, only a small percentage report using mathematical programming (4.3%) and certainty equivalents (0.9%) often or always.

B. Cost of Capital, Capital Structure, and Capital Rationing

Table 5 presents information on how frequently the responding firms use various discount rates when evaluating a new project. Consistent with finance theory, the majority of the companies (63.6%) report using the company's overall discount rate (weighted average cost of capital or WACC) often or always. Using WACC appears more popular among large firms, which is consistent with the view that large firms tend to use more sophisticated approaches (Graham and Harvey, 2001). The second most popular alternative (43.5%) relies on management's experience followed by the cost of specific funds planned for financing the project (38.2%). Only 36.6% of respondents indicate using a risk-matched discount rate often or always, while 14.1% report employing a different discount rate for each cash flow that has a different risk characteristic.

TABLE 5. Discount Rates Used by Canadian Firms When Evaluating a New Project

			Response Mean				
				Firm Size		CEO with an MBA	
S#	Statement	% of Often or Always	Full Sample	Large	Small	Yes	No
1	The company's overall discount rate (weighted average cost of capital).	63.6	2.44	2.80	2.35*	2.30	2.46
4	A rate based on management's experience.	43.5	1.80	1.76	1.84	1.12	1.92*
2	The cost of specific funds planned for financing the project.	38.2	1.70	1.72	1.70	1.05	1.97**
5	A risk-matched discount rate for this particular project.	36.6	1.63	1.80	1.55	1.50	1.69
6	A different discount rate for each cash flow that has a different risk characteristic.	14.1	0.85	1.21	0.77	0.86	0.87
3	A divisional discount rate (if the product line of business matches a division).	11.3	0.59	0.98	0.45**	0.41	0.65

Note: This table presents the responses by managers of Canadian firms on how their firms select a discount rate when evaluating a new project. Respondents indicate the frequency level based on a five-point scale where 0 = never, 1 = rarely, 2 = sometimes, 3 = often, and 4 = always. The table partitions the sample by firm size (large and small) and by whether or not the firm's CEO holds an MBA. *, ** indicate significance at the 0.05 and 0.01 levels, respectively.

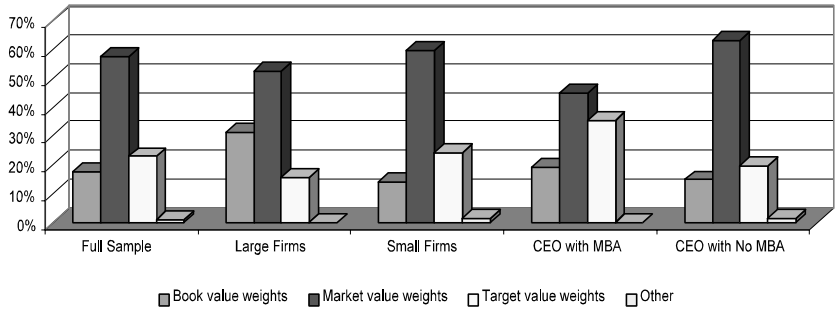


FIGURE 3.— Weighting Schemes Used by Canadian Firms to Compute Their WACC

Note: This figure provides the responses by Canadian firms on which weighting scheme their firms use to compute WACC. The figure partitions the sample by firm size (large and small) and by whether or not the firm's CEO holds an MBA.

Given that the majority of respondents report using their firm's WACC to evaluate new projects, respondents are asked to identify the weighting scheme used to calculate WACC. As figure 3 shows, in line with finance theory, the majority of the companies (57.7%) use market value weights to get WACC. Surprisingly, however, the use of market value weights is more popular in small firms and firms managed by CEOs without an MBA. The second most popular weighting scheme for calculating WACC is target value weights (23.1%) followed by book value weights (18.0%).

As figure 4 shows, about 75% of the respondents indicate that their companies estimate the cost of equity capital, a result that seems consistent with theory. Large firms and those managed by CEOs holding an MBA are more likely to estimate the cost of equity capital. For those corporations that estimate their cost of equity capital, respondents are asked to indicate how they make their estimates from 10 choices. In contrast to finance theory, table 6 indicates that managers of Canadian firms tend to rely more on subjective judgment than on formal models when computing the cost of equity capital. In fact, 60.3% of respondents report using judgment often or always, compared to 52.3% using the cost of debt plus an equity premium. This evidence contrasts with their counterparts in the United States and Europe. For example, although the CAPM is the most popular technique in the United States (Graham and Harvey, 2001) and Europe (Brounen, De Jong, and Koedijk, 2004), only

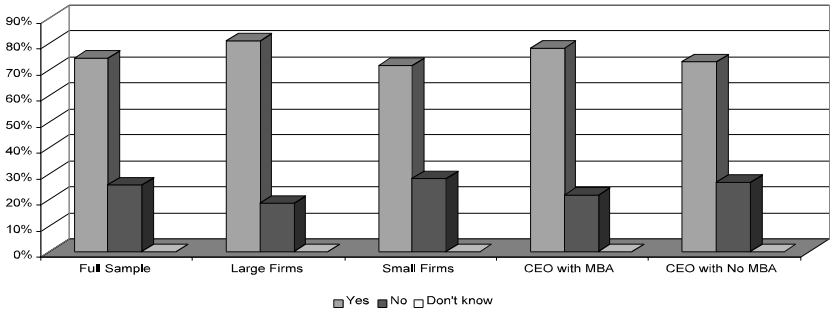


FIGURE 4.— Canadian Firms Reporting Whether They Estimate the Cost of Equity Capital

Note: This figure presents the responses by managers of Canadian firms on whether their firms estimate the cost of equity capital. The figure partitions the sample by firm size (large and small) and by whether or not the firm's CEO holds an MBA.

36.8% of Canadian firms indicate using it often or always. The use of judgment is more pronounced in small firms while the CAPM is more popular in large firms. This evidence is consistent with the capital budgeting literature suggesting that small firms tend to use less sophisticated methods when setting their cost of capital (Brounen, De Jong, and Koedijk, 2004).

The use of subjective judgment by Canadian executives does not seem to be limited to computing the cost of equity capital and risk analysis but also to how they forecast project cash flows. In fact, table 7 shows that 94.0% of the respondents indicate a moderate or high reliance on management's subjective judgment in forecasting future cash flows, while 70.1% use quantitative methods, and 42.7% rely on consensus of experts' opinion. Neither firm size nor CEO education (holding an MBA) appears to affect these results.

The survey also examines the level of support for two competing theories of capital structure in a Canadian context, namely, static trade-off theory and pecking order theory. Trade-off theory suggests that a firm sets a target capital structure that reflects its trade off between the costs and benefits associated with debt. The pecking order theory of Myers and Majluf (1984) predicts that a firm does not have a target capital structure and finances new projects using retentions first followed by debt and then equity issues.

One way to directly test which capital structure theory is likely to

TABLE 6. How Canadian Firms Estimate the Cost of Equity Capital

S#	Statement	% of Often or Always	Response Mean				
				Firm Size		CEO with an MBA	
			Full Sample	Large	Small	Yes	No
1	Judgment	60.3	2.33	2.01	2.64**	2.39	2.30
5	Cost of debt plus equity risk premium	52.3	2.01	1.85	2.08	1.89	2.07
3	Capital asset pricing model (CAPM)	36.8	1.52	1.96	1.12*	2.36	1.13**
6	Earnings/price (E/P) ratio	21.8	1.02	0.53	1.20*	0.83	1.09
9	Based on what our investors tell us they require	20.0	1.00	0.85	1.07	1.56	0.76*
8	Average historical returns on common stock adjusted for risk	14.1	0.81	0.46	0.93**	0.94	0.79
7	Accounting return on equity	17.5	0.73	0.74	0.73	0.22	0.88*
2	Dividend growth model (dividend yield plus an estimate of growth)	12.9	0.66	0.48	0.74	0.44	0.73
4	Multi-factor asset pricing model	7.1	0.33	0.19	0.40	0.33	0.33
10	By regulatory decisions	5.9	0.29	0.19	0.34	0.01	0.38

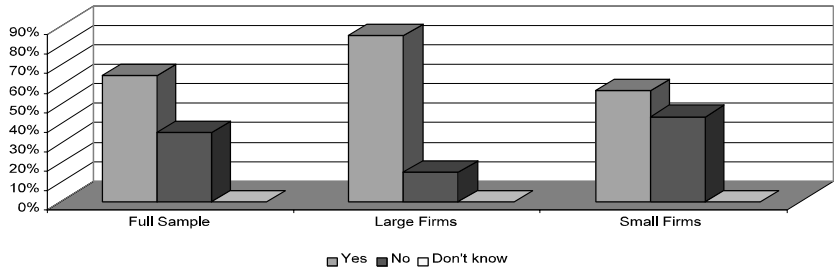
Note: This table presents the responses by managers of Canadian firms on how their firms estimate their cost of equity capital. Respondents indicate the frequency level based on a five-point scale where 0 = never, 1 = rarely, 2 = sometimes, 3 = often, and 4 = always. The table partitions the sample by firm size (large and small) and by whether or not the firm's CEO holds an MBA. *, ** indicate significance at the 0.05 and 0.01 levels, respectively.

TABLE 7. Methods Used by Canadian Firms to Forecast Project Cash Flows

			Response Mean				
				Firm Size		CEO with an MBA	
S#	Statement	% of Moderate or High	Full Sample	Large	Small	Yes	No
1	Management's subjective judgment	94.0	3.49	3.58	3.46	3.46	3.50
3	Quantitative methods	70.1	2.88	2.89	2.88	3.04	2.84
2	Consensus of experts' opinions	42.7	2.32	2.42	2.29	2.17	2.37

Note: This table shows the responses by managers of Canadian firms on the level of importance that their firms attach to several methods of forecasting project cash flows. Respondents indicate the level of importance of each reason on a four-point scale where: 1 = none, 2 = low, 3 = moderate, and 4 = high. The table partitions the sample by firm size (large and small) and by whether or not the firm's CEO holds an MBA. None of the differences between firm size and CEO education is significant at the 0.05 level.

A. Survey responses to the question: "Does your firm have a target capital structure (debt-to-equity ratio)?"



B. Survey responses to the question: "If 'Yes', what type of target debt ratio does your firm have?"

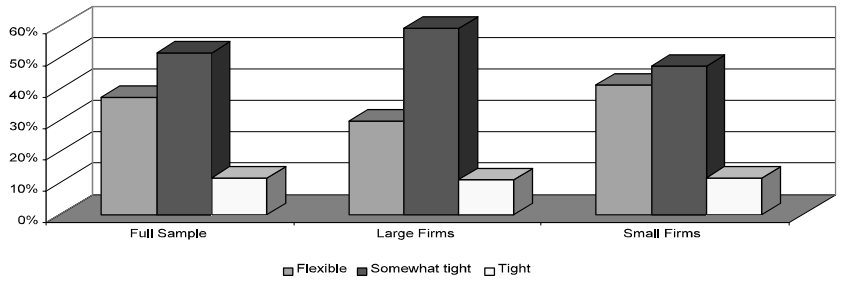


FIGURE 5.— Canadian Firms Reporting a Target Capital Structure

Note: This figure reports the responses by managers of Canadian firms on whether their firms have a target capital structure in Panel A and the degree of flexibility of their capital structure in Panel B. The figure partitions the sample by firm size (large and small).

hold for Canadian firms is to examine the percentage of firms having a target capital structure. According to the results presented in Panel A of figure 5, the majority (65%) of the respondents indicate that their firms have a target capital structure, which provides support for static trade-off theory. The percentage is smaller than that reported by Graham and Harvey (2001) and Brounen, De Jong, and Koedijk (2004) for the United States (83%), the Netherlands (75%), Germany (71%). Still, the percentage is higher than the rate for the United Kingdom (60%) and France (43%).

Panel B of figure 5 presents the results on the degree of flexibility of a firm's target capital structure: flexible, somewhat tight, and tight. Unlike U.S. and European firms, the majority (53%) of the Canadian

firms have a somewhat tight target. A tight target capital structure is the least popular with only about 12% of respondents claiming this type of structure. Compared with smaller firms, a greater percentage of larger firms indicate a somewhat tight target debt ratio (60% versus 47%) but a lower percentage have a flexible target (30% versus 41%).

Respondents are also asked to indicate, to the nearest 10%, the percentage of time that their firms face capital rationing (i.e., have more acceptable projects than funds available to invest). The survey results indicate that the mean percentage is 40%. Compared with large firms, small firms are more likely to face capital rationing (43% versus 34%, respectively).

C. Real Options

As Baldwin (1987, p. 61) noted more than two decades ago "given the increase in variability in both product and financial markets worldwide, companies that recognize option values and build a degree of flexibility into their investments are likely to be at a significant advantage in the future, relative to companies that fail to take account of options in the design and evaluation of capital projects." Considering the current economic and financial turmoil, Baldwin's vision is more relevant today than ever. Unlike DCF techniques, real options enable firms to cope with high levels of uncertainty and allow for high levels of flexibility. Thus, real options potentially offer a more efficient way for managers to allocate their firm's capital and maximize shareholder value. Graham and Harvey (2001) find that 27% of their respondents report that their firms use real options. In fact, this approach ranks eighth among 12 capital budgeting techniques considered in their study.

The survey results indicate that real options are even less popular in Canada. As table 3 shows, using real options is the least popular approach among the nine capital budgeting techniques presented in the survey. When asked whether their company uses real options in making capital budgeting decisions 17% answer "yes," 79% respond "no", and 4% indicate "don't know." Thus, only 36 of the 214 respondents report that their firms use real options, while 169 indicate that their firms do not use real options. As expected, the real options approach is employed mainly by firms in industries characterized by large capital investments and considerable uncertainty and flexibility: mining (38.9%), oil and gas (16.7%), biotechnology (13.9%), and pharmaceuticals (11.1%).

To gain further insight about real options, the 36 respondents from

TABLE 8. Why Canadian Firms Use Real Options in Making Capital Budgeting Decisions

			Response Mean				
				Firm Size		CEO with an MBA	
S#	Statement	% of Moderate or High	Full Sample	Large	Small	Yes	No
6	Provides a management tool to help form the strategic vision	85.0	3.35	3.65	3.21*	3.67	3.29
1	Incorporates managerial flexibility into the analysis	83.4	3.06	2.80	3.15	3.20	3.06
5	Provides a way of thinking about uncertainty and its effect on valuation over time	82.0	3.05	2.60	3.20	3.33	3.00
2	Complements traditional capital budgeting techniques	65.0	2.85	2.60	2.93	2.47	2.98**
4	Provides an analytical tool to deal with uncertainty	65.0	2.75	2.60	2.80	3.43	2.45**
3	Provides a long-term competitive advantage through better decision making	60.0	2.65	2.60	2.67	2.67	2.65

Note: For Canadian firms using real options in making capital decisions, this table presents the importance that their firms place on six reasons for using these real options. Respondents indicate the level of importance of each reason on a four-point scale where: 1 = none, 2 = low, 3 = moderate, and 4 = high. The table partitions the sample by firm size (large and small) and by whether or not the firm's CEO holds an MBA. The sample size is 36. *, ** indicate significance at the 0.05 and 0.01 levels, respectively.

TABLE 9. Why Canadian Firms Do Not Use Real Options

			Response Mean				
				Firm Size		CEO with an MBA	
S#	Statement	% of Moderate or High	Full Sample	Large	Small	Yes	No
1	Lack of expertise or knowledge	77.9	3.27	2.86	3.55**	3.78	3.10**
5	Too complex to apply in practice	38.0	2.02	2.00	2.02	1.78	2.07
4	Lack of applicability to our business	36.6	2.01	1.64	2.24*	1.40	2.25*
3	Difficulty of estimating inputs	31.6	1.83	1.81	1.83	1.78	1.84
2	Requires unrealistic assumptions	28.3	1.72	1.59	1.77	1.56	1.76
7	Does not help managers make better decisions	27.2	1.71	1.59	1.75	1.50	1.76
8	Limited support for real-world applicability of real options models	26.2	1.69	1.70	1.69	1.59	1.72
6	Requires many internal resources	21.7	1.66	1.56	1.71	1.72	1.65

Note: This table reports the responses by managers of Canadian firms on the reasons that their firms do not use real options. Respondents indicate the level of importance of each reason on a four-point scale where: 1 = none, 2 = low, 3 = moderate, and 4 = high. The table partitions the sample by firm size (large and small) and by whether or not the firm's CEO holds an MBA. The sample size is 169. *, ** indicate significance at the 0.05 and 0.01 levels, respectively.

firms already employing real options are asked to indicate the importance of six reasons for using this approach in making capital budgeting decisions. As table 8 shows, at least 60% of these respondents view all six reasons for using real options as of moderate to high importance. The most important reason is that real options provide a management tool to help form the strategic vision. The next most highly ranked reasons for using real options are that they incorporate managerial flexibility into the analysis and provide a way of thinking about uncertainty and its effect on valuation over time.

Using an open-ended question, respondents are asked to state the most important reason for using real options. Based on 11 responses, the most common reasons are that real options tie closely to the true pace of business activities, challenge historical perspectives, fit a rational strategic planning model, and present an informal means to improve understanding and perspective.

As the survey indicates, the level of popularity of real options among Canadian firms appears relatively low, especially given the purported advantages associated with them compared to traditional techniques. Thus, managers of firms not using real options are asked to indicate the importance of eight reasons for not using them. As table 9 shows, the overwhelming reason for not using real options is the lack of expertise or knowledge. In fact, 77.9% of the respondents indicate that this reason is of moderate to high importance. The next most important reasons for not using real options concern their complexity and inapplicability.

Using an open-ended question, respondents are asked to indicate the major reason for their firms not using real options. Based on 29 responses, the evidence shows that these responses are consistent with the results reported in table 9. Representative responses to the open-ended question are: "What are real options?", "Don't know enough about it, but don't feel it's necessary", "We feel that it is not widely accepted yet in our industry", "Don't take time to understand them", "Never been exposed to it", "Never considered it", "Our decision making process works great, no desire to change", and "We are comfortable with our capital budgeting approach".

V. Explaining the Difference between U.S. and Canadian Survey Results

Several studies document that institutional differences influence corporate decision-making (Rajan and Zingales, 1995, 2003; La Porta et al., 1998; Aggarwal et al., 2009), which, in turn, may lead to country

differences in corporate finance practices. Although the United States and Canada have well-developed equity markets, some important differences between these markets may explain why the survey results diverge between the two countries.

A. Difference in Corporate Governance and Ownership Structure

According to Brounen, De Jong, and Koedijk (2004), firms that attempt to maximize shareholder value are likely to use advanced and theoretically correct capital budgeting techniques. This finding is consist with La Porta et al. (1998) and others who stress that corporate governance and ownership structure determine whether insiders' (managers and controlling shareholders) main objective is to maximize minority shareholders wealth or to extract private benefit of control.

The United States and Canada differ in several features of ownership structure and corporate governance. Morck, Strangeland, and Yeung (2001, p. 327) assert that these economies "have broadly similar factor endowments, and employ virtually identical technology and human capital in similar institutional frameworks" except for their ownership structure. Ownership is highly concentrated in Canadian public firms but widely diffused in U.S. public firms. In Canada, a small group of large blockholders, or affiliated groups of investors, dominate the ownership scene. Wealthy families maintain some influence over public officials through different control mechanisms such as pyramidal holdings, cross holdings, and multiple class shares. In fact, Morck, Strangeland, and Yeung (2001) find that 254 of the 500 largest Canadian companies represent privately-held firms. The remaining 246 are public firms of which only 53 have broad ownership. Attig and Gadhoum (2003) extend Morck, Strangeland, and Yeung's (2001) analysis and find that more than 80% of all Canadian public firms have controlling shareholders with 40% controlled by wealthy family groups. Attig and Gadhoum also report that 33% of public firms are controlled through pyramidal structures while 16% are controlled through shares with superior voting rights. More recently, in a sample of 263 Canadian firms, Klein, Shapiro, and Young (2005) find 123 widely-held firms, and 140 closely-held firms, of which 84 are family-owned.

Recent allegations of corporate wrongdoings in Canada such as Hollinger Inc. and Royal Group Technologies Inc. typify the use of control pyramids and multiple-class shares in expropriating minority shareholders. These governance failures allegedly involved related-party transactions and large fund transfers in the form of management

agreements and improper "non-compete" fees from affiliated firms to their ultimate owners. In fact, many Canadian firms also use a dual-class share structure (Amoako-Adu and Smith, 1995; Attig, 2005; King and Segal, 2009). For instance, King and Segal document that about 20% of Canadian public firms have dual-class shares. Clearly, the corporate ownership and control structure in Canada differs substantially from the freestanding, widely-held firm prototype customary in the United States and the United Kingdom.

Furthermore, while the U.S. corporate governance regime is mandatory, the Canadian regime is largely voluntary (Anand, 2005). Anand, Milne, and Purda (2006), who examine the governance practices of Canadian firms listed on the Toronto Stock Exchange from 1999 to 2003, find that the presence of an executive blockholder or a majority shareholder is negatively associated with voluntary adoption of the corporate governance regime.

Moreover, various empirical studies suggest that Canadian corporate governance is weaker than that in the United States (Jabbour, Jalilvand, and Switzer, 2000; McNally and Smith, 2003). Bris (2005), for example, argues that Canada ranks behind the United States with respect to law enforcement, mandatory disclosure, illegal insider trading, and other aspects of regulatory regime. King and Segal (2003) examine why equity of Canadian-listed firms trades at a discount to equity of Canadian firms cross listed on both a Canadian and a U.S. stock exchange. The authors show that the valuation discount is due to the weaker corporate governance in Canada relative to the United States.

The higher concentration of ownership in Canadian firms coupled with a relatively weak Canadian corporate governance system may exacerbate managerial opportunism, which in turn could result in not using corporate finance practices that maximize minority shareholders' value. Consistent with this view Athanassakos (2007) shows that the lack of value-based management in Canada helps to explain the underperformance of the Canadian stock market during the 1990s relative to the United States.

B. Firm Size

The results suggest that Canadian managers rely more on subjective judgment than other methods when adjusting their discount rate, analyzing risk, forecasting project cash flow, and estimating the cost of equity capital. This finding differs markedly from the widespread use of the CAPM by U.S. firms. Canadian managers are also less likely to

use real options. These differences could be due to the smaller size, on average, of Canadian firms relative to U.S. firms (Leung, Meh, and Terajima, 2008). In fact, Graham and Harvey (2001), among others, document fundamental differences between large and small firms when analyzing corporate finance practices. Specifically, they report that smaller firms tend to use less sophisticated methods, which is consistent with Canadian firms relying more on subjective judgment rather than using more analytical or sophisticated approaches.

VI. Summary and Conclusions

This study uses a survey to investigate financial practices of Canadian firms involving capital budgeting, cost of capital estimation, capital structure, and real options. What are the major findings from this study? Consistent with finance theory, the findings on capital budgeting practices show a strong preference for NPV followed by IRR and PBP. In contrast to theory, Canadian managers, however, rely mainly on subjective judgment when dealing with risk analysis and to a slightly lesser extent on sensitivity analysis.

The survey also examines the approach that Canadian firms use to incorporate differential project risk into their analysis. Although responding firms tend to differentiate between the riskiness of capital projects as recommended by finance theory, they rely mainly on subjective risk assessments in adjusting the discount rate. The majority of respondents use a WACC based on market value weights as an appropriate discount rate when evaluating an average risk project. The use of subjective judgment by Canadian managers also applies both to forecasting project cash flows and to estimating the cost of equity capital. This latter finding contrasts with the widespread use of the CAPM by U.S. and European firms. In examining capital structure choice, the evidence finds support for the trade-off theory relative to pecking-order theory.

Contrary to the optimistic predictions from the academic and professional community, the use of real options appears disproportionate to its potential as a powerful capital budgeting and management tool. The evidence shows that the major reason for firms not using real options is the lack of expertise and knowledge rather than the features and design of real options.

Finally, the evidence indicates that both firm size and CEO education influence some corporate finance practices. For example,

large firms and firms managed by CEOs with an MBA tend to use more sophisticated techniques when evaluating new projects and when estimating the cost of equity capital. The study also documents that large firms are more likely to use real options but that real options are less popular in firms managed by CEOs with an MBA.

What are the implications of the findings for practitioners and academics? Taken together, the findings show that despite improvements in finance practices in Canada over time, more effort is needed to encourage Canadian firms, particularly small ones, to use more objective approaches and to take greater advantage of real options analysis. Using sub-optimal approaches is likely to negatively influence firm value and hence stock price performance as discussed by Athanassakos (2007).

The study also shows that "one size does not fit all" involving corporate finance practices. Important institutional and other differences exist between countries and in such areas as corporate governance, ownership structure, and firm size. Because such differences could influence managerial decisions about which finance practices they use, researchers need to consider them.

Another implication of the study involves the use of real options. The survey evidence provides support for Triantis (2005) who calls for academic research that integrates practitioners' concerns about applying real options to real world cases. Triantis (p. 16) notes, "Academics must listen carefully to the critiques of practitioners and allow them to influence the kinds of problems that are addressed in academic research. To the extent that we can be responsive to the concerns of practitioners, and improve the normative models we offer them, real options will have the type of profound impact that we have long been expecting, but which has not yet been realized." Because the low popularity of real options among Canadian managers is mainly due to a lack of expertise and knowledge, business schools have the opportunity to place greater emphasis on this powerful tool in their MBA and other programs.

Accepted by: *Prof. P. Theodossiou*, *Editor-in-Chief*, *May* 2011

References

Aggarwal, R.; Erel, I.; Stulz, R.; and Williamson, R. 2009. Differences in governance practices between U.S. and Foreign firms: Measurement, causes, and consequences. *Review of Financial Studies* 22(8): 3131–3169.

Amoako-Adu, B., and Smith, B. 1995. Relative prices of dual-class shares. *Journal of Financial and Quantitative Analysis* 30(2): 223–239.

Anand, A. 2005. An analysis of enabling vs. mandatory corporate governance post Sarbanes-Oxley. *Delaware Journal of Corporate Law* 31(1): 229–252.

Anand, A.; Milne, F.; and Purda, L. 2006. Voluntary adoption of corporate governance mechanisms. American Law and Economics Association Meetings.

Athanassakos, G. 2007. Value–based management, EVA and stock price performance in Canada. *Journal of Management Decision* 45(9): 1397–1411.

Attig, N. 2005. Balance of power. *Canadian Investment Review* 18(3): 6–13.

Attig, N., and Gadhoum, Y. 2003. The governance of Canadian traded firms: An analysis of the ultimate ownership structure. Working paper. Montreal: University of Quebec.

Baker, H. K.; Chang, B.; Dutta, S.; and Saadi, S. 2009. Why firms do not pay dividends: The Canadian experience. 5th International Finance Conference (ICF) Meetings. Hammamet, March 12–14.

Baker, H. K.; Singleton, J. C.; and Veit, T. E. 2011. *Survey Research in Corporate Finance – Bridging the Gap between Theory and Practice*. Oxford and New York: Oxford University Press.

Baldwin, C. 1987. Competing for capital in a global environment. *Midland Corporate Finance Journal* 5(1): 43–64.

Block, S. 2007. Are 'real options' actually used in the real world? *The Engineering Economist* 52(3): 255–267.

Brealey, R.; Myers, S.; and Allen, F. 2007. *Principles of Corporate Finance*. New York: McGraw-Hill/lrwin.

Brennan, M. J., and Schwartz, E. S. 1985. Evaluating natural resource investments. *Journal of Business* 58(2): 135–157.

Bris, A. 2005. Do insider trading laws work? *European Financial Management* 11(3): 267–312.

Brounen, D.; De Jong, A.; and Koedijk, K. 2004. Corporate finance in Europe: Confronting theory with practice. *Financial Management* 34(4): 71–101.

Chance, D. M., and Peterson, P. P. 2002. *Real Options and Investment Valuation*. Charlottesville, VA: Research Foundation of AIMR.

Chew, D. 1997. *Studies in International Corporate Finance and Governance Systems: A Comparison of the U.S., Japan, and Europe*. Oxford and New York: Oxford University Press.

Chu, H., and Partington, G. 2001. Dangers in data adjustment: The case of rights issues and returns. *Accounting and Finance* 41(2): 143–168.

Gitman, L., and Mercurio, V. 1982. Cost of capital techniques used by major U.S. firms: Survey and analysis of Fortune's 1000. *Financial Management* 11(4): 21–29.

Gitman, L., and Vandenberg, P. 2000. Cost of capital techniques used by major U.S. firms: 1997 vs. 1980. *Financial Practice and Education* 10(2): 53–68.

Graham, J., and Harvey, C. 2001. The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics* 60(2–3): 187–243.

Ingersoll, J. E., and Ross, S. A. 1992. Waiting to invest: Investment and uncertainty. *Journal of Business* 65(1): 1–30.

Istvan, D. F. 1961. The economic evaluation of capital expenditures. *Journal of Business* 34(1): 45–51.

Jabbour, A. R.; Jalilvand, A.; and Switzer, J. A. 2000. Pre-bid price run-ups and insider trading activity: Evidence from Canadian acquisitions. *International Review of Financial Analysis* 9(1): 21–43.

Jagannathan, R., and Meier, I. 2002. Do we need CAPM for capital budgeting? *Financial Management* 31(4): 5–27.

Jog, V., and Srivastava, A. 1995. Capital budgeting practices in corporate Canada. *Financial Practice and Education* 5(2): 37–43.

King, M. R., and Segal, D. 2003. Corporate governance, international cross listing and home bias. *Canadian Investment Review* 16(4): 8–19.

King, M. R., and Segal, D. 2009. The long-term effects of cross-listing, investor recognition, and ownership structure on valuation. *Review of Financial Studies* 22(6): 2393–2421.

Klein, P.; Shapiro, D.; and Young, J. 2005. Corporate governance, family ownership and firm value: The Canadian evidence. *Corporate Governance: An International Review* 13(6): 769–784.

La Porta, R.; Lopez-de-Silanes, F. ; Shleifer, A. ; and Vishny, R. W. 1998. Law and finance. *Journal of Political Economy* 106(6): 1113–1155.

Lasfer, M., and Alzahrani, M. 2009. The impact of taxation on dividends: A cross-country analysis. Working paper. Cass Business School.

Leung, D.; Meh, C.; and Terajima, Y. 2008. Productivity in Canada: Does firm size matter? *Bank of Canada Review* (Autumn), 7–16.

McNally, W. J., and Smith, B. F. 2003. Do insiders play by the rules? *Canadian Public Policy* 29(2): 125–144.

Morck, R.; Stangeland, D. A.; and Yeung, B. 2001. Inherited wealth, corporate control, and economic growth: The Canadian disease. In R. K. Morck (ed.). *Concentrated Corporate Ownership*, 319–369. Chicago: University of Chicago Press.

Myers, S., and Majluf, N. 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* 13(2): 187–221.

Paddock, J. D.; Siegel, D.; and Smith, J. 1988. Option valuation of claims on real assets: The case of offshore petroleum leases. *Quarterly Journal of Economics* 103(3): 479–508.

Pindyck, R. 1991. Irreversible investment, uncertainty and investment. *Journal of Economic Literature* 29(3):1110–1152.

Rajan, R. G., and Zingales, L. 1995. What do we know about capital structure? Some evidence from international data. *Journal of Finance* 50(5): 1421–1460.

Rajan, R. G., and Zingales, L. 2003. The great reversals: The politics of financial development in the twentieth Century. *Journal of Financial Economics* 69(1): 5–50.

Trahan, E. A., and Gitman, L. J. 1995. Bridging the theory-practice gap: A survey of chief financial officers. *Quarterly Review of Economics and Finance* 35(1): 73–87.

Triantis, A. J. 2005. Realizing the potential of real options: Does theory meet practice? *Journal of Applied Corporate Finance* 17(2): 8–16.

Triantis, A. J., and Borison, A. 2001. Real options: State of the practice. *Journal of Applied Corporate Finance* 14(2): 8–24.

Trigeorgis, L. 1993. The nature of option interactions and the valuation of investments with multiple real options. *Journal of Financial and Quantitative Analysis* 28(1): 1–20.

Wallace, R. S. O., and Mellor, C. J. 1988. Non-response bias in mail accounting surveys: A pedagogical note. *British Accounting Review* 20(2): 131–139.

EB-2024-0063
Evidence of Dr. Sean Cleary, CFA
Attachment AV

Berk et al – How do Investors Computer the Discount Rate?

Perspectives

How Do Investors Compute the Discount Rate? They Use the CAPM

(Corrected June 2017)

Jonathan B. Berk and Jules H. van Binsbergen

Jonathan B. Berk is the A.P. Giannini Professor of Finance at the Graduate School of Business, Stanford University, California. Jules H. van Binsbergen is associate professor of finance at the Wharton School, University of Pennsylvania, Philadelphia.

We provide guidance to corporate managers and investors on how to select the discount rate when evaluating investment opportunities. When making corporate investment decisions on behalf of the equity investors in a firm, an obvious choice is to use the method that equity investors use in making their own investment decisions. We infer how investors compute the discount rate by looking at mutual fund investors' capital allocation decisions. We find that investors adjust for risk by using the beta of the capital asset pricing model (CAPM). Extensions to the CAPM perform poorly, implying that investors do not use these models to compute discount rates.

Editor's Note: The original version had a production error in Table 2, which has been corrected in this version.

Disclosure: The authors report no conflicts of interest. This article is an updated version of the version that was posted online on 26 September 2016.

CE Credits: 0.5

Arguably, the most important tool in business decision making is valuing future cash flow streams by using the present value criterion. Without this valuation technique, making routine investment decisions would be difficult. Given this criterion's importance, it is surprising how little consensus there is in the field of finance on one of its crucial inputs: the discount rate. Because there is no generally accepted standard, investors must make the choice themselves. Unfortunately, the choice set runs a gamut of possible risk models, from simply ignoring risk to using complicated multifactor models. How should practitioners make this choice?

One way practitioners can find guidance is to observe what other people are doing. For example, one could consult surveys, such as Graham and Harvey (2001), who interviewed chief financial officers. These surveys generally find that practitioners use the capital asset pricing model (CAPM).[1] By their very nature, however, surveys suffer from two important limitations. First, it is unclear whether the sample of surveyed investors is representative. Second, one can never be sure whether the people surveyed actually put their money where their mouth is.

In our study, we took a different tack. Rather than using survey data, we measured what a large set of investors actually do, and from those data, we inferred which risk model they use. Specifically, we observed the investment decisions of mutual fund investors and show that these decisions are most consistent with the hypothesis that they use the CAPM. Because mutual fund investors represent a very large fraction of all investors (in 2013, 81% of households with an annual income over $100,000 invested in mutual funds), we argue, on the basis of this evidence, that using the CAPM to compute the discount rate is state of the art.

The idea behind our test is to apply the principles that the investment and academic communities use to explain the behavior of stock

prices. It is widely accepted that investors compete fiercely with each other for attractive investment opportunities. For example, as soon as news about a company is released, the price adjusts very quickly to reflect that new information. Thus, the expected return that an investor earns by investing in a stock after the public information is released is not influenced by that news. Rather, the stock's expected return is solely a reflection of the stock's riskiness. Put differently, as soon as an attractive trading opportunity presents itself, investors submit orders in an attempt to profit from the opportunity, thereby driving the price up or down. In the end, the equilibrium price (the price that clears the market) is set so the expected return is commensurate with the risk of owning the stock. Because these orders are the mechanism that determines the equilibrium price, they reveal investors' risk preferences. Simply put, if an investor submits a buy order after a news announcement, the investor believes that the stock is cheap or, equivalently, that the expected return is higher than the *risk-adjusted* expected return. Thus, we can use these orders to infer something about the risk model that investors are using.

To implement this idea in our study, we needed to observe two quantities. First, we needed to observe a news announcement that resulted in an attractive investment opportunity. Second, we needed a way to measure how investors respond to such opportunities. Fortunately, both quantities are easily observable for mutual funds. When a mutual fund manager outperforms on a risk-adjusted basis (the news), investors will revise upward their assessment of that manager's skill, creating an attractive investment opportunity they will want to take advantage of. The subsequent capital flow into the mutual fund is the equivalent of the buy orders for stocks and thus reveals investors' risk preferences.

Method

To make these ideas concrete, let us revisit how the mutual fund market reaches equilibrium.[2] Because mutual fund managers do not have an infinite number of investment ideas, their outperformance deteriorates as more money is allocated to them. So, if investors perceive that a fund offers a positive net alpha, they will want in on the fund and will shower it with money. This inflow of capital will drive the return down and will cease only when investors no longer perceive that they can earn an extra return. Similarly, if investors perceive that a fund is underperforming (i.e., has a negative net alpha), they will withdraw capital, thereby raising the fund's return. The outflow will cease only when the net alpha is zero—that is, when, in equilibrium, the net alpha of all funds, as with stocks, is driven to zero.

Let us now consider what happens, in equilibrium, when a new piece of information arrives. The most important piece of information investors use to assess a fund manager's skill is the return the manager achieves. If the fund earns a high abnormal return, investors will positively update their estimate of the fund manager's skill, implying that investors' expectations for the risk-adjusted expected return (the fund's net alpha) will rise above zero. Earlier, we discussed what happens to the price of a stock when good news is revealed: The stock price rises to reflect the good news. How does that work for mutual funds? Because the price of a mutual fund cannot adjust (after all, the fund's price is merely the net asset value and thus cannot change to reflect the manager's skill), the equilibrium adjustment will happen in quantities; that is, the size of the fund will change. Funds will flow in until the net alpha is again zero. A similar mechanism occurs when a fund's abnormal return is low; in that case, funds flow out. In summary, a fund's realized return is the news that reveals attractive investment opportunities. The subsequent flow of capital is how investors respond to such opportunities.

So, how do investors decide whether a realized abnormal return is high or low? They decide by comparing the realized return with the return predicted by the risk model. If the realized return exceeds the return predicted by the risk model (a positive abnormal return), investors conclude that the manager has outperformed and invest capital in the fund. If the realized return is less than what the risk model predicted, investors conclude that the manager has underperformed and withdraw capital from the fund. We can thus infer which risk

model investors are using by finding which model best explains capital flows.

We now describe in detail the test that we performed. First, we selected a set of risk models that are often used in the literature. For each of these models and for each time period, we determined which funds outperformed and which funds underperformed relative to that model. Next, we observed the flows into and out of these funds. The model for which performance best lines up with subsequent capital flows is the model closest to what investors actually use when adjusting for risk.

In our study, we computed for every risk model the fraction of times we observed an inflow when the fund's realized return exceeded the risk-adjusted return and the fraction of times we observed an outflow when the fund's realized return was less than the risk-adjusted return. Our measure of the fit of a particular model was the average of these two fractions. In Berk and van Binsbergen (2016b), we showed that this average can also be estimated by running a simple linear regression of the sign of flows against the sign of outperformance. This approach is preferable because, as we showed in the same paper, the *t*-statistic of this regression is an accurate measure of statistical significance. In particular, if the coefficient from using one risk model statistically significantly exceeds the coefficient from using a second risk model, we can say that the first model is closer to the risk model investors are actually using.

Results

The dataset that we used, from Berk and van Binsbergen (2015), covered January 1977–March 2011. We removed funds with less than five years of data, resulting in a total of 4,275 funds.[3] In Berk and van Binsbergen (2015), we crosschecked the CRSP and Morningstar databases, which allowed us to overcome several important shortcomings of both databases (see the appendix in that paper for more details about this extensive data project).

Moreover, we had to address two practical issues before we could proceed with our test. First, we needed to define what a flow actually is. A fund's assets under management (AUM) change for two reasons: Either the prices of the underlying stocks change, or investors invest or withdraw capital. Although both mechanisms change AUM, they are unlikely to affect the fund's alpha equally. For example, increases in fund size that result from inflation are unlikely to affect the fund's alpha-generating process. Similarly, the alpha-generating process is unlikely to be affected by changes in fund size that result from changes in the price level of the market as a whole. Consequently, in our empirical specification, we considered only capital flows into and out of funds net of what would have happened if investors had not invested or withdrawn capital and the fund manager had adopted a purely passive strategy and invested in Vanguard index funds. Thus, we measured the flow of funds as

$$\text{SIGN}\left[q_{it} - q_{i,t-T}\left(1 + R_{it}^{V}\right)\right], \tag{1}$$

where q_{it} is the size of fund i at time t, and R_{it}^{V} is the cumulative return (over the horizon $t - T$ to t) to investors of the collection of available Vanguard index funds that comes closest to matching the fund being considered. Under this definition of capital flows, we assumed that in making their capital allocation decisions, investors consider changes in fund size resulting from returns that are due to managerial outperformance alone. That said, all our results are robust to replacing R_{it}^{V} with the fund's own return in Equation 1.

The second practical issue that we had to address was the horizon length over which to measure the effects. For most of our sample, funds reported their AUM monthly. In the early part of the sample, however, many funds reported their AUM only quarterly. To avoid introducing a selection bias by dropping these funds, the shortest horizon we considered was three months. If investors react to new information immediately, flows should respond to performance immediately, and the appropriate horizon for measuring the effect is the shortest horizon possible. There is evidence, however, that some investors do not respond immediately. For this reason, we also considered longer horizons (up to four years). The downside of

using longer horizons is that they tend to put less weight on investors who update immediately, and these investors are also more likely to be marginal in setting prices.

In our study, we considered an array of risk models. Because the market portfolio is unobservable, we tested two versions of the CAPM that correspond to two different market proxies: the CRSP value-weighted index of stocks and the S&P 500 Index. We also tested the factor models proposed by Fama and French (1993), hereafter the FF factor specification, and Carhart (1997), hereafter the FFC factor specification. In addition, we considered three "no model" benchmarks. The first uses the actual return of the fund, which corresponds to investors using no model at all. The second uses the return of the fund in excess of the risk-free return; risk-neutral investors would use this measure of risk. In the third model, the performance of the fund is simply the fund's return minus the return of the market (as measured by the CRSP value-weighted index). Investors *ignore beta* in this model; all they care about is outperformance relative to the market.

Which model best approximates the true asset-pricing model? **Table 1** reports the averages of the fractions of times we observed an inflow when the fund's realized return exceeded the risk-adjusted return and the fractions of times we observed an outflow when the fund's realized return was less than the risk-adjusted return. If flows and outperformance are unrelated, we would expect this average to equal 50%. The first takeaway from Table 1 is that none of our candidate models can be rejected outright,[4] implying that regardless of the risk adjustment, a flow–performance relationship exists. But none of the models perform better than 64%. Apparently, a large fraction of flows remains unexplained. Investors seem to be using other criteria to make a nontrivial fraction of their investment decisions.

Importantly, the CAPM with the CRSP value-weighted index as the market proxy performs best at all horizons. To assess whether the difference

Table 1. Relationship of Flow of Funds and Outperformance, 1977–2011

	Horizon					
Model	3 Months	6 Months	1 Year	2 Years	3 Years	4 Years
Market models (CAPM)						
CRSP value weighted	**63.63%**	**63.49%**	**63.38%**	**64.08%**	**63.86%**	**63.37%**
S&P 500	62.52	62.26	61.61	62.20	61.40	60.92
No model						
Return	58.55%	59.77%	57.72%	59.76%	60.83%	61.20%
Excess return	58.29	59.64	57.57	60.91	61.27	61.69
Return in excess of market	62.08	61.99	61.19	62.45	62.05	61.76
Multifactor models						
FF	63.14%	62.84%	63.05%	63.62%	63.59%	62.43%
FFC	63.25	62.92	63.09	63.59	63.46	62.35

Notes: This table reports the averages of the fractions of times we observed an inflow when the fund's realized return exceeded the risk-adjusted return and the fractions of times we observed an outflow when the fund's realized return was less than the risk-adjusted return. Each row corresponds to a different risk model. The first two rows report the results for the market model (CAPM) with the CRSP value-weighted index and the S&P 500 Index as the market portfolio. The next three rows report the results for using as the benchmark return three rules of thumb: (1) the fund's actual return, (2) the fund's return in excess of the risk-free rate, and (3) the fund's return in excess of the market return as measured by the CRSP value-weighted index. The last two rows report the results for the FF and FFC factor specifications. The largest value in each column is shown in boldface.

in performance between the CAPM and the other models is statistically significant, we report in **Table 2** the double-clustered (by fund and time) *t*-statistics.[5] No model statistically significantly outperforms the CAPM at any horizon.

To assess the relative performance of the models, we can begin by first focusing on the behavioral model in which investors simply react to past returns without adjusting for risk—the column marked "Ret." in Table 2. Looking down that column, we can see that the factor models all statistically significantly outperform this model at horizons of less than two years. For example, the *t*-statistic of the CAPM outperforming this no-model benchmark at the three-month horizon is 4.98, indicating that we can reject the hypothesis that the behavioral model is a better approximation of the true model than is the CAPM. On the basis of these results, we can reject the hypothesis that investors simply react to past returns.

The next possibility is that investors are risk neutral. In an economy with risk-neutral investors, we would find that the excess return (the difference between the fund's return and the risk-free rate) best explains flows, so the performance of this model can be assessed by looking at the column labeled "Ex. Ret." Note that all the risk models nest this model, and thus to conclude that a risk model better approximates the true model, the risk model must statistically significantly outperform this model. For horizons of less than two years, all the risk models satisfy this criterion. Finally, we could hypothesize that investors benchmark their investments relative to the market portfolio alone; that is, they do not adjust for any risk differences (beta) between their investment and the market. The performance of this model is reported in the column labeled "Ex. Mkt." The CAPM statistically significantly outperforms this model at all horizons; investors' actions reveal that they use betas to allocate resources.

Our method can also be used to discriminate between the different risk models. Note that the CAPM is the first factor in both the FF and the FFC factor specifications, implying that the CAPM is nested in these models. Thus, to conclude that either factor model better approximates the true model, it must statistically significantly outperform the CAPM. We report the results for this hypothesis in Table 2 (the column labeled "CAPM"). Neither factor model statistically significantly outperforms the CAPM at any horizon, suggesting that the additional factors add no explanatory power for flows. Indeed, as Table 1 shows, the CAPM outperforms all extensions to the model at all horizons.

It is also informative to compare the tests of statistical significance across horizons. The ability to discriminate statistically among the models deteriorates as the horizon increases. This finding is what we would expect if investors instantaneously moved capital in response to the information in realized returns. Thus, this evidence is consistent with the idea that capital does in fact move quickly to attractive investment opportunities.

We demonstrated that these results are robust in Berk and van Binsbergen (2016b). There, we restricted the sample to post-1995 data and showed that the results are consistent: No model statistically significantly outperforms the CAPM. We also dropped small outperformance deviations that might not be worth responding to (because of transaction costs) and found the same results.

Implications for Practitioners

Our results have a number of important practical implications—beyond the main implication that mutual fund investors use the CAPM to make their investment decisions. First, the CAPM is useful to financial practitioners in determining the discount rate for capital-budgeting decisions. When practitioners make investment decisions on behalf of the equity investors in a firm, an obvious choice is to use the method the equity investors use in making their investment decisions. Our results imply that if practitioners wish to implement the rule their equity investors use, they should use the CAPM to compute the discount rate.

Second, that the factor models do worse than the CAPM suggests that investors do not see the additional factors as risk factors. When the factors outperform the CAPM, investors respond with additional capital, implying that they interpret

Table 2. Tests of Statistical Significance

Model	Prob.	Univ. *t*-Statistic	CAPM	FFC	FF	CAPM S&P 500	Ex. Mkt.	Ret.	Ex. Ret.
A. Three-month horizon									
CAPM	63.63%	26.35	0.00	1.15	1.52	4.71	7.28	4.98	5.77
FFC	63.25	28.64	−1.15	0.00	0.65	1.69	3.16	4.42	5.13
FF	63.14	28.45	−1.52	−0.65	0.00	1.42	2.76	4.35	5.07
CAPM S&P 500	62.52	21.25	−4.71	−1.69	−1.42	0.00	1.25	3.97	4.62
Excess market	62.08	22.46	−7.28	−3.16	−2.76	−1.25	0.00	3.40	3.95
Return	58.55	10.72	−4.98	−4.42	−4.35	−3.97	−3.40	0.00	1.18
Excess return	58.29	10.11	−5.77	−5.13	−5.07	−4.62	−3.95	−1.18	0.00

Model	Prob.	Univ. *t*-Statistic	CAPM	FFC	FF	CAPM S&P 500	Ex. Mkt.	Ret.	Ex. Ret.
B. Six-month horizon									
CAPM	63.48%	21.11	0.00	1.08	1.23	3.24	4.64	2.63	3.17
FFC	62.92	21.21	−1.08	0.00	0.35	0.95	1.47	2.21	2.64
FF	62.84	22.40	−1.23	−0.35	0.00	0.79	1.38	2.09	2.49
CAPM S&P 500	62.26	14.21	−3.24	−0.95	−0.79	0.00	0.50	1.78	2.09
Excess market	61.99	16.03	−4.64	−1.47	−1.38	−0.50	0.00	1.47	1.73
Return	59.77	8.44	−2.63	−2.21	−2.09	−1.78	−1.47	0.00	0.32
Excess return	59.64	8.26	−3.17	−2.64	−2.49	−2.09	−1.73	−0.32	0.00

Model	Prob.	Univ. *t*-Statistic	CAPM	FFC	FF	CAPM S&P 500	Ex. Mkt.	Ret.	Ex. Ret.
C. One-year horizon									
CAPM	63.38%	13.54	0.00	0.44	0.47	3.89	6.42	2.25	2.98
FFC	63.09	14.30	−0.44	0.00	0.18	1.63	2.39	2.17	2.79
FF	63.05	14.55	−0.47	−0.18	0.00	1.47	2.25	2.11	2.67
CAPM S&P 500	61.61	8.31	−3.89	−1.63	−1.47	0.00	0.54	1.69	2.15
Excess market	61.18	10.38	−6.42	−2.39	−2.25	−0.54	0.00	1.26	1.60
Return	57.72	4.10	−2.25	−2.17	−2.11	−1.69	−1.26	0.00	0.17
Excess return	57.57	4.00	−2.98	−2.79	−2.67	−2.15	−1.60	−0.17	0.00

Model	Prob.	Univ. *t*-Statistic	CAPM	FF	FFC	Ex. Mkt.	CAPM S&P 500	Ex. Ret.	Ret.
D. Two-year horizon									
CAPM	64.08%	12.80	0.00	0.80	0.97	5.73	3.81	1.45	1.42
FF	63.62	16.17	−0.80	0.00	0.13	1.86	1.57	1.37	1.37
FFC	63.59	16.46	−0.97	−0.13	0.00	2.06	1.72	1.31	1.33
Excess market	62.45	10.89	−5.73	−1.86	−2.06	0.00	0.36	0.70	0.89
CAPM S&P 500	62.20	8.16	−3.81	−1.57	−1.72	−0.36	0.00	0.60	0.84
Excess return	60.91	7.09	−1.45	−1.37	−1.31	−0.70	−0.60	0.00	1.22
Return	59.76	5.99	−1.42	−1.37	−1.33	−0.89	−0.84	−1.22	0.00

(continued)

Table 2. Tests of Statistical Significance (continued)

Model	Prob.	Univ. *t*-Statistic	CAPM	FF	FFC	Ex. Mkt.	CAPM S&P 500	Ex. Ret.	Ret.
E. Three-year horizon									
CAPM	63.85%	13.86	0.00	0.51	1.04	4.90	3.53	1.24	1.11
FF	63.59	14.39	−0.51	0.00	0.43	2.54	2.41	1.21	1.09
FFC	63.46	14.42	−1.04	−0.43	0.00	2.67	2.55	1.07	0.98
Excess market	62.05	9.93	−4.90	−2.54	−2.67	0.00	0.84	0.37	0.46
CAPM S&P 500	61.40	8.05	−3.53	−2.41	−2.55	−0.84	0.00	0.05	0.19
Excess return	61.27	6.91	−1.24	−1.21	−1.07	−0.37	−0.05	0.00	0.51
Return	60.83	5.85	−1.11	−1.09	−0.98	−0.46	−0.19	−0.51	0.00

Model	Prob.	Univ. *t*-Statistic	CAPM	FF	FFC	Ex. Mkt.	Ex. Ret.	Ret.	CAPM S&P 500
F. Four-year horizon									
CAPM	63.37%	13.02	0.00	1.81	1.95	4.76	0.79	0.90	3.93
FF	62.43	11.77	−1.81	0.00	0.37	1.11	0.38	0.57	1.62
FFC	62.35	11.61	−1.95	−0.37	0.00	0.96	0.32	0.50	1.58
Excess market	61.76	9.70	−4.76	−1.11	−0.96	0.00	0.04	0.24	1.26
Excess return	61.69	7.20	−0.79	−0.38	−0.32	−0.04	0.00	0.52	0.32
Return	61.20	6.37	−0.90	−0.57	−0.50	−0.24	−0.52	0.00	0.11
CAPM S&P 500	60.92	7.30	−3.93	−1.62	−1.58	−1.26	−0.32	−0.11	0.00

Notes: The first column reports the averages of the fractions of times we observed an inflow when the fund's realized return exceeded the risk-adjusted return and the fractions of times we observed an outflow when the fund's realized return was less than the risk-adjusted return. The second column shows the *t*-statistics for the tests of whether these averages are significantly different from 50%. The other columns report the statistical significance of the pairwise tests of whether the models are better approximations of the true asset-pricing model. For each model in a column, the table displays the *t*-statistic for the test of whether the model in the row is a better approximation of the true asset-pricing model. The rows and columns are ordered by the probabilities in the first column, with the best-performing model on top. All *t*-statistics are double clustered by fund and time (see Thompson 2011).

this outperformance as evidence of alpha, not as compensation for additional risk.

Third, it is well known that the CAPM does not describe the cross section of expected returns very well. This empirical result implies one of three things. First, it could imply that the profession has simply not found the correct risk model yet, that a risk model will eventually be discovered that better explains the cross section of expected returns. In that case, the neoclassical paradigm that a stock's expected return is only a function of its risk is the right paradigm. Second, perhaps expected returns and risk are simply unrelated. In that case, it is important to identify other non-risk-based factors that drive the cross section of expected returns. The third possibility is a combination of the first two: Both risk-based and non-risk-based factors drive the cross section of expected returns. Our study provides insight into the question of which of these three possibilities is most likely.

Because the factor models in our study statistically significantly outperformed the "no model" case, the second possibility is not particularly likely. Thus, the open question is whether the CAPM's inability to describe the cross section of expected returns is due to (1) the existence of a superior risk model or (2) the fact that non-risk-based factors drive expected returns. To conclude that a better

risk model exists, we must show that the part of the variation in asset returns not explained by the CAPM is unrelated to flows. If it *is* related to flows, investors perceive this variation in asset returns as alpha, not as compensation for risk. Therefore, any factor that is proposed because it explains this variation must also not drive flows if it is to be considered a measure of risk.

Conclusion

The main contribution of this article is to provide guidance to financial practitioners in selecting the discount rate when evaluating investment opportunities. We have demonstrated that among a range of proposed models, the CAPM—though perhaps far from being a perfect model of risk—is most consistent with investor behavior. Thus, if the criterion for deciding how to compute the discount rate is to use the method investors use, practitioners should use the CAPM.

Editor's Note

Submitted 3 November 2015

Accepted 31 May 2016 by Stephen J. Brown

Notes

1. The CAPM was developed independently by Treynor (1962), Sharpe (1964), Lintner (1965), and Mossin (1966).
2. See Berk and Green (2004); Berk and van Binsbergen (2016a, 2016b).
3. We chose to remove these funds to ensure that incubation flows would not influence our results. Changing the criterion to two years does not change our results.
4. The second column in Table 2 reports the double-clustered (by fund and time) *t*-statistics under the null hypothesis that flows and performance are unrelated.
5. The rows and columns in Table 2 are ordered by the probabilities in the first column, with the best-performing model on top, which explains why the order of Table 2's rows and columns differs from the order in which they are discussed in the text.

References

Berk, J.B., and R.C. Green. 2004. "Mutual Fund Flows and Performance in Rational Markets." *Journal of Political Economy*, vol. 112, no. 6 (December): 1269–1295.

Berk, J.B., and J.H. van Binsbergen. 2015. "Measuring Skill in the Mutual Fund Industry." *Journal of Financial Economics*, vol. 118, no. 1 (October): 1–20.

——. 2016a. "Active Managers Are Skilled." *Journal of Portfolio Management*, vol. 42, no. 2 (Winter): 131–139.

——. 2016b. "Assessing Asset Pricing Models Using Revealed Preference." *Journal of Financial Economics*, vol. 119, no. 1 (January): 1–23.

Carhart, M.M. 1997. "On Persistence in Mutual Fund Performance." *Journal of Finance*, vol. 52, no. 1 (March): 57–82.

Fama, E.F., and K.R. French. 1993. "Common Risk Factors in the Returns on Stocks and Bonds." *Journal of Financial Economics*, vol. 33, no. 1 (February): 3–56.

Graham, J.R., and C.R. Harvey. 2001. "The Theory and Practice of Corporate Finance: Evidence from the Field." *Journal of Financial Economics*, vol. 60, no. 2–3 (May): 187–243.

Lintner, J. 1965. "The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets." *Review of Economics and Statistics*, vol. 47, no. 1 (February): 13–37.

Mossin, J. 1966. "Equilibrium in a Capital Asset Market." *Econometrica*, vol. 34, no. 4 (October): 768–783.

Sharpe, W.F. 1964. "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk." *Journal of Finance*, vol. 19, no. 3 (September): 425–442.

Thompson, S.B. 2011. "Simple Formulas for Standard Errors That Cluster by Both Firm and Time." *Journal of Financial Economics*, vol. 99, no. 1 (January): 1–10.

Treynor, J. 1962. "Toward a Theory of the Market Value of Risky Assets." Working paper (Fall): https://papers.ssrn.com/sol3/papers2.cfm?abstract_id=628187.

Dimson et al 2016
- Long Term Asset Returns

1. Long-Term Asset Returns
(Corrected June 2017)

Elroy Dimson
Chairman of the Centre for Endowment Asset Management at Cambridge Judge Business School, emeritus professor of finance at London Business School, and adviser to the board of FTSE International

Paul Marsh
Emeritus professor of finance at London Business School

Mike Staunton
Director of the London Share Price Database, a research resource of London Business School

This chapter summarizes the long-run global historical evidence on the returns from stocks, bonds, bills, and exchange rates, all adjusted for inflation, over the 116 years since 1900. It updates and expands the data originally published in our 2002 book, Triumph of the Optimists. *Given that returns are volatile, long-run historical data are important for understanding security returns and long time series are needed both to reduce measurement errors and to span the broadest possible range of historical market conditions.*

The Dimson–Marsh–Staunton (DMS) Dataset

Our database of annual returns (DMS 2016c) has expanded to cover 23 countries from the beginning of 1900 to the beginning of 2016. It comprises annual returns for stocks, bonds, and bills, plus inflation and exchange rates. It now covers two North American markets (the United States and Canada), ten markets from the Eurozone (Austria, Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, and Spain), six European markets that are outside the Eurozone (Denmark, Norway, Russia, Sweden, Switzerland, and the United Kingdom), four Asia-Pacific markets (Australia, China, Japan, and New Zealand), and one African market (South Africa). As of the start of 2016, these countries make up 92% of the investable universe for a global investor, based on free-float market capitalizations. Our database also includes three global indices (World, World ex-USA, and Europe) denominated in a common currency (US dollars). The equity indices are weighted by market capitalization, and the bond indices are weighted by GDP.

General Methodology

The DMS database is based on the best-quality capital appreciation and income series available for each country, drawing heavily on previous studies and existing sources. Where possible, data are taken from peer-reviewed academic papers or highly rated professional studies that are listed in DMS (2002, 2007, 2016b). Many of the underlying studies are also listed by Annaert, Buelens, and Riva (2016). We update these studies by linking their return series to the best, most comprehensive commercial return indices available. To span the entire period from 1900, we link multiple index series. The best index is chosen for each period, switching when feasible to better alternatives as they become available. Other factors equal, we have chosen equity indices that afford the broadest coverage of their market. The DMS series are all total return series, including reinvested income (dividends for stocks; coupons for bonds).

The creation of the DMS database was in large part an investigative and assembly operation. Most of the series already existed, but some were long forgotten, unpublished, or came from research in progress. In other cases, the task was to estimate total returns by linking dividends to existing capital gains indices. For several countries, there were periods when no adequate series existed. In these cases, we compiled our own indices from archival records of the underlying securities. A detailed description of the sources used for each country, together with references to the multitude of researchers to whom we are indebted and whose studies we have drawn on, is provided in the *Global Investment Returns Sourcebook* (DMS 2016b).

The DMS series all start in 1900, a common start date that facilitates international comparisons. Data availability and quality dictated this choice of start date, and for practical purposes, 1900 was the earliest plausible start date for a comparative international database with broad coverage (see DMS 2007).

Every one of the 23 countries experienced market closures at some point, typically during wartime. However, in all but two cases, it is possible to bridge these interruptions and construct an investment returns history that spans the closure period. For 21 countries, therefore, we have a complete 116-year history of investment returns. For Russia and China, market closure was followed by expropriation of investors' assets, so we have market returns only for the pre- and post-communist eras. We incorporate these returns into the world and regional indices, showing a total loss on both Russian and Chinese stocks and bonds at the start of the communist eras. A brief history for each market is included in DMS (2016a).

Then and Now

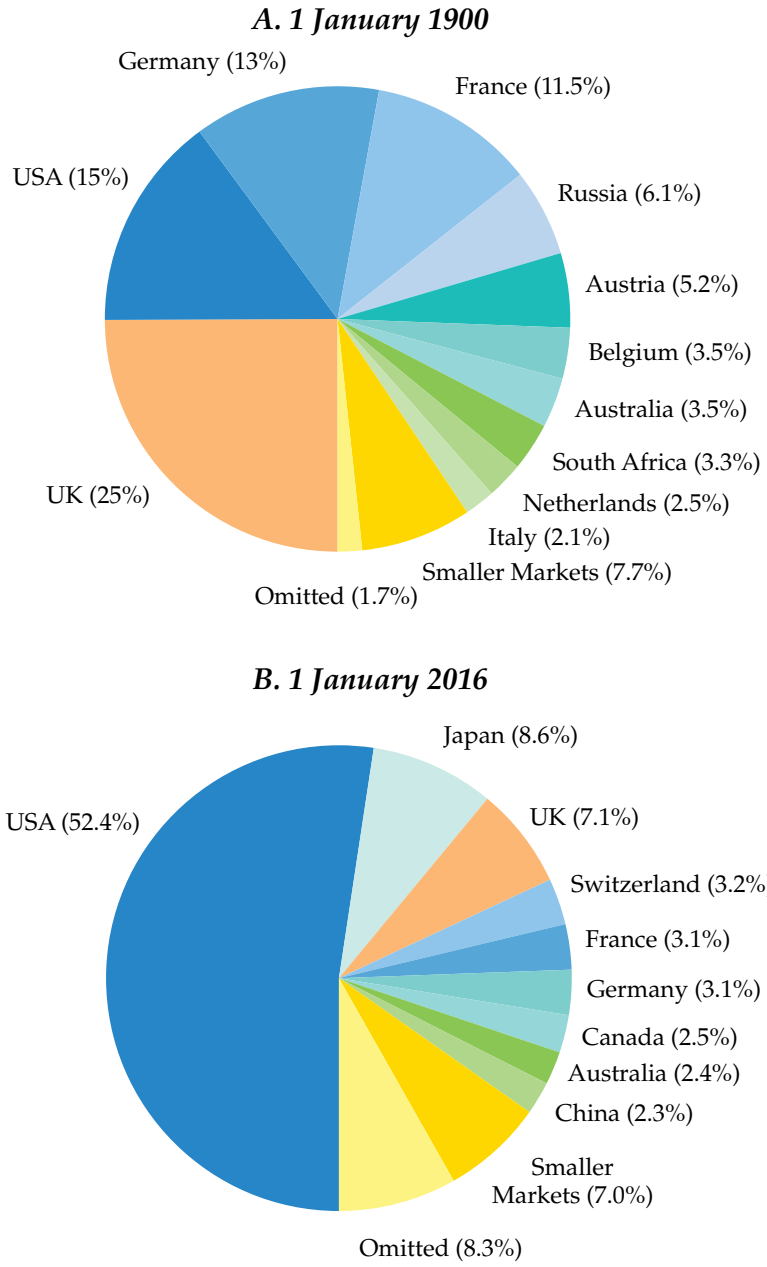
Figure 1.1 shows the relative sizes of world equity markets at our starting date of New Year's Day 1900 (Panel A) and how they had changed by 2016 (Panel B). Panel B is based on free-float market capitalizations within the FTSE All-World Index and hence shows the investable universe for a global investor. Note that emerging markets, especially China, would have a higher weighting if measured using full market-cap weights and if restrictions and quotas for global investors were ignored (see DMS 2014).

Panel A of Figure 1.1 shows the national breakdown at the start of the DMS database. The UK stock market was the largest in the world, accounting for a quarter of world capitalization and dominating the United States, Germany, and France, each of which represented some 12%–15% of global equities. The next two markets, each accounting for 5%–6%, are those of Russia and Austria. They are followed by two Benelux countries (Belgium and the Netherlands) and two then-British colonies (Australia and South Africa), which are in turn trailed by 12 smaller markets. In total, the DMS database covers 98.3% of global equity market capitalization at the start of 1900.

Early in the 20th century, the United States overtook the United Kingdom to become the world's dominant stock market (although from the start of 1988 until the start of 1990, Japan was briefly the largest, with a weighting of almost 45% of the World Index at the start of 1989 compared with 29% for the United States). The changing fortunes of individual countries, which we evaluate in detail in DMS (2013), raise two important issues. The first is survivorship bias. While investors in some countries were lucky, others suffered financial disaster. Incorporating China and Russia into our database—the two best-known cases of markets that failed to survive—addresses this issue. China was a small market in 1900 and in subsequent decades, but Russia accounted for some 6% of world market capitalization in 1900. Similarly, Austria–Hungary had a 5% weighting in the 1900 World Index, and although it was not a total catastrophe, it was the worst-performing equity market and the second-worst bond market among the 21 countries with continuous investment histories. Incorporating Austria, China, and Russia drastically reduces the potential for bias in world market returns from ignoring non-surviving and deeply unsuccessful markets.

Panel B of Figure 1.1 shows that today the US market dominates its closest rivals, accounting for more than half of global stock market value. Japan and the United Kingdom are next, each representing 7%–9% of global equities. Switzerland, France, and Germany each represent about 3% of the global market, and Canada, Australia, and China now represent around 2% each. These markets are followed by 14 smaller markets. The areas in the pie charts

Figure 1.1. Relative Sizes of World Stock Markets, 1 January 1900 versus 1 January 2016



Sources: DMS (2002, 2016b); FTSE Russell (2015).

labelled "omitted" represent countries that are excluded because the available data do not extend all the way forward from 1900 to 2016 or all the way backward from 2016 to 1900. The former are small markets that failed to prosper ("submerging markets"); the latter are mostly markets that came into existence after 1900 ("emerging markets").

An issue more serious than survivorship bias is success bias. The United States is the world's best-documented capital market, and prior to assembly of the DMS database, the evidence cited on long-run asset returns was predominantly US-based, mostly from Ibbotson Associates (see, for example, Ibbotson Associates 1999). Extrapolating from an unusually successful market—ignoring the fact that the economic and financial performance of that nation was exceptional—introduces success bias. That is mitigated by making inferences from the experience of a broad sample of countries.

The Great Transformation[1]

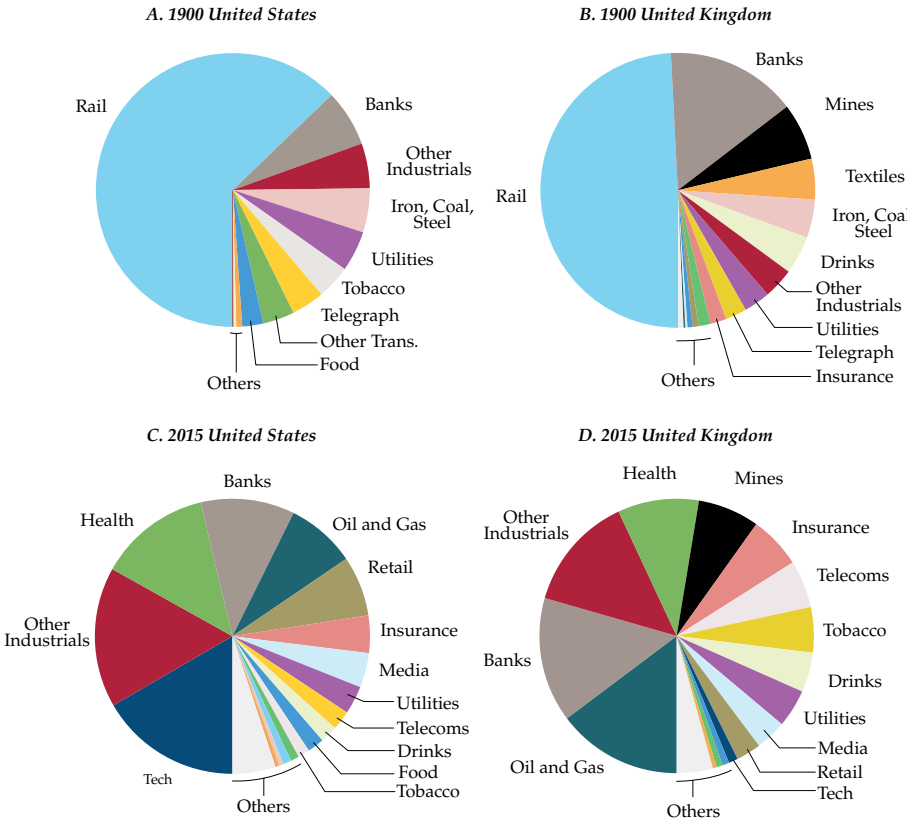
At the beginning of 1900—the start date of our global returns database—virtually no one had driven a car, made a phone call, used an electric light, heard recorded music, or seen a movie; no one had flown in an aircraft, listened to the radio, watched TV, used a computer, sent an e-mail, or used a smartphone. There were no x-rays, body scans, DNA tests, or transplants, and no one had taken an antibiotic; as a result, many would die young.

Mankind has enjoyed a wave of transformative innovation dating from the Industrial Revolution, continuing through the Golden Age of Invention in the late 19th century, and extending into today's information revolution. These transformations have given rise to entire new industries: electricity and power generation, automobiles, aerospace, airlines, telecommunications, oil and gas, pharmaceuticals and biotechnology, computers, information technology, and media and entertainment. Meanwhile, makers of horse-drawn carriages and wagons, canal boats, steam locomotives, candles, and matches have seen their industries decline. There have been profound changes in what is produced, how it is made, and the way in which people live and work.

These changes can be seen in the shifting composition of the firms listed on world stock markets. **Figure 1.2** shows the industrial composition of listed companies in the United States and the United Kingdom. The upper two pie charts show the position at the beginning of 1900, while the lower two show the beginning of 2015. Markets at the start of the 20th century were dominated by railroads, which accounted for 63% of US stock market value and almost 50% in the United Kingdom. More than a century later, railroads

[1]Material in this section from Dimson, Marsh, and Staunton (2015).

Figure 1.2. Industry Weightings in the USA and UK, 1900 Compared with 2015



Note: For 1900, UK data are based on the top 100 companies and US data on the total market.
Sources: DMS (2002, 2015); FTSE Russell 2015.

declined almost to the point of stock market extinction, representing less than 1% of the US market and close to zero in the UK market.

Of the US firms listed in 1900, more than 80% of their value was in industries that are today small or extinct; the UK figure is 65%. Besides railroads, other industries that have declined precipitously are textiles, iron, coal, and steel. These industries still exist but have moved to lower-cost locations in the emerging world. Yet, similarities between 1900 and today are also apparent. The banking and insurance industries continue to be important. Similarly, such industries as food, beverages (including alcohol), tobacco, and utilities were present in 1900 just as they are today. And, in the United

Kingdom, quoted mining companies were important in 1900 just as they are in London today.

But even industries that initially seem similar have often altered radically. For example, compare telegraphy in 1900 with smartphones today. Both were high-tech at the time. Or contrast other transport in 1900—shipping lines, trams, and docks—with their modern counterparts, airlines, buses, and trucking. Similarly, within manufacturing and industrials, the 1900 list of companies includes the world's then-largest candle maker and the world's largest manufacturer of matches.

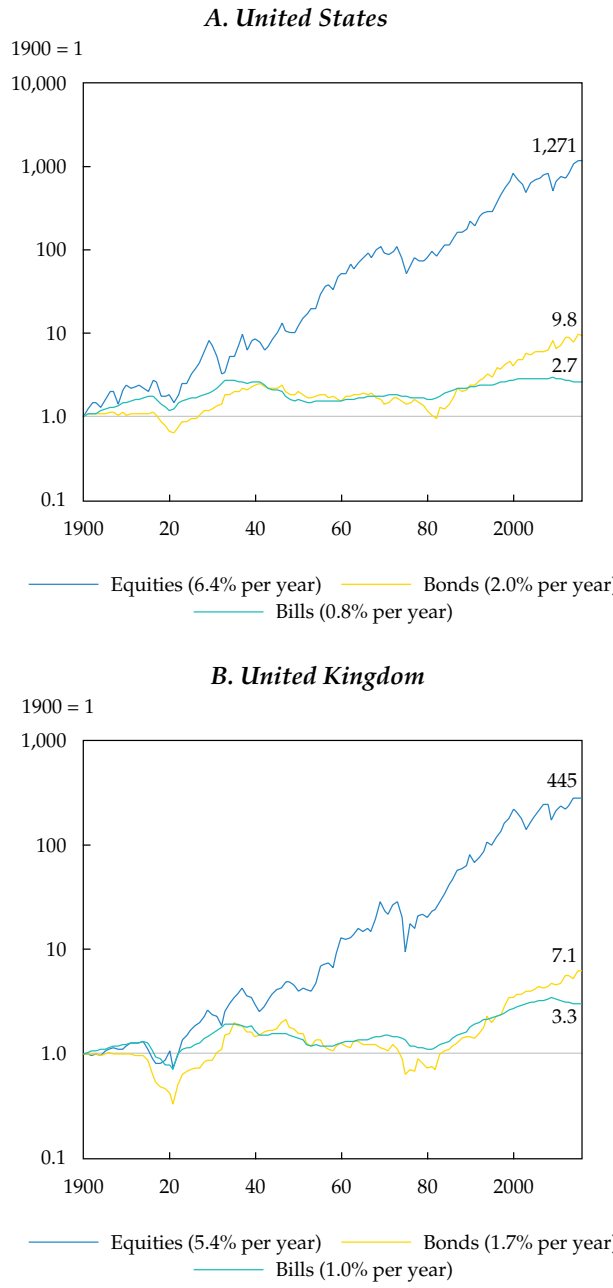
Another statistic that stands out from Figure 1.2 is the high proportion of today's companies whose business is in industries that were small or nonexistent in 1900, 62% by value for the United States and 47% for the United Kingdom. The largest industries today are technology (notably in the United States), oil and gas, banking, healthcare, the catch-all group of other industrials, mining (for the United Kingdom), telecommunications, insurance, and retail. Of these, oil and gas, technology, and health care (including pharmaceuticals and biotechnology) were almost totally absent in 1900. Telecoms and media, at least as we know them now, are also new industries.

Our analysis relates only to exchange-listed businesses. Some industries existed throughout the period but were not always listed. For example, there were many retailers in 1900, but apart from the major department stores, these were often small, local outlets rather than national and global retail chains like Walmart or Tesco. Similarly, in 1900 a higher proportion of manufacturing firms were family owned and unlisted. In the United Kingdom and other countries, nationalization has also caused entire industries—railroads, utilities, telecoms, steel, airlines, airports—to be delisted, often to be re-privatized at a later date. We included listed railroads, for example, while omitting highways that remain largely state-owned. The evolving composition of the corporate sector highlights the importance of avoiding survivorship bias within a stock market index, as well as across indices (see DMS 2002).

Long-Run Asset Returns

Figure 1.3 shows the cumulative real total return for the main asset categories in the United States and the United Kingdom. Returns include reinvested income, are measured in local currency, and are adjusted for inflation. In each country, equities performed best, long-term government bonds less well, and Treasury bills the worst. In the United States, an initial investment of $1 grew in real value to $1,271 if invested in equities, $10 in bonds, and $2.7 in bills. In the United Kingdom, an initial investment of £1 grew in real value to £445 if invested in equities, £7 in bonds, and £3.3 in bills.

Figure 1.3. Cumulative Returns on US and UK Asset Classes in Real Terms, 1900–2015



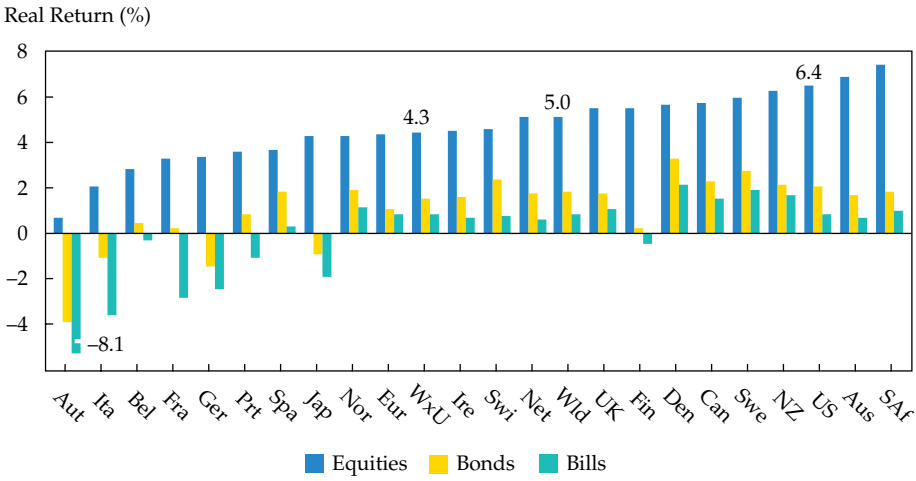
Sources: DMS (2016b, 2016c).

We previously noted the need for caution when generalizing from the United States, which, with hindsight, emerged as the world's premier economic power. We have already shown the acceptable, but lower, long-term performance of the United Kingdom. For a more complete view, we examine investment returns in other countries. **Figure 1.4** shows annualized real equity, bond, and bill returns over the period 1900–2015 for the 21 countries with continuous index histories, plus the World Index (Wld), the World ex-USA (WxU), and Europe (Eur). The abbreviations for each market are listed in Appendix 1.1. Markets are ranked in ascending order of real (inflation-adjusted) equity market returns, which were positive in every location, typically at a level of 3% to 6% per year. Equities were the best-performing asset class everywhere. Bonds beat bills in every country.

In most countries, bonds gave a positive real return over the 116 years, with just four exceptions: Austria, Italy, Germany, and Japan. These countries also delivered poor equity performance, the origins of which date from the first half of the 20th century. These were the countries that suffered most from the ravages of war and from ensuing periods of high or hyperinflation.

Figure 1.4 shows that the United States performed well, ranking third for equity performance (6.4% per year) and sixth for bonds (2.0% per year). This confirms the conjecture that US returns would be above average. However, the differences in annualized performance are moderate. Although its stock

Figure 1.4. Real Annualized Returns (%) on Equities versus Bonds and Bills Internationally, 1900–2015



Sources: Appendices 1.2, 1.4, and 1.5 in this chapter.

market performance was good, the United States was not the top performer and its return was not especially high relative to the world averages. The real return on US equities of 6.4% contrasts with the real US dollar return of 4.3% on the World ex-USA Index. A common factor among the best-performing equity markets over the last 116 years is that they tended to be resource-rich and/or New World countries.

Although risky equities, viewed as an asset class, performed better than less-volatile bonds or bills, investors did not benefit from investing in more-volatile stock markets as compared to more-stable markets. US equities had a standard deviation of returns of 20.1%, placing the United States among the lower-risk markets ranking sixth after Canada (17.0%), Australia (17.7%), New Zealand (19.4%), Switzerland (19.5%), and the United Kingdom (19.7%). The World Index, with a standard deviation of just 17.5%, shows the risk reduction obtained from international diversification. The most volatile markets were Portugal (34.4%), Germany (31.7%), Austria (30.0%), Finland (30.0%), Japan (29.6%), and Italy (28.5%), which were the countries most seriously affected by the depredations of war, civil strife, and inflation, and (in Finland's case) also reflecting the risk of a concentrated market in more-recent periods. Further details on the risk and return from equity investing are presented in Appendix 1.2.

Inflation, Bills, and Bonds

Inflation was a major force in the 20th century. In the United States, annualized inflation was 2.9% per year, versus 3.7% in the United Kingdom. This apparently small difference means that, since 1900, US consumer prices rose by a factor of 27 and UK prices rose 69-fold. Prices did not rise steadily over the 116 years, and all the DMS countries experienced deflation at some stage in the 1920s and early 1930s. In the United States, consumer prices fell by almost a third in the years after 1920 and did not regain their 1920 level until 1947. In three-quarters of the years since the mid-1990s, one or more of our 21 countries experienced (generally mild) deflation. Over the last 116 years, there were seven high inflation countries: Germany, Austria, Portugal, Finland, France, Japan, and Spain. There were two runners-up, Belgium and South Africa, and one low-inflation country, Switzerland. Further details on historical inflation rates are provided in Appendix 1.3. Note that the true 116-year mean and standard deviation for Germany are far higher than Appendix 1.3 shows because the hyperinflationary years of 1922–23 are omitted from the table.

Treasury bills provide a benchmark for the risk-free rate of interest. Since 1900, US and UK investors earned annualized real (inflation-adjusted)

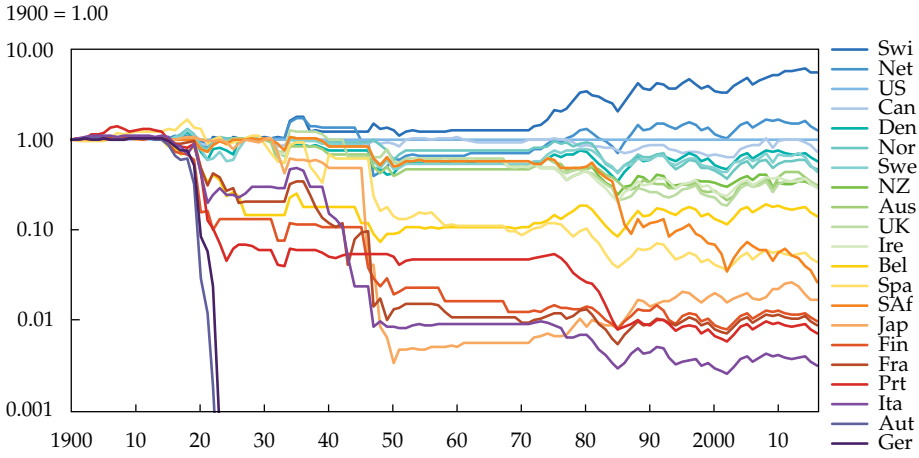
returns of 0.8% and 1.0%, respectively. Over the period, there were negative real returns on bills in eight countries: Austria, Belgium, Finland, France, Germany, Italy, Japan, and Portugal. If we include the hyperinflation of 1922–23, German bill (and bond) investors lost virtually everything in real terms. Further details on real interest rates over the long term are in Appendix 1.4.

Government bonds were on average disappointing for investors over the 116 years from 1900 to 2015. Across the 21 countries, the average annualized real return was 1.0% (1.2% excluding Austria's very low figure). Although this exceeds the return on cash by 1.3%, bonds had much higher risk. As already noted, real bond returns were negative in four countries, with German bonds doing worst once the 1922–23 hyperinflation is incorporated. In the United Kingdom, the annualized real bond return was 1.7%, while US bondholders did better with a real return of 2.0% per year. Over the full period, Denmark, Sweden, Switzerland, Canada, and New Zealand did better than the USA, with real bond returns of 3.2%, 2.7%, 2.4%, 2.3%, and 2.1%, respectively. Note that Danish bond returns were estimated from mortgage bonds over part of their history (see DMS 2016b) and were thus exposed to some credit risk. The best-performing country in terms of pure government bonds was therefore Sweden, with an annualized real return of 2.7%. Since 1900, the average standard deviation of real bond returns was 13.1%, versus 23.6% for equities and 7.7% for bills (these averages exclude Austria). US real bond returns had a standard deviation of 10.4%, versus 20.1% for equities and 4.6% for bills. Further details on real bond returns are in Appendix 1.5.

Exchange Rates

For decades, investors have been exhorted to diversify internationally so they can benefit from the "free lunch" of risk reduction through diversification. It is an old idea: More than a century ago when capital flowed freely, London, New York, Amsterdam, and Paris facilitated the development of transport systems, utilities, and natural resources around the world. In those days, many currencies were linked to the price of gold and foreign exchange risk seemed unimportant. However, that was to change as the 20th century unfolded. **Figure 1.5** compares our 21 countries' exchange rates against the US dollar. On the left of the graph, we show the dollar value of 5.38 Swiss francs, 0.21 British pounds, and the sums in other currencies that equated to one dollar at the beginning of 1900. That is, we re-based the exchange rates at the start of 1900 to a value of 1.0. The vertical axis displays the number of dollars required to purchase one local currency unit (after re-basing). A depreciating currency trends downward, while an appreciating currency trends upward.

Figure 1.5. Nominal Exchange Rates, 1900–2015, in US Dollars per Unit of Local Currency (rebased to 1900=1)



Sources: DMS (2002, 2016b, 2016c).

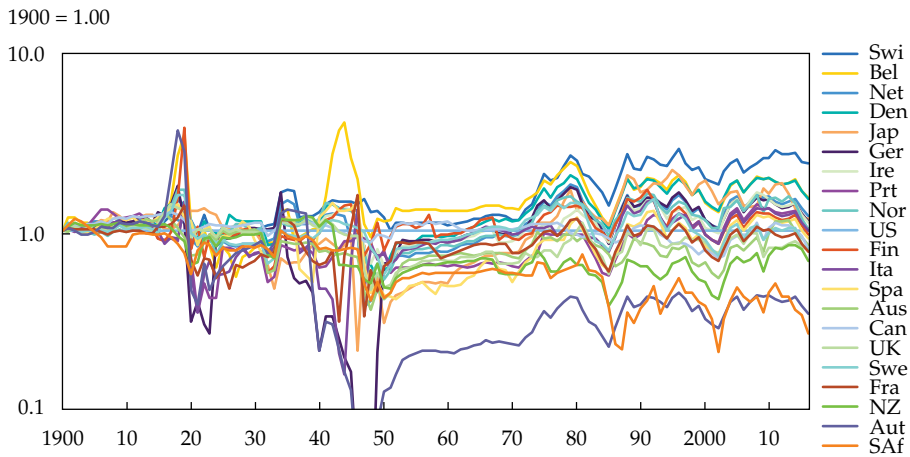
Because of Austria's ultrahigh inflation that peaked in 1922 and Germany's hyperinflation that peaked in 1923, the currencies of these two countries were debased to a negligible value. Other currencies took longer to move less. By the beginning of 2016, the currencies in the diagram had depreciated to the point where the number of Italian currency units (lira, followed by euros) that could be bought for one dollar was 314 times as large as in 1900; the number of yen was 59 times larger; and the number of British pounds was 3.3 times larger. The strongest currency was the Swiss franc, which had appreciated until, by today, one dollar could buy only 18 rappen (Swiss centimes)—that is, 0.18 Swiss francs, one-sixth of the number of francs that the dollar could have bought in 1900.

At the start of 1900, the exchange rate between US dollars and British pounds was \$1 = £0.208, almost five dollars to the pound. By the end of 2015, the pound had weakened to \$1 = £0.67—only 1.48 dollars for each pound, a fall of 1% per year. But the strengthening of the dollar against the pound was accompanied by lower inflation in the United States than in the United Kingdom. So, to determine the "real" movement in the exchange rate, we must adjust the exchange rate for inflation in the United States relative to the United Kingdom. The inflation-adjusted, or real, exchange rate is defined as the nominal exchange rate multiplied by the ratio of the

two countries' inflation indices. Over the long run, the real dollar/pound exchange rate moved by much less than the nominal exchange rate, increasing by 0.22% per year.

Figure 1.6 presents the real exchange rates for the 21 countries with a complete history over the period from 1900 onward. Note that the vertical scale is quite different from the previous chart of nominal exchange rates. As with the real dollar/pound rate discussed above, these inflation-adjusted currency values have been comparatively stable over this long interval, albeit with large spikes for countries that emerged from wartime defeat. Consistent with the findings in Taylor (2002), real exchange rates do not appear to exhibit a long-term upward or downward trend but are clearly volatile. Over the long term, it is remarkable that no country had a currency that in real terms appreciated against the US dollar by as much as 1% per year (the strongest, the Swiss franc, appreciated by 0.76% per year). Only one country had a currency that depreciated by as much as 1% per year (the weakest, the South African rand, depreciated by –1.15% per year). Detailed real exchange rate statistics for 1900–2015 are provided in Appendix 1.7.

Figure 1.6. Real Exchange Rates, 1900–2015, in US Dollars per Unit of Local Currency (rebased to 1900=1)



Sources: DMS (2002, 2016b, 2016c).

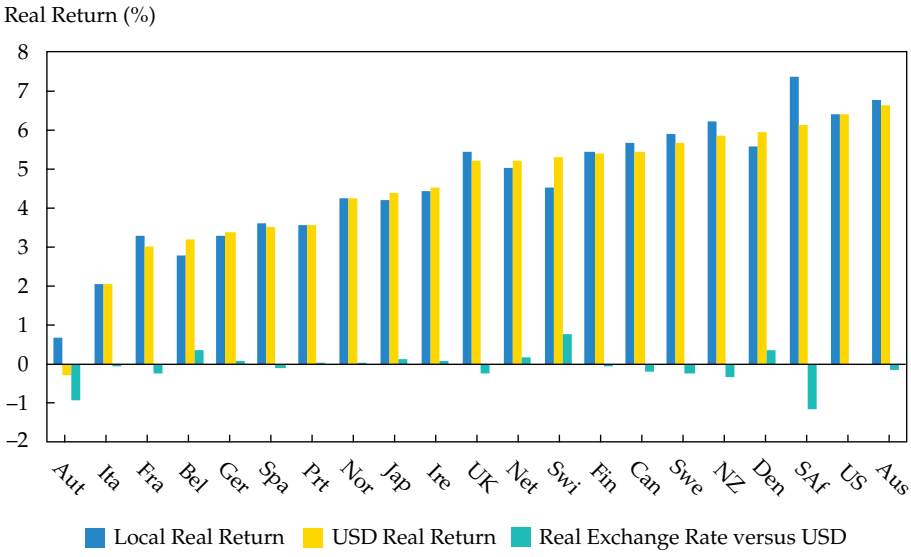
Common-Currency Returns

We have displayed the real returns to a domestic equity investor based on local purchasing power in that investor's home country (see Figure 1.4 and Appendix 1.2). For example, over the period 1900–2015, the annualized real return to an American buying US equities was 6.4%, and for a Swiss investor buying Swiss equities it was 4.5%. However, when considering cross-border investment, we also need to account for exchange rate movements. To illustrate, consider an American buying Swiss equities and a Swiss investor buying US equities. Each investor now has two exposures, one to foreign equities and the other to foreign currency. We thus convert each investor's return into his or her reference currency.

To convert nominal returns, we use changes in the nominal exchange rate. By analogy, to convert real returns in one currency into real returns in another, we simply adjust by the change in the real exchange rate. Over the period 1900–2015, Appendix 1.7 shows that the real (inflation-adjusted) Swiss franc was stronger than the US dollar by 0.76% per year. Thus, the American who invested in Switzerland had a real return of 4.48% (from Swiss equities) plus 0.76% (from the Swiss franc), giving an overall return of (1+4.48%) × (1+0.76%) − 1 = 5.28% (all numbers rounded). In contrast, the Swiss investor who invested in America had a real return of 6.36% (from US equities) minus 0.76% (from the US dollar), namely (1+6.36%) × (1–0.76%) – 1 = 5.55% (again, rounded).

To provide a common-currency view of stock market investing, **Figure 1.7** therefore converts local-currency real returns into US dollar-denominated real returns. It simply involves adding each country's real exchange rate movement to the local real returns we presented in Figure 1.4. In the case of Switzerland, for example, the domestic real return is 4.5% and the real exchange rate movement is +0.76%. Adding these (geometrically) gives the real dollar return of 5.3% that we just discussed. It is clear that, over the long haul, the cross section of stock market returns reflects differing real equity performances far more than differing real exchange rates.

Figure 1.7. Real Annualized Equity Returns (%) in Local Currency and US Dollars, 1900–2015



Sources: DMS (2002, 2016b, 2016c).

Conclusion

Since 1900, there have been transformational changes in the relative sizes of stock markets around the world. Coinciding with these developments, there has been a fundamental change in the industries represented on major stock exchanges. Although there have been setbacks, over the 116 years, equities beat bonds and bills in all 21 countries for which we have a continuous stock market history. For the world as a whole, equities outperformed bills by 4.2% per year and bonds by 3.2% per year. Over the long run, there was a reward for the higher risk of investing in stocks.

Currencies fluctuated considerably between 1900 and 2015. Over this long interval, most currencies weakened against the US dollar and only a few, led by the Swiss franc, strengthened. Yet during this 116-year period, foreign exchange fluctuations were largely a response to relative inflation. Over more than a century, real exchange rates against the US dollar changed by an annualized amount that was, in almost every case, below 1% per year. Common-currency returns have thus been quite close to, and have a very similar ranking to, real returns expressed in local currency terms.

We have provided an update on long-run rates of return on stocks, bonds, bills, currencies, and inflation in the 21 countries with continuous histories since 1900. We have updated and commented on the key statistics, charts, and findings from *Triumph of the Optimists* (DMS 2002). Interested readers also are referred to the *Global Investment Returns Sourcebook* (DMS 2016b) for additional analysis.

References

Annaert, Jan, Frans Buelens, and Angelo Riva. 2016. "Financial History Databases." In *Financial Market History*. Edited by David Chambers and Elroy Dimson. Charlottesville, VA: CFA Institute Research Foundation.

Dimson, Elroy, Paul Marsh, and Mike Staunton. 2002. *Triumph of the Optimists: 101 Years of Global Investment Returns*. New Jersey: Princeton University Press.

———. 2007. "The Worldwide Equity Premium: A Smaller Puzzle." In *The Handbook of the Equity Risk Premium*. Edited by R. Mehra. Amsterdam: Elsevier.

———. 2013. "The Low Return World." In *Global Investment Returns Yearbook 2013*. Edited by DMS. Zurich: Credit Suisse Research Institute.

———. 2014. "Emerging Markets Revisited." In *Global Investment Returns Yearbook 2014*. Edited by DMS. Zurich: Credit Suisse Research Institute.

———. 2015. "Industries: Their Rise and Fall." In *Global Investment Returns Yearbook 2015*. Edited by DMS. Zurich: Credit Suisse Research Institute.

———. 2016a. *Global Investment Returns Yearbook 2016*. Zurich: Credit Suisse Research Institute.

———. 2016b. *Global Investment Returns Sourcebook 2016*. Zurich: Credit Suisse Research Institute.

———. 2016c. "The Dimson-Marsh-Staunton Global Investment Returns Database" (the "DMS Database"). Morningstar Inc.

FTSE Russell. 2015. "FTSE All-World Index Series Monthly Review" (December).

Ibbotson Associates. 1999. *SBBI Yearbook*. Chicago: Ibbotson Associates.

Taylor, Alan. 2002. "A Century of Purchasing-Power Parity." *Review of Economics and Statistics*, vol. 84, no. 2: 139–150.

Appendices

The appendices below provide summary statistics on the return series for 21 countries and three regions with a continuous history. The markets are identified by the abbreviated names listed in **Appendix 1.1**. **Appendix 1.2** summarizes global equity returns; **Appendix 1.3** reports inflation rates; **Appendices 1.4** and **1.5** present real interest rates and real bond returns; and **Appendices 1.6** and **1.7** present nominal and real exchange rate changes. The data sources are the DMS dataset distributed by Morningstar (DMS 2016c) and the *Global Investment Returns Sourcebook* (DMS 2016b), which updates and extends the statistics presented in *Triumph of the Optimists* (DMS 2002).

The structure of Appendices 1.2–1.7 is as follows. The geometric means in the second column show the 116-year annualized returns achieved by investors; these are the figures that are plotted for selected asset-class returns in Figure 1.4. The arithmetic means in the third column show the average of the 116 annual returns for each market. The arithmetic mean of a sequence of different returns is always larger than the geometric mean, and the more volatile the sequence of returns, the greater the amount by which the arithmetic mean exceeds the geometric mean. This is verified by the fifth column, which shows the standard deviation of each market's returns. The fourth column presents the standard error of the arithmetic mean return (the lower the standard error, the more precise the estimate of the mean return). The sixth and eighth columns present the lowest and highest annual return for each market, respectively, and those returns are accompanied in the seventh and ninth columns by the years in which these extreme events occurred.

Note that Appendices 1.6 and 1.7 report each country's annualized rate of currency appreciation or depreciation in terms of the dollar value of local currency units. A strong currency (e.g., the Swiss franc) is shown by a positive rate of change in column two: More dollars are needed to buy one franc. A weak currency has a negative rate of change: Fewer dollars are needed to buy a unit of the currency.

Appendix 1.1. Markets Presented in This Study and Their Abbreviations

Country	Abbreviation	Country	Abbreviation	Country/ Region	Abbreviation
Australia	Aus	Ireland	Ire	Spain	Spa
Austria	Aut	Italy	Ita	Sweden	Swe
Belgium	Bel	Japan	Jap	Switzerland	Swi
Canada	Can	The Netherlands	Net	United Kingdom	UK
Denmark	Den	New Zealand	NZ	United States	US
Finland	Fin	Norway	Nor	Europe	Eur
France	Fra	Portugal	Prt	World ex-USA	WxU
Germany	Ger	South Africa	SAf	World	Wld

Appendix 1.2. Real (Inflation-Adjusted) Equity Returns around the World, 1900–2015

Country	Geometric mean%	Arithmetic mean%	Standard error%	Standard deviation%	Minimum return%	Minimum year	Maximum return%	Maximum year
Aus	6.7	8.3	1.6	17.7	–42.5	2008	51.5	1983
Aut	0.7	4.7	2.8	30.0	–60.1	2008	127.1	1985
Bel	2.8	5.4	2.2	23.7	–48.9	2008	105.1	1919
Can	5.6	7.0	1.6	17.0	–33.8	2008	55.2	1933
Den	5.5	7.4	1.9	20.9	–49.2	2008	107.8	1983
Fin	5.4	9.3	2.8	30.0	–60.8	1918	161.7	1999
Fra	3.2	5.8	2.1	23.1	–41.5	2008	66.1	1954
Ger	3.3	8.2	2.9	31.7	–90.8	1948	154.6	1949
Ire	4.4	7.0	2.1	23.0	–65.4	2008	68.4	1977
Ita	2.0	6.0	2.7	28.5	–72.9	1945	120.7	1946
Jap	4.2	8.8	2.7	29.6	–85.5	1946	121.1	1952
Net	5.0	7.1	2.0	21.4	–50.4	2008	101.6	1940
NZ	6.2	7.9	1.8	19.4	–54.7	1987	105.3	1983
Nor	4.2	7.1	2.5	26.9	–53.6	2008	166.9	1979
Prt	3.5	8.5	3.2	34.4	–76.6	1978	151.8	1986
SAf	7.3	9.4	2.1	22.1	–52.2	1920	102.9	1933
Spa	3.6	5.8	2.0	22.0	–43.3	1977	99.4	1986
Swe	5.9	8.0	2.0	21.2	–42.5	1918	67.5	1999
Swi	4.5	6.3	1.8	19.5	–37.8	1974	59.4	1922
UK	5.4	7.2	1.8	19.7	–57.1	1974	96.7	1975
US	6.4	8.3	1.9	20.1	–38.4	1931	56.2	1933
Eur	4.2	6.1	1.8	19.8	–47.5	2008	75.7	1933
WxU	4.3	6.0	1.8	19.0	–44.2	2008	80.0	1933
Wld	5.0	6.5	1.6	17.5	–41.4	2008	68.0	1933

Sources: DMS (2002, 2016b, 2016c).

Appendix 1.3. Inflation Rates around the World, 1900–2015

Country	Geometric mean%	Arithmetic mean%	Standard error%	Standard deviation%	Minimum return%	Minimum year	Maximum return%	Maximum year
Aus	3.8	3.9	0.5	5.1	–12.6	1921	19.3	1951
Aut	12.7	32.0	16.7	180.1	–5.0	1931	1748.1	1922
Bel	5.0	6.1	1.5	16.5	–37.9	1919	96.3	1917
Can	3.0	3.1	0.4	4.5	–15.8	1921	15.1	1917
Den	3.8	3.9	0.6	6.0	–15.1	1926	24.4	1940
Fin	7.1	8.8	2.4	26.2	–11.3	1919	241.4	1918
Fra	6.9	7.5	1.1	12.1	–18.4	1921	65.1	1946
Ger*	4.6	5.4	1.4	14.8	–9.5	1932	209 bn	1923
Ire	4.1	4.3	0.6	6.9	–26.0	1921	23.3	1981
Ita	8.1	10.4	3.2	34.3	–9.7	1931	344.4	1944
Jap	6.7	10.0	3.8	40.9	–18.7	1930	361.1	1946
Net	2.9	3.0	0.4	4.7	–13.4	1921	18.7	1918
NZ	3.6	3.7	0.4	4.6	–12.0	1932	14.7	1980
Nor	3.6	3.9	0.7	7.2	–19.5	1921	40.3	1918
Prt	7.4	8.2	1.4	14.7	–17.6	1948	80.9	1918
SAf	4.9	5.2	0.7	7.3	–17.2	1921	47.5	1920
Spa	5.6	5.8	0.6	6.8	–6.7	1928	36.5	1946
Swe	3.4	3.6	0.6	6.6	–25.2	1921	39.4	1918
Swi	2.2	2.3	0.5	5.2	–17.7	1922	25.7	1918
UK	3.7	3.9	0.6	6.5	–26.0	1921	24.9	1975
US	2.9	3.0	0.4	4.8	–10.7	1921	20.5	1918

*For Germany, the means, standard deviation, and standard error are based on 114 years, excluding 1922–23.
Sources: DMS (2002, 2016b, 2016c).

Appendix 1.4. Real Interest Rates around the World, 1900–2015

Country	Geometric mean%	Arithmetic mean%	Standard error%	Standard deviation%	Minimum return%	Minimum year	Maximum return%	Maximum year
Aus	0.7	0.8	0.5	5.3	–15.5	1951	18.5	1921
Aut	–8.0	–3.9	1.7	18.6	–94.2	1922	12.6	1931
Bel	–0.3	0.6	1.2	12.7	–46.6	1941	69.0	1919
Can	1.5	1.6	0.4	4.8	–12.5	1947	27.1	1921
Den	2.1	2.3	0.6	6.0	–15.8	1940	25.1	1921
Fin	–0.4	0.5	1.1	11.6	–69.2	1918	19.9	1919
Fra	–2.7	–2.2	0.9	9.4	–38.5	1946	29.7	1921
Ger*	–2.4	–0.4	1.2	13.0	–100.0	1923	38.8	1924
Ire	0.7	0.9	0.6	6.5	–15.5	1915	42.2	1921
Ita	–3.5	–2.5	1.0	11.3	–76.6	1944	14.2	1931
Jap	–1.9	–0.3	1.3	13.6	–77.5	1946	29.8	1930
Net	0.6	0.7	0.5	4.9	–12.7	1918	19.6	1921
NZ	1.7	1.8	0.4	4.6	–8.1	1951	21.1	1932
Nor	1.1	1.3	0.7	7.0	–25.4	1918	31.2	1921
Prt	–1.1	–0.5	0.9	9.7	–41.6	1918	23.8	1948
SAf	1.0	1.2	0.6	6.1	–27.8	1920	27.3	1921
Spa	0.3	0.5	0.5	5.7	–23.8	1946	12.6	1928
Swe	1.9	2.1	0.6	6.5	–23.2	1918	42.7	1921
Swi	0.8	0.9	0.5	4.9	–16.5	1918	25.8	1922
UK	1.0	1.2	0.6	6.3	–15.7	1915	43.0	1921
US	0.8	1.0	0.4	4.6	–15.1	1946	20.0	1921

*For Germany, the means, standard deviation, and standard error are based on 114 years, excluding 1922–23.
Sources: DMS (2002, 2016b, 2016c).

Appendix 1.5. Real Bond Returns around the World, 1900–2015

Country	Geometric mean%	Arithmetic mean%	Standard error%	Standard deviation%	Minimum return%	Minimum year	Maximum return%	Maximum year
Aus	1.7	2.5	1.2	13.2	–26.6	1951	62.2	1932
Aut	–3.8	4.8	4.8	51.2	–94.4	1945	441.6	1926
Bel	0.4	1.6	1.4	15.0	–45.6	1917	62.3	1919
Can	2.3	2.8	1.0	10.4	–25.9	1915	41.7	1921
Den	3.2	3.8	1.1	11.9	–18.2	1919	50.1	1983
Fin	0.2	1.4	1.3	13.7	–69.5	1918	30.2	1921
Fra	0.2	1.1	1.2	13.0	–43.5	1947	35.9	1927
Ger*	–1.4	1.3	1.5	15.8	–100.0	1923	62.5	1932
Ire	1.5	2.6	1.4	15.1	–34.1	1915	61.2	1921
Ita	–1.1	0.3	1.4	14.8	–64.3	1944	35.5	1993
Jap	–0.9	1.7	1.8	19.7	–77.5	1946	69.8	1954
Net	1.7	2.1	0.9	9.8	–18.1	1915	32.8	1932
NZ	2.1	2.5	0.8	9.0	–23.7	1984	34.1	1991
Nor	1.9	2.6	1.1	12.0	–48.0	1918	62.1	1921
Prt	0.8	2.6	1.7	18.7	–49.7	1994	82.4	1922
SAf	1.8	2.3	1.0	10.5	–32.6	1920	37.1	1921
Spa	1.8	2.5	1.2	12.6	–30.2	1920	53.2	1942
Swe	2.7	3.4	1.2	12.7	–37.0	1939	68.2	1921
Swi	2.4	2.7	0.9	9.4	–21.4	1918	56.1	1922
UK	1.7	2.6	1.3	13.7	–30.7	1974	59.4	1921
US	2.0	2.5	1.0	10.4	–18.4	1917	35.1	1982
Eur	1.1	2.4	1.5	16.2	–52.4	1919	72.8	1933
WxU	1.5	2.5	1.4	14.7	–45.5	1919	76.1	1933
Wld	1.8	2.4	1.0	11.3	–32.0	1919	46.7	1933

*For Germany, the means, standard deviation, and standard error are based on 114 years, excluding 1922–23.
Sources: DMS (2002, 2016b, 2016c).

Appendix 1.6. Nominal Exchange Rate Changes against the US Dollar, 1900–2015

Country	Geometric mean%	Arithmetic mean%	Standard error%	Standard deviation%	Minimum change%	Minimum year	Maximum change%	Maximum year
Aus	–1.0	–0.4	1.0	11.1	–39.4	1931	53.4	1933
Aut	–9.6	–4.0	2.1	22.1	–96.2	1922	53.0	1940
Bel	–1.7	–0.7	1.2	13.3	–41.9	1919	55.8	1933
Can	–0.3	–0.1	0.5	5.8	–20.0	2008	22.3	2003
Den	–0.5	0.2	1.1	11.4	–37.6	1946	40.2	1925
Fin	–3.9	–2.4	1.4	15.1	–73.3	1919	54.4	1933
Fra	–4.0	–1.5	1.8	19.4	–85.3	1946	91.3	1943
Ger*	–2.5	8.6	9.6	102.5	–100.0	1923	1046.3	1948
Ire	–1.1	–0.5	1.0	10.7	–30.2	1931	53.4	1933
Ita	–4.8	–3.0	1.5	16.7	–64.8	1946	59.1	1933
Jap	–3.5	–0.7	1.6	16.9	–91.7	1945	47.8	1933
Net	0.2	1.0	1.1	11.9	–59.1	1946	55.1	1933
NZ	–1.0	–0.3	1.2	12.5	–36.0	1942	74.2	1933
Nor	–0.7	0.0	1.1	12.0	–30.5	1931	49.5	1933
Prt	–4.2	–2.9	1.3	14.3	–70.5	1920	52.5	1933
SAf	–3.1	–2.0	1.3	14.1	–46.0	1985	46.1	1987
Spa	–2.7	–1.2	1.6	16.9	–62.2	1946	99.2	1939
Swe	–0.7	–0.1	1.0	10.5	–29.2	1931	44.7	1933
Swi	1.5	2.0	1.0	11.1	–29.4	1936	56.0	1933
UK	–1.0	–0.4	1.0	10.8	–30.2	1931	53.4	1933
US	0.0	0.0	0.0	0.0	0.0		0.0	

*For Germany, the means, standard deviation, and standard error are based on 114 years, excluding 1922–23.
Sources: DMS (2002, 2016b, 2016c).

Appendix 1.7. Real Exchange Rate Changes against the US Dollar, 1900–2015

Country	Geometric mean%	Arithmetic mean%	Standard error%	Standard deviation%	Minimum change%	Minimum year	Maximum change%	Maximum year
Aus	−0.16	0.52	1.1	11.7	−39.9	1931	46.4	1933
Aut	−0.93	2.06	2.0	21.9	−83.2	1919	74.7	1917
Bel	0.37	2.23	1.8	19.1	−68.6	1919	77.8	1917
Can	−0.21	−0.03	0.6	6.1	−19.2	2008	22.5	2003
Den	0.35	1.07	1.1	11.8	−47.6	1946	35.0	1933
Fin	−0.04	2.10	1.9	21.0	−79.4	1919	146.8	1918
Fra	−0.24	2.34	2.1	22.6	−79.4	1946	135.9	1943
Ger	0.10	13.45	11.7	125.8	−75.0	1945	1302.0	1948
Ire	0.09	0.70	1.0	11.1	−38.1	1946	53.6	1933
Ita	0.00	3.73	3.4	37.0	−64.9	1946	335.2	1944
Jap	0.14	2.98	2.9	30.7	−77.9	1945	290.2	1946
Ne	0.16	1.01	1.1	12.4	−61.6	1946	54.3	1933
NZ	−0.33	0.48	1.2	13.1	−39.7	1942	66.1	1933
Nor	0.01	0.75	1.1	12.1	−37.4	1946	46.4	1933
Prt	0.01	1.36	1.6	17.0	−52.1	1919	91.1	1924
SAf	−1.15	−0.01	1.4	15.4	−38.3	1985	60.5	1987
Spa	−0.09	1.33	1.7	18.0	−56.4	1946	128.7	1939
Swe	−0.21	0.40	1.0	11.0	−39.2	1919	41.0	1933
Swi	0.76	1.35	1.0	11.2	−29.1	1936	51.6	1933
UK	−0.22	0.43	1.1	11.4	−36.7	1946	52.6	1933
US	0.00	0.00	0.0	0.0	0.0		0.0	

Sources: DMS (2002, 2016b, 2016c).

EB-2024-0063
Evidence of Dr. Sean Cleary, CFA
Attachment AX

McKinsey 2017 – The Real Economy and Future Investment Returns

McKinsey&Company

The Real Economy and Future Investment Returns

January 17, 2017

Summary

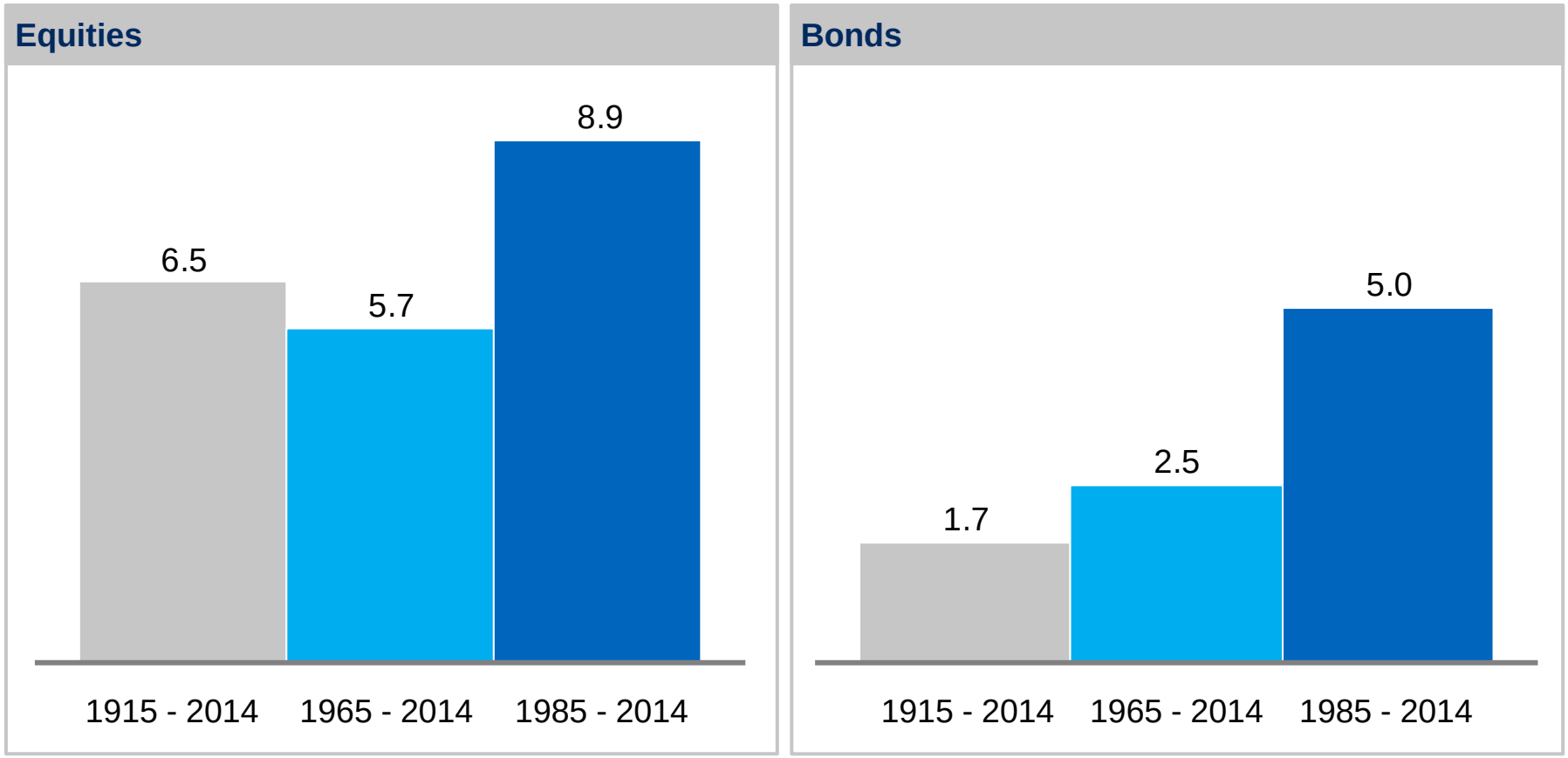
- Equity and bond returns driven by “real” economy
- Unique elements driving last 30 years returns are not repeatable (declining inflation/interest rates, increasing profit margins)
- Future long-term real returns could be 4.0 – 6.5% for equities and 0.0 – 2.0% for bonds
- Even under extreme scenarios, equities likely to outperform bonds under most time frames

SOURCE: Source

Returns on equities and bonds have been high over the past 30 years versus long-term average

Total real returns

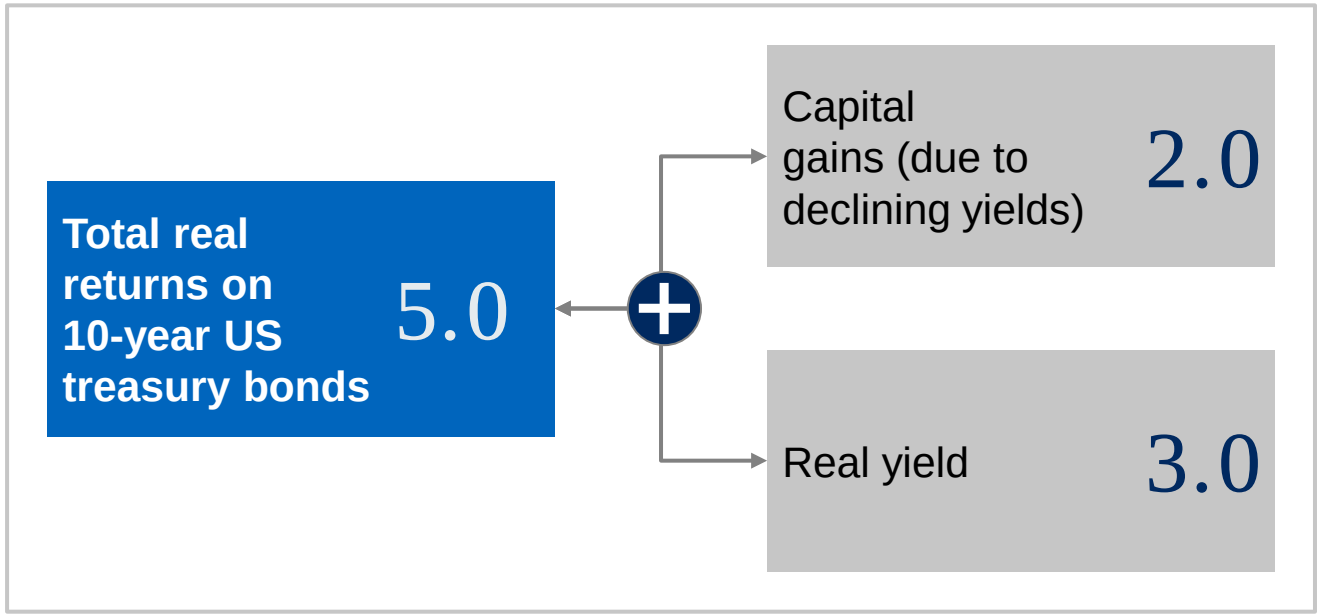
Annualized, based on 3-year average index at start and end years, %



SOURCE: Dimson-Marsh-Staunton Global Returns database; Damodaran database, Stern School of Business, New York University; Jutta Bolt and Jan Luiten van Zanden, The first update of the Maddison Project: Re-estimating growth before 1820, Maddison Project working paper number 4, University of Groningen, January 2013; Conference Board; McKinsey Global Institute analysis

During last 30 years, bond returns driven by capital gains

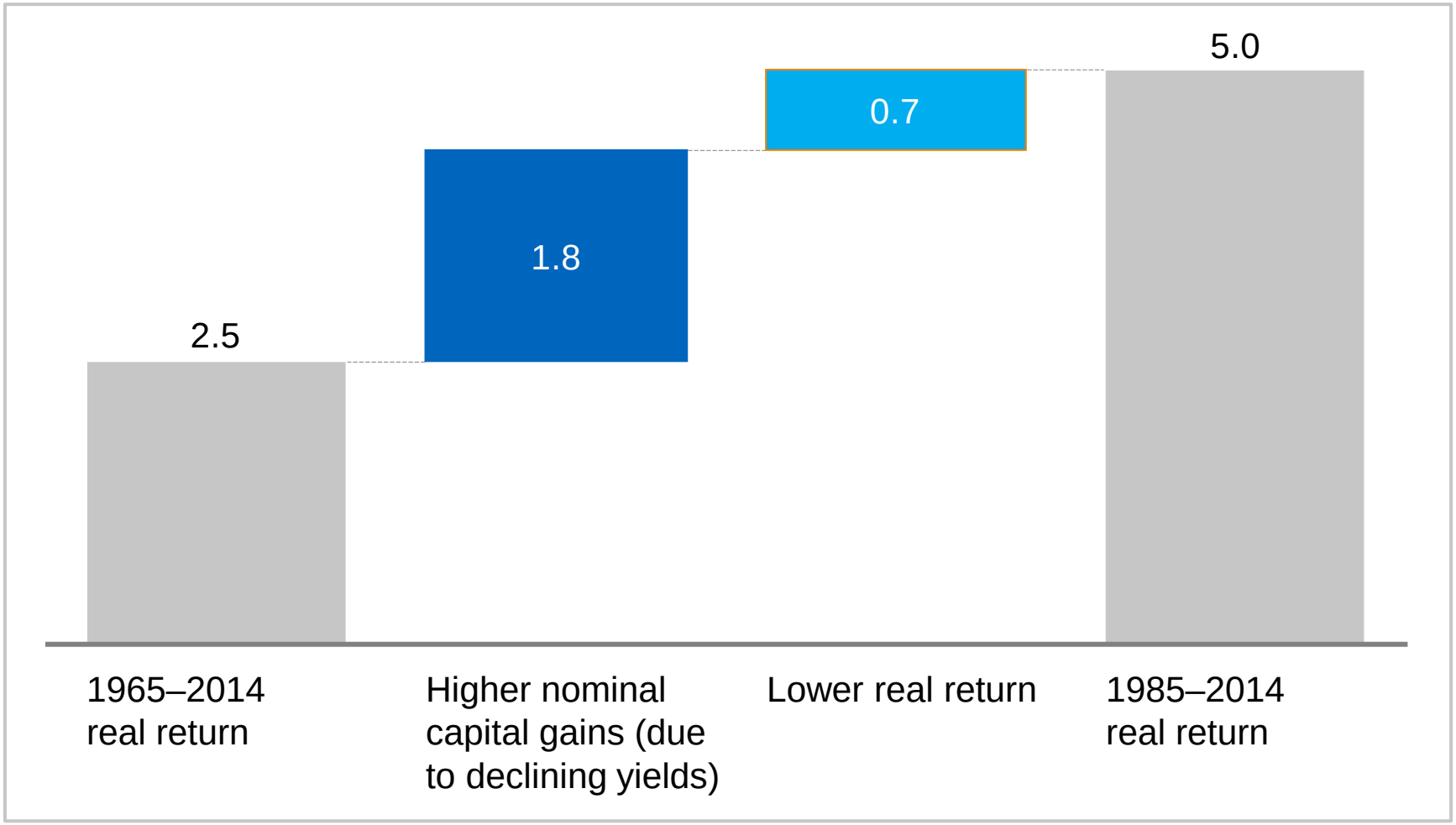
Percent, 1985 to 2014



Capital gains due to declining yields and inflation drove higher bond returns in the last 30 years

10-year US Treasury bond returns, annualized

Percent



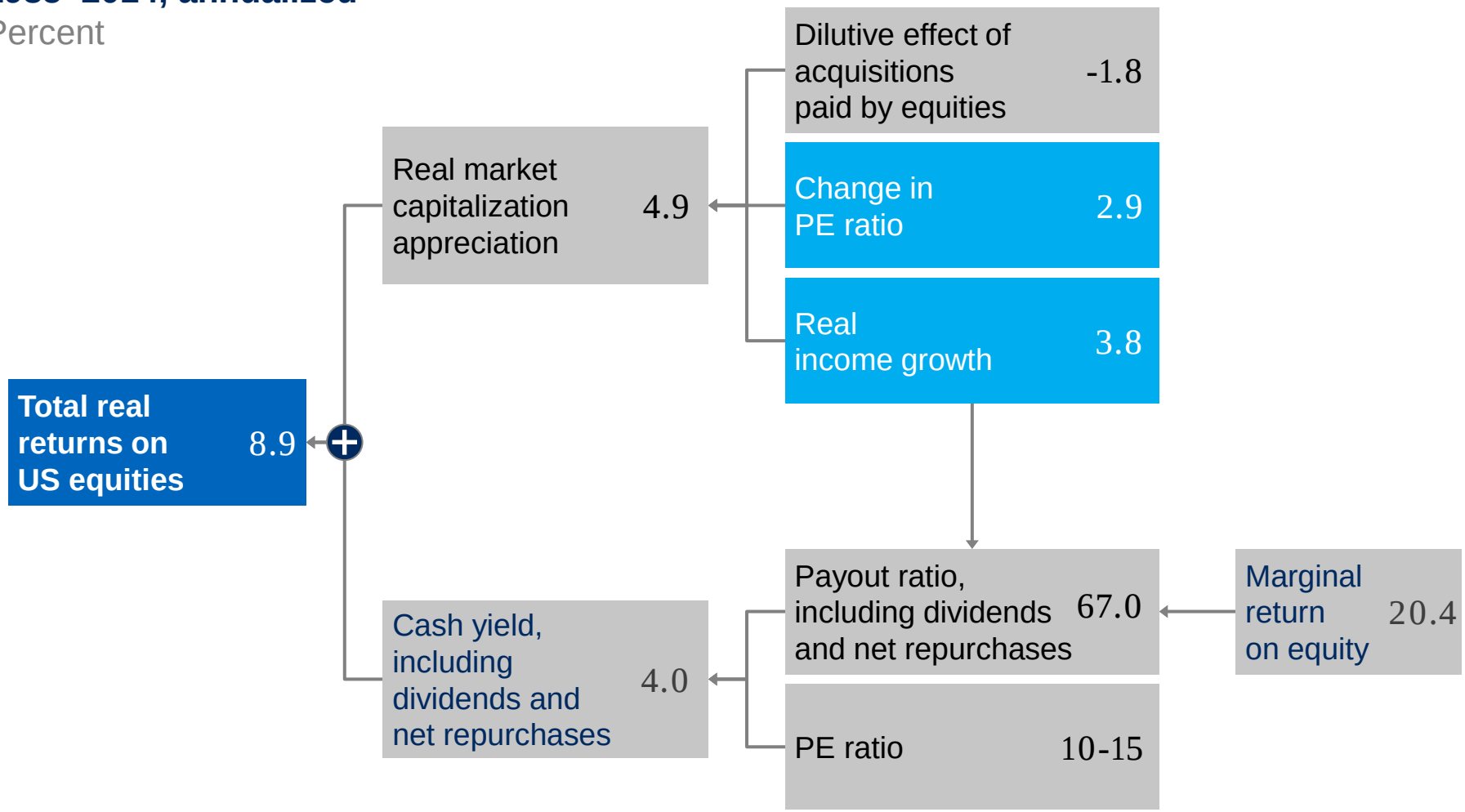
SOURCE: Dimson-Marsh-Staunton Global Returns database; Damodaran database, Stern School of Business, New York University; McKinsey Global Institute analysis

Equity returns linked to real economy drivers

1985–2014, annualized

Percent

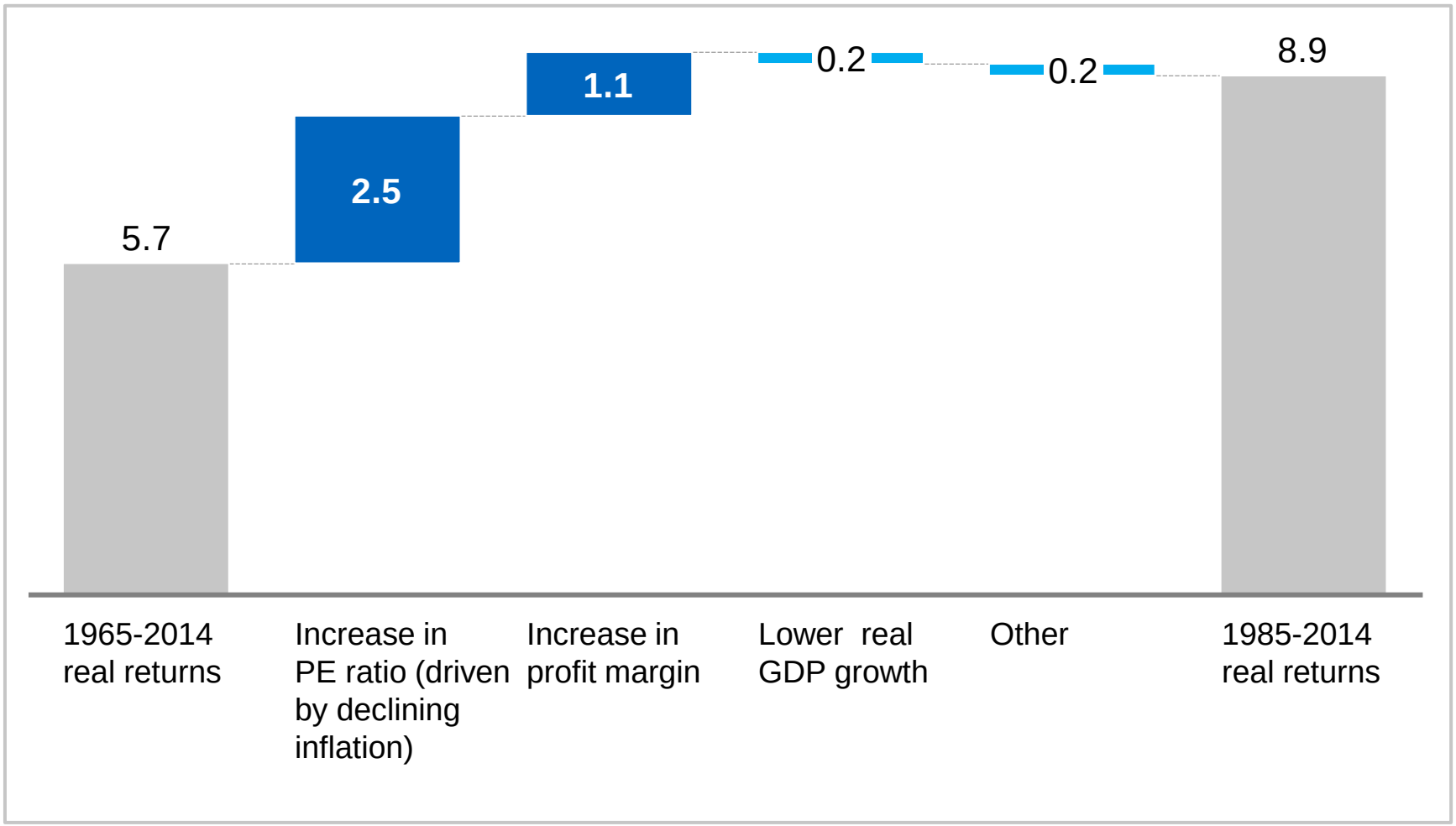
Major difference from last 50 years



SOURCE: McKinsey Corporate Performance Analytics; McKinsey Global Institute analysis

Declining inflation, which increased PE ratios, and increasing margins drove higher equity returns in the United States in the last 30 years

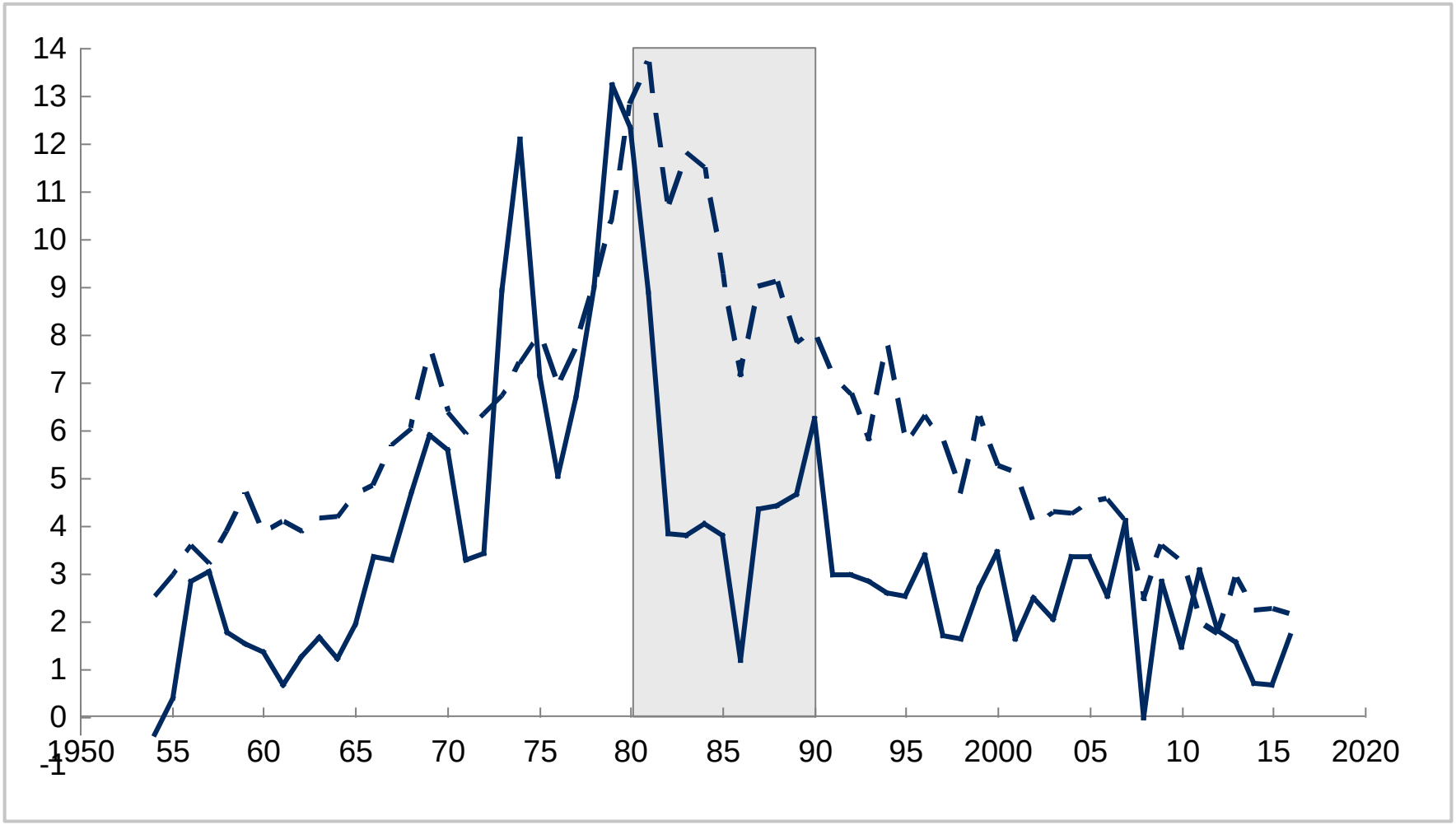
Equity returns, United States
Percent annualized



1980s started with unusually high inflation and interest rates

10-year US Treasury yields and annual inflation

Percent

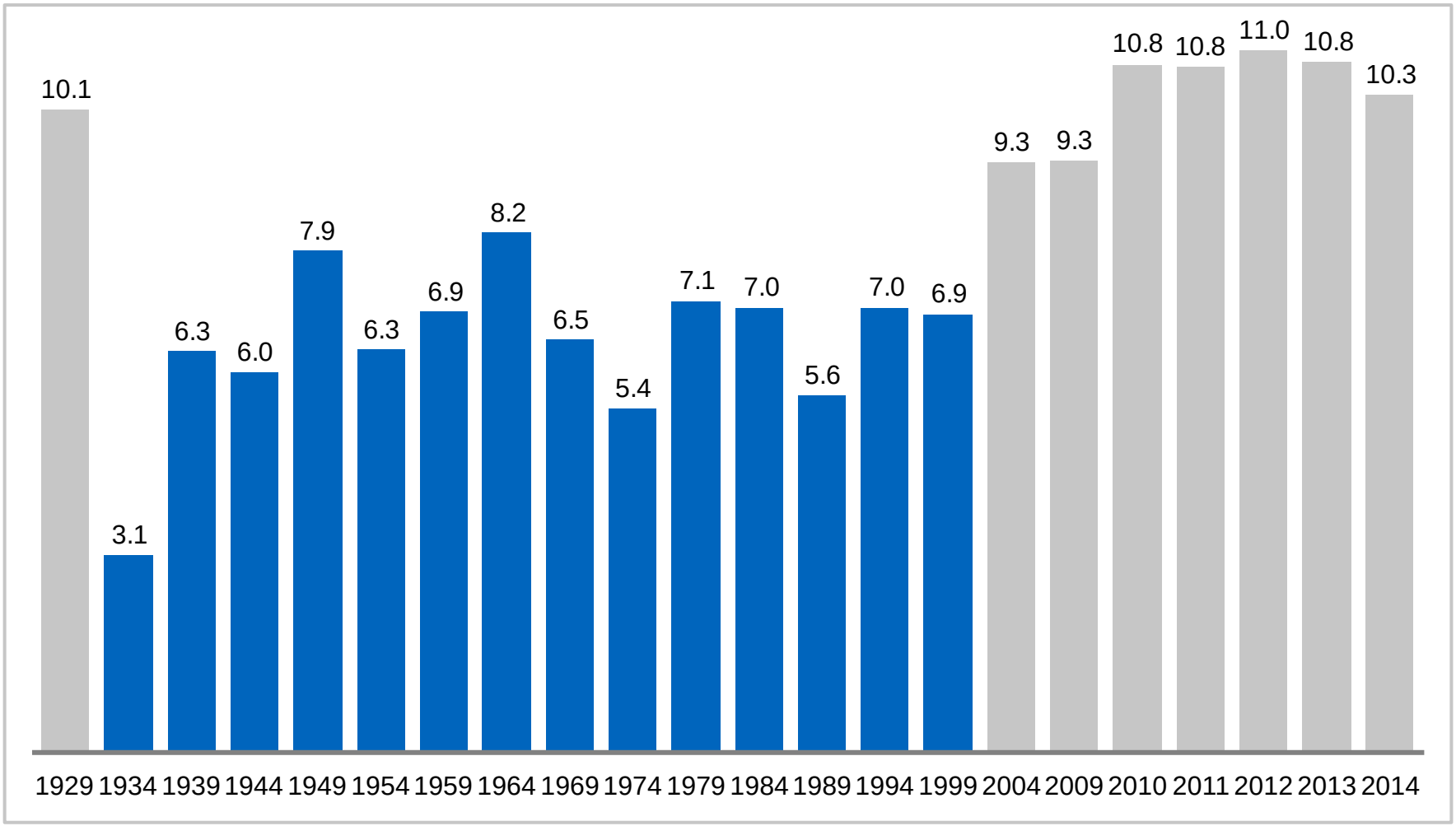


SOURCE: Source

US corporate profits are at their highest level vs. GDP since 1929

US after-tax corporate profits as share of US national income

Percent

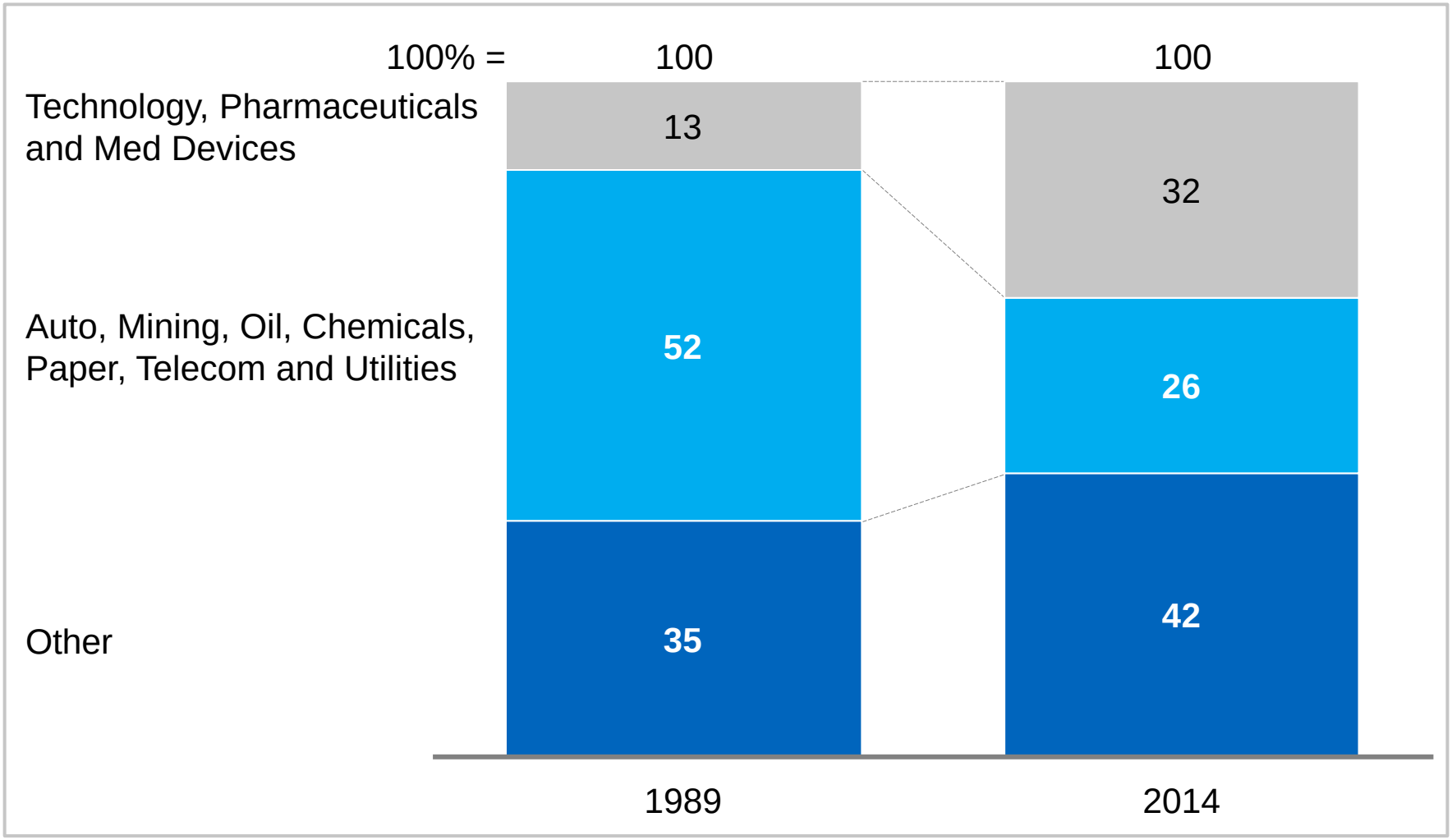


SOURCE: Source

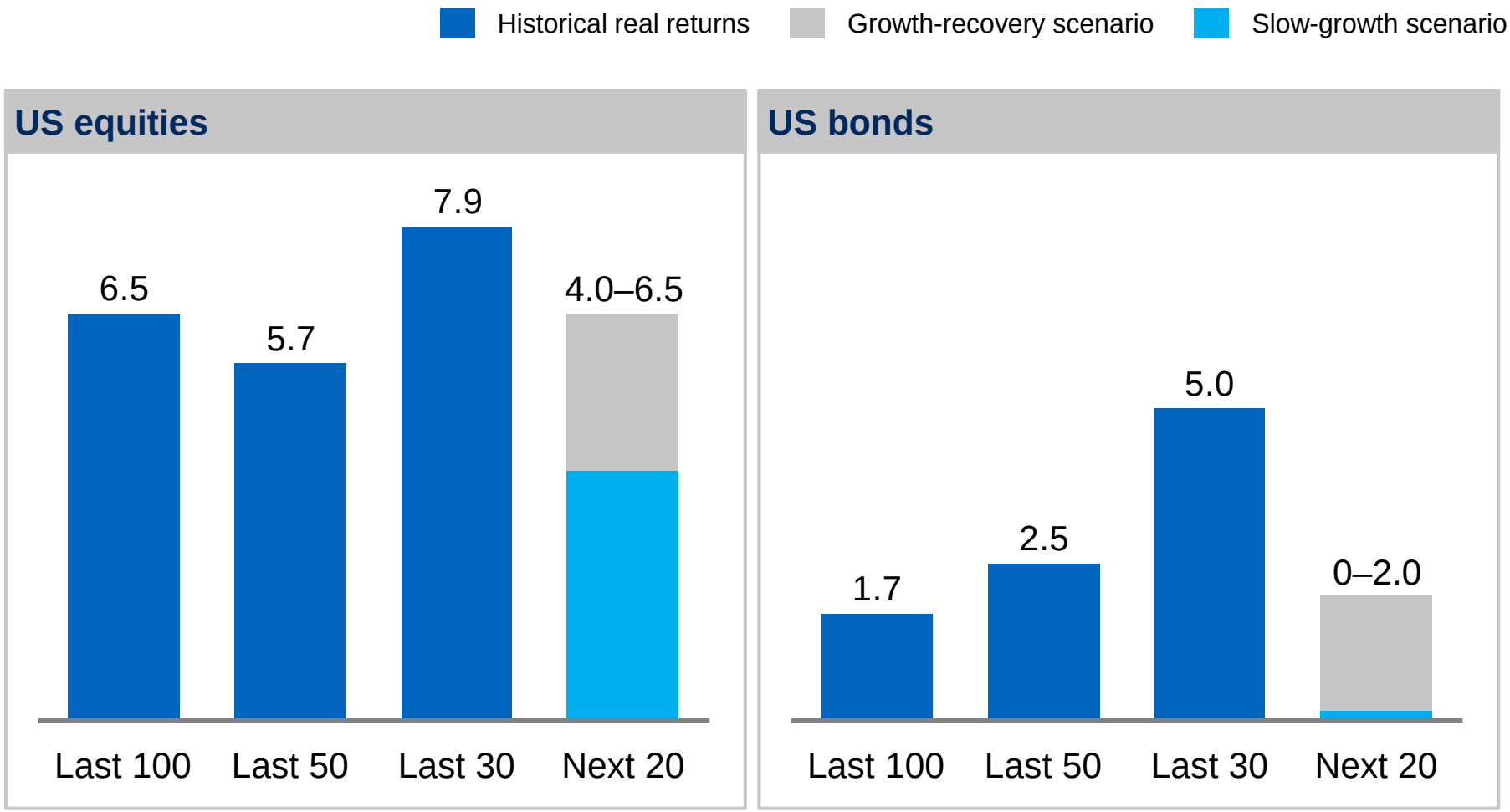
Significant shift in composition of US based companies led to higher profit margins

Share of total profits for US based companies

Percent

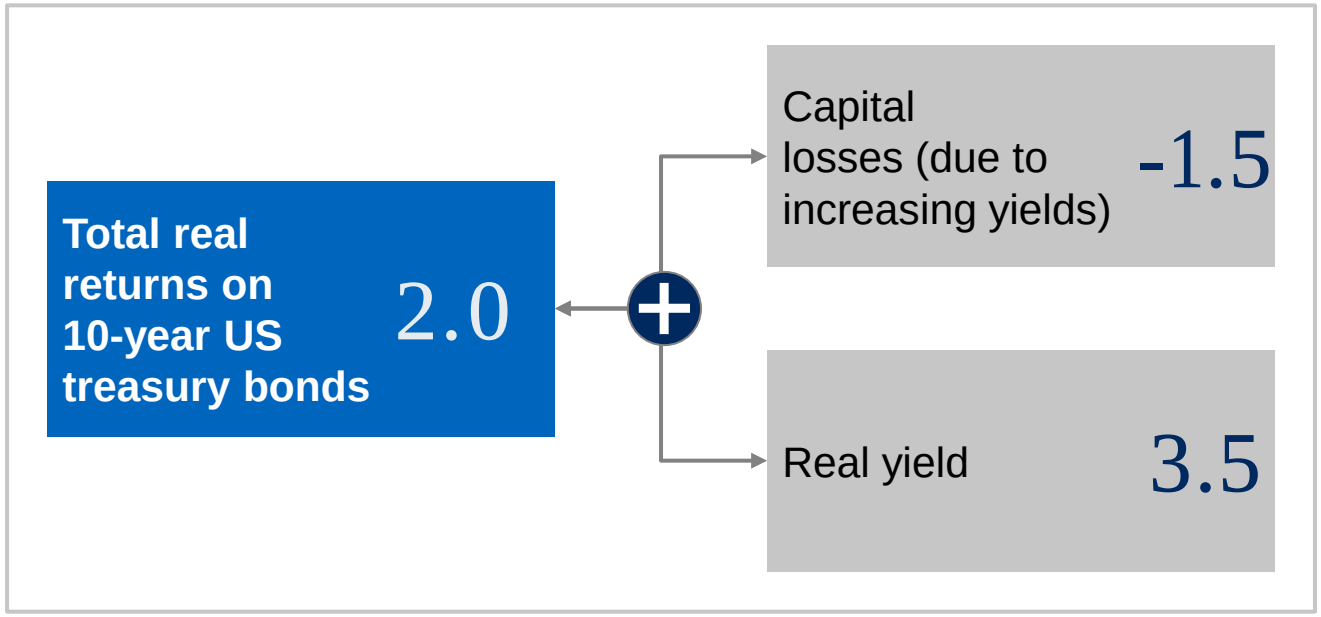


Returns over the next 20 years could be lower than long term averages



Future bond returns depressed by capital losses as interest rates return to typical levels

Potential bond returns next 20 years
Percent



Real economy factors driving future equity returns

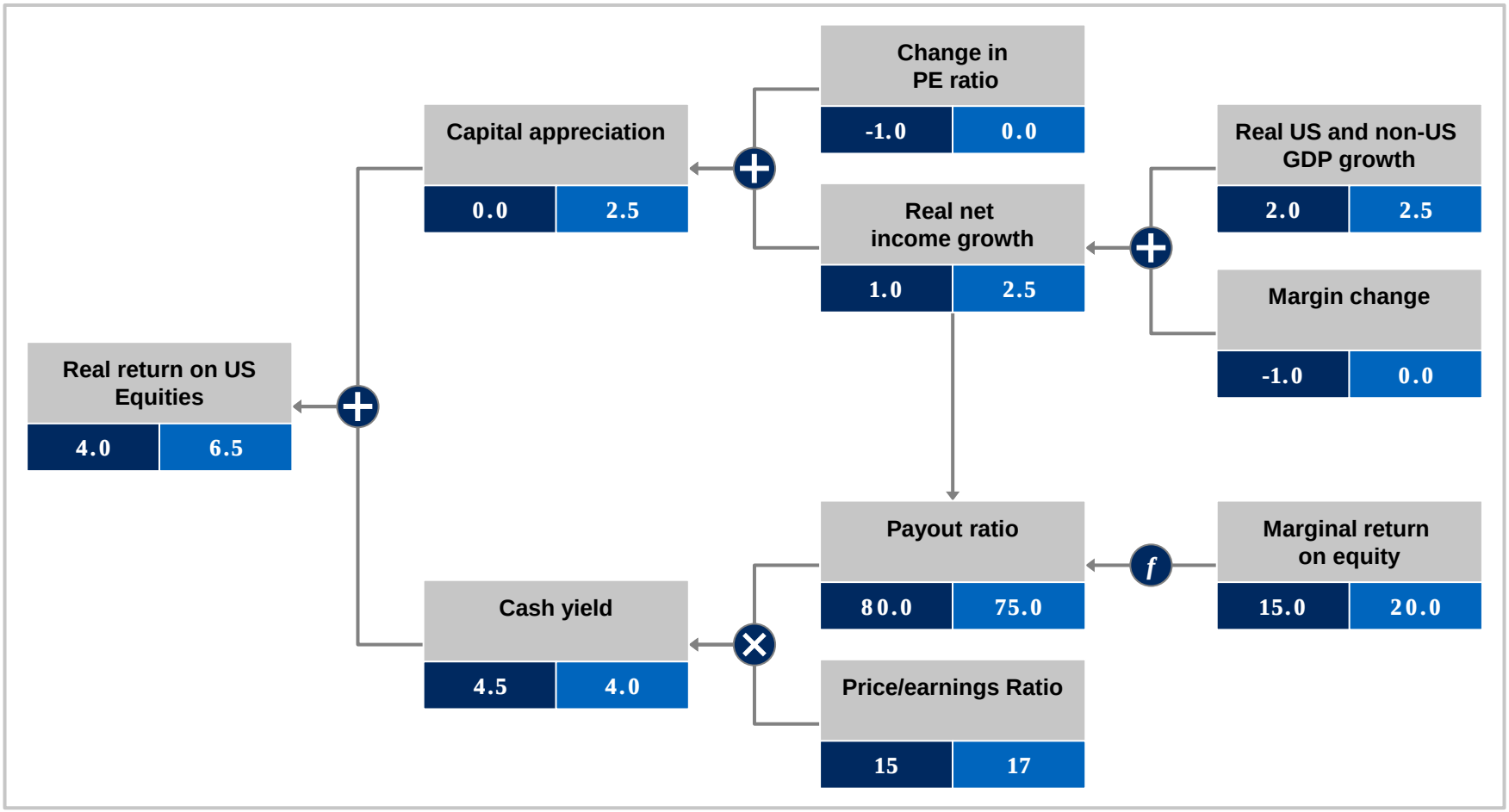
- No increase in P/E ratio
  - Inflation currently low
  - P/E ratios near “normal”
- Slower profit growth
  - Lower workforce growth
  - Lower productivity
  - Margins currently at all-time high
  - Potential pressures on future margins

SOURCE: Source

Scenarios for future US equity returns

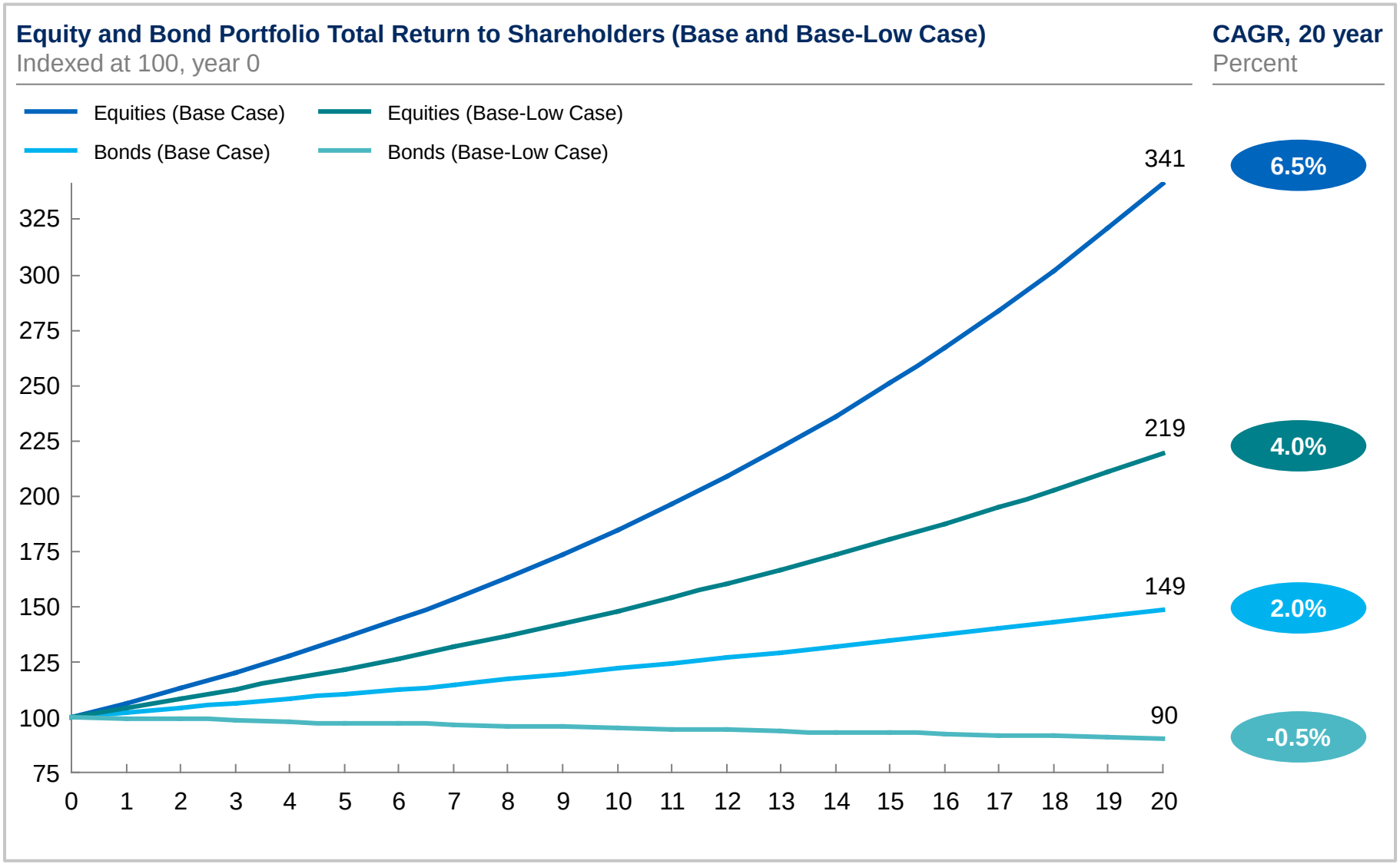
2016–35, annualized

Percent



SOURCE: McKinsey Corporate Performance Analytics; McKinsey Global Institute analysis

Scenario returns

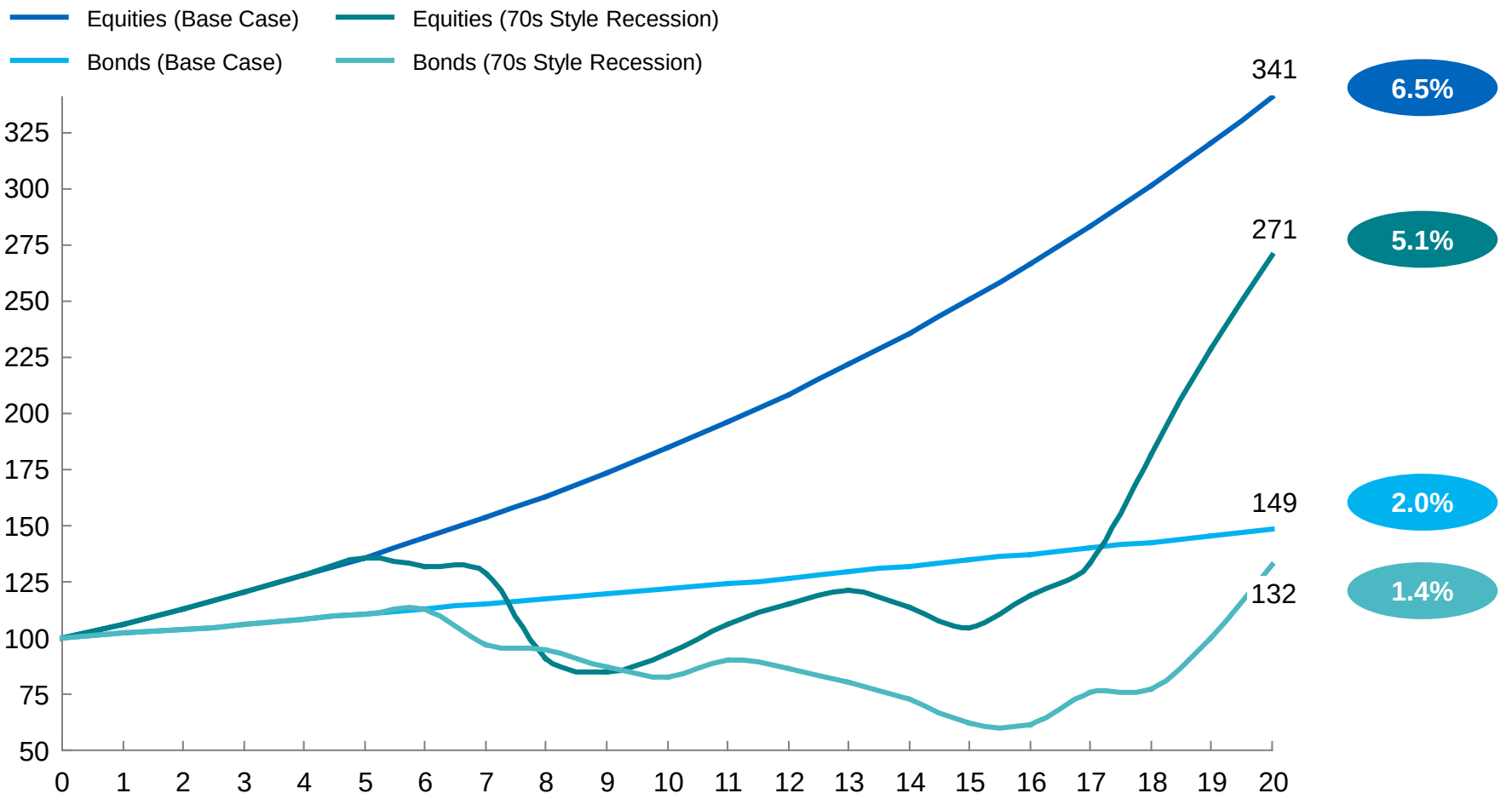


SOURCE: Corporate Performance Analytics, Bureau of Economic Analysis

Total real return on equities higher than bonds even under a 1970's style recession

Equity and Bond Portfolio Total Return to Shareholders (Base Case & 70's Recession)
Indexed at 100, year 0

CAGR, 20 year
Percent

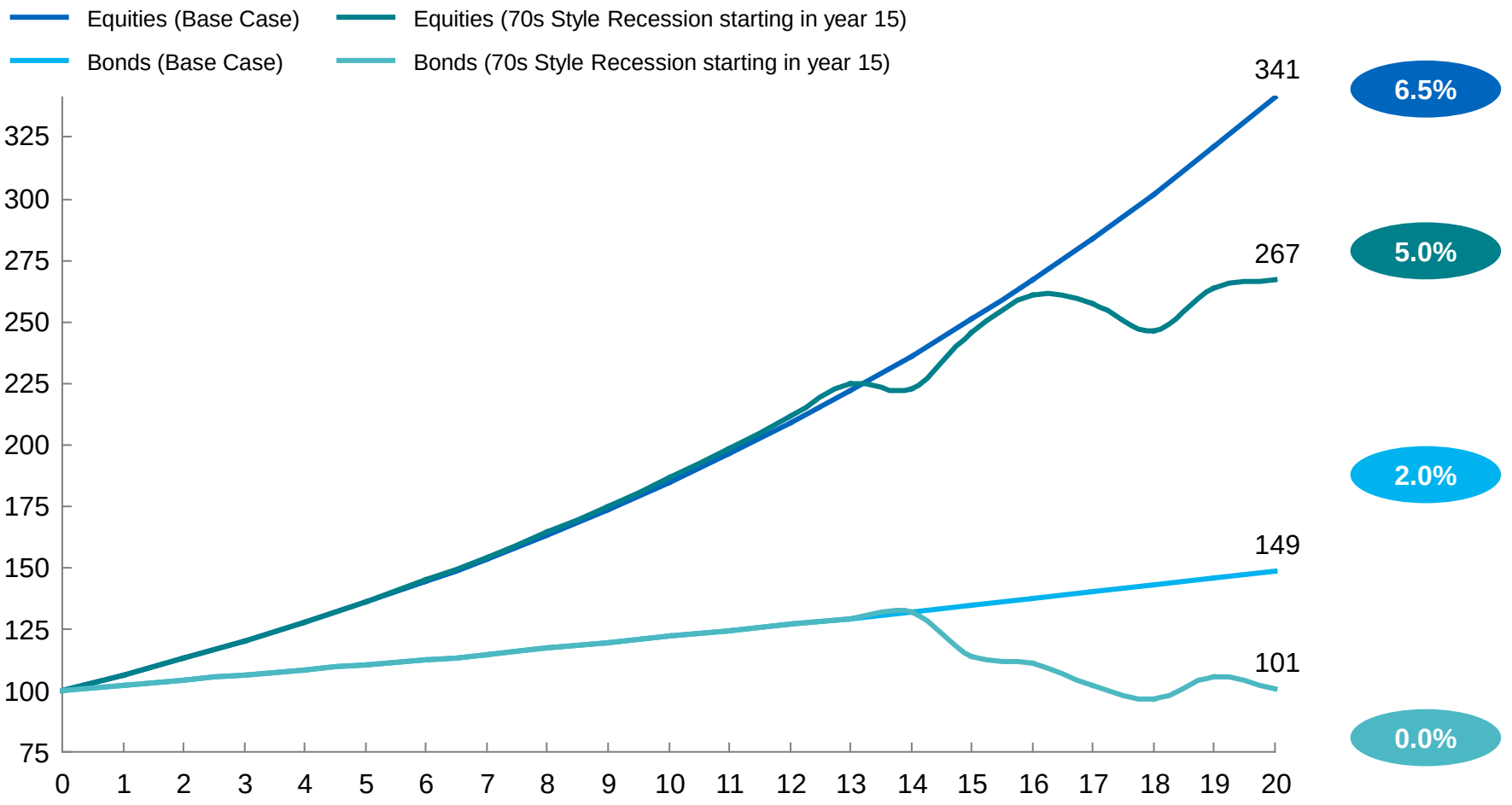


SOURCE: Corporate Performance Analytics, Bureau of Economic Analysis

Delay in 1970s style recession makes equities even more attractive

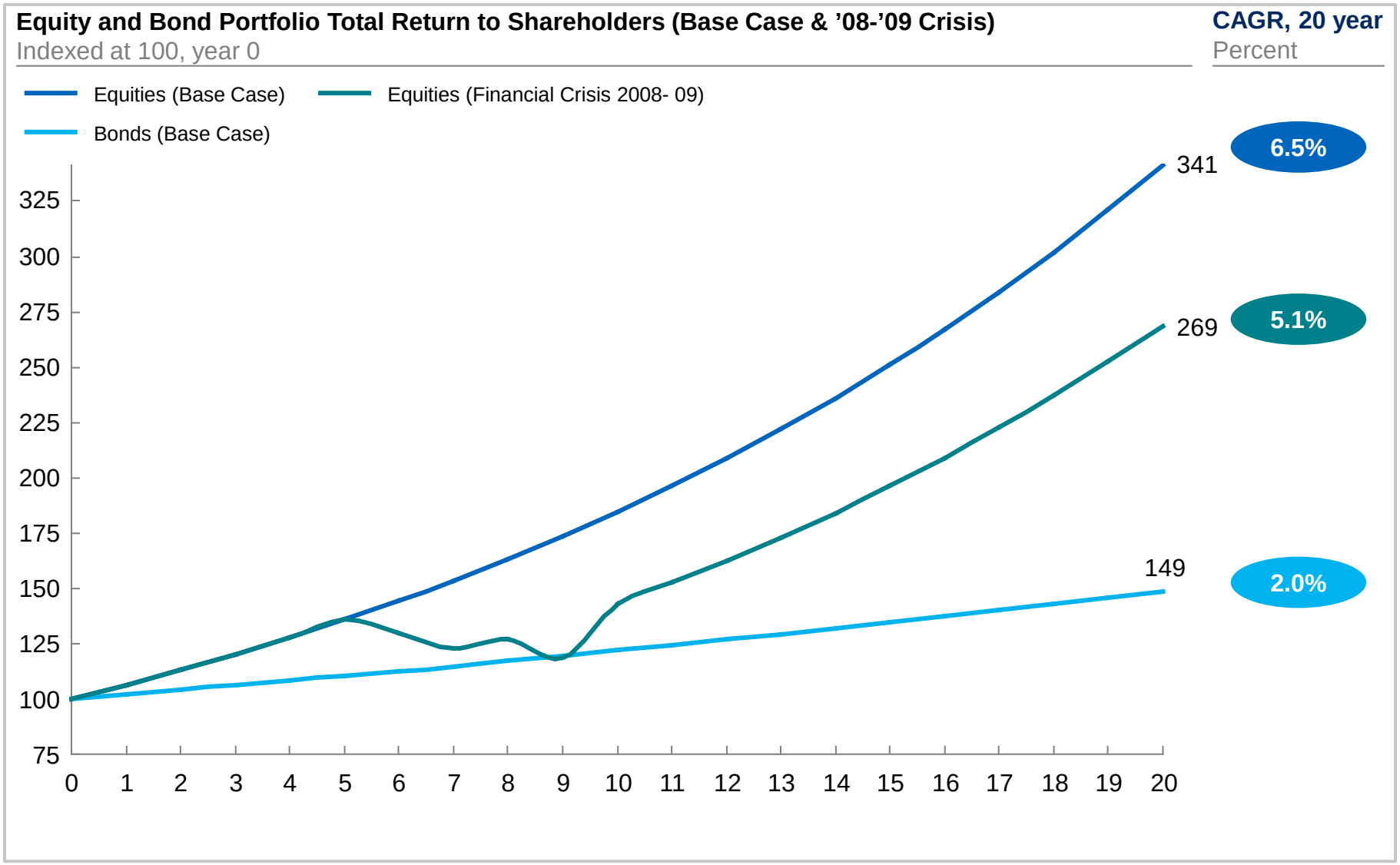
Equity and Bond Portfolio Total Return to Shareholders (Base Case & Delayed 70's Recession)
Indexed at 100, year 0

CAGR, 20 year
Percent



SOURCE: Corporate Performance Analytics, Bureau of Economic Analysis

Under a 2008-2009 financial crisis environment, equity returns remain higher than bond returns



SOURCE: Corporate Performance Analytics, Bureau of Economic Analysis

Summary

- Equity and bond returns driven by “real” economy
- Unique elements driving last 30 years returns are not repeatable (declining inflation/interest rates, increasing profit margins)
- Future long-term real returns could be 4.0 – 6.5% for equities and 0.0 – 2.0% for bonds
- Even under extreme scenarios, equities likely to outperform bonds under most time frames

SOURCE: Source

Financial Planning Standards Council of Canada – April 2024

PROJECTION ASSUMPTION GUIDELINES

Nathalie Bachand, A.S.A., Pl. Fin., Institute of Financial Planning Fellow

Jeff Cormier, CFP®, CFA®

Derek Dedman, M.Sc., CFP®, CFA®

Martin Dupras, A.S.A., Pl. Fin., Institute of Financial Planning Fellow, M. Fisc., ASC

Benjamin Felix, MBA, CFP®, Pl. Fin, CFA®, CIM®

Nick Hearne, CFP®, CFA®

Tanya Staples, M.A., CFP®

Effective April 30, 2024

TABLE OF CONTENTS

Institute of FINANCIAL PLANNING

FP Canada Standards Council®

1. EXECUTIVE SUMMARY

LIFE TAKES PLANNING AND IT STARTS WITH REALISTIC PROJECTIONS

An important facet of the financial planner's work is to make a variety of projections: retirement income needs, insurance needs, children's education funding needs, etc.

To make these projections, financial planners must estimate future inflation and borrowing rates, investment returns, how long the need will exist... In short, they must make assumptions.

This is why the Institute of Financial Planning (the Institute), formerly the Institut québécois de planification financière (IQPF), and FP Canada Standards Council™ jointly publish the Projection Assumption Guidelines: to help financial planners make realistic financial projections. Judicious use of these assumptions should protect both the client and the financial planner.

The Projection Assumption Guidelines (referenced as the "Guidelines" or the "PAG") were first released in 2009. When looking at the actual rates from January 2009 to January 2024, the PAG rates are within the same range, which speaks to the reliability and validity of the PAG projections. A chart is included in the Addendum to show the PAG Results from 2009 and how they have tracked over the years.

HOW TO USE THE GUIDELINES

These Guidelines are intended as a guide and are appropriate for making realistic long-term (10+ years) financial projections. Predicting the direction the economy will take and how financial markets will evolve is a difficult exercise, requiring the integration of a large number of variables and highly sophisticated valuation models.

Financial planners should also develop sensitivity analyses to illustrate and assess the impact of changes in assumptions on client's financial position. This is particularly important when client goals may be at risk.

GUIDING PRINCIPLES FOR ESTABLISHING THE GUIDELINES

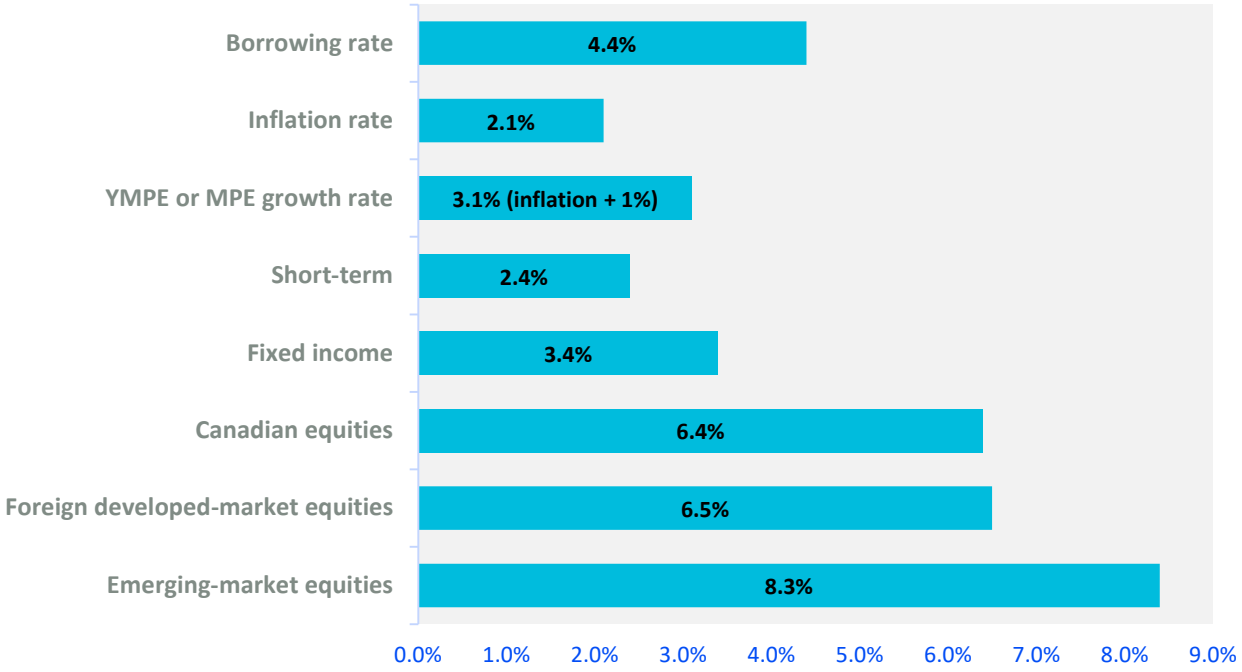
These Guidelines were established using a variety of reliable and publicly available sources, including the actuarial reports for the Quebec Pension Plan and Canada Pension Plan. They do not represent the individual opinion of the members of the Projection Assumption Guidelines Committee, the Institute of Financial Planning or FP Canada Standards Council.

Using numerous sources of data also eliminates the potential bias that may be created by relying on any single source.

The fact that the Quebec Pension Plan and Canada Pension Plan actuarial reports are updated every three years ensures the Guidelines will remain stable.

GUIDELINES FOR 2024

FINANCIAL ASSUMPTIONS (before any administrative and investment management fees)



Note that the administrative and investment management fees paid by clients both for products and advice must be subtracted to obtain the net return.

PROBABILITY OF SURVIVAL TABLE

	10 %	10 %	10 %	15 %	15 %	15 %	20 %	20 %	20 %	25 %	25 %	25 %	30 %	30 %	30 %	35 %	35 %	35 %	40 %	40 %	40 %	45 %	45 %	45 %	50 %	50 %	50 %
Current Age in 2024	M	F	M/F	M	F	M/F	M	F	M/F	M	F	M/F	M	F	M/F	M	F	M/F	M	F	M/F	M	F	M/F	M	F	M/F
20	99	101	102	97	100	101	96	98	100	95	97	99	94	97	98	93	96	98	92	95	97	91	94	96	90	93	96
25	99	101	102	97	99	101	96	98	100	95	97	99	94	96	98	93	95	97	92	95	97	91	94	96	90	93	95
30	99	101	102	97	99	101	96	98	100	95	97	99	94	96	98	93	95	97	92	94	97	91	93	96	90	92	95
35	98	101	102	97	99	100	96	98	99	95	97	99	94	96	98	93	95	97	92	94	96	91	93	96	90	92	95
40	98	100	102	97	99	100	96	98	99	95	97	98	94	96	98	93	95	97	92	94	96	91	93	96	90	92	95
45	98	100	101	97	99	100	95	98	99	94	97	98	93	96	98	92	95	97	91	94	96	90	93	95	89	92	95
50	98	100	101	96	99	100	95	98	99	94	96	98	93	95	97	92	95	97	91	94	96	90	93	95	89	92	95
55	98	100	101	96	99	100	95	97	99	94	96	98	93	95	97	92	94	96	91	93	96	90	92	95	89	91	94
60	98	100	101	96	98	100	95	97	99	94	96	98	93	95	97	92	94	96	91	93	96	90	92	95	89	91	94
65	97	100	101	96	98	100	95	97	99	94	96	98	93	95	97	92	94	96	91	93	96	90	92	95	89	91	94
70	97	100	101	96	98	99	95	97	99	94	96	98	93	95	97	92	94	96	91	93	96	90	92	95	89	91	94
75	97	100	101	96	98	99	95	97	99	94	96	98	93	95	97	92	94	96	91	93	96	90	93	95	90	92	94
80	98	100	101	96	98	100	95	97	99	94	96	98	93	95	97	93	95	96	92	94	96	91	93	95	90	92	95
85	98	100	101	97	99	100	96	98	99	95	97	98	94	96	98	94	95	97	93	95	96	92	94	96	92	93	95
90	99	101	102	98	100	101	97	99	100	97	98	99	96	97	99	95	97	98	95	96	98	94	96	97	94	95	97
95	101	102	103	100	101	102	100	101	102	99	100	101	99	100	101	98	99	100	98	99	100	98	98	100	97	98	99
100	105	105	106	104	104	105	103	104	105	103	103	104	103	103	104	102	103	104	102	102	103	102	102	103	102	102	103

The table used to calculate the probability of survival is the CPM2014 Mortality Table, based on data from both public and private sector pension plans for 1999-2008, taken forward to 2024 using the CPM Improvement Scale B. For years beyond 2014, the same improvement scale was used to establish generational mortality rates. This mortality table and the improvement scale were published by the Canadian Institute of Actuaries in February 2014.

Final Report: Canadian Pensioners' Mortality

2. BACKGROUND

An important facet of the financial planner's work is to make a variety of projections: retirement income needs, insurance needs, children's education funding needs, etc. In making projections, financial planners are bound by method, rather than results. The purpose of this document is to map out the economic and investment assumptions to use in the preparation of these projections.

The Guidelines are intended as a guide and are appropriate for making realistic long-term (10+ years) financial projections that are free from the potential biases of financial planners. Predicting the direction the economy will take and how financial markets will evolve is a difficult exercise, requiring the integration of a large number of variables and highly sophisticated valuation models. To protect themselves and their clients, financial planners are encouraged to rely on these Guidelines.

Financial planners should also develop sensitivity analyses to illustrate and assess the impact of changes in assumptions on clients' financial position. A sensitivity analysis might take the form of a Monte Carlo analysis, scenario testing using an adjusted rate of return or determining a client's minimum required rate of return. This is particularly important when client goals may be at risk.

a) Updating and useful life of the Guidelines

The Guidelines are updated annually. Although some of the assumptions set out in these Guidelines may change from time to time, this does not mean that projections based on previously published assumptions are no longer valid. The projections are considered valid at the time of preparation.

b) Use of the Guidelines

Given the Guideline's objectivity and basis in reliable sources, their use is strongly encouraged to promote trust and confidence in the financial planner's projections.

That said, a financial planner is in the best position to understand their clients' unique circumstances. Because every client situation is different, assumptions that vary from the Guidelines may be used, but should be documented.

Assumptions may also differ from the Guidelines based on local market conditions. As an example, projections of education costs, which tend to be impacted by local market differences, may justify using an inflation rate that differs from the Guidelines. Projections of salary increases may also justify an inflation rate that differs from the Guidelines, where clients give good reason for the change.

c) Compliance with the Guidelines

In all cases, assumptions used should be documented, with sound rationale, and clearly communicated to clients together with a written explanation. The use of the Guidelines can be disclosed using a statement such as the following:

- Projection prepared using the Institute of Financial Planning and FP Canada Standards Council™ *Projection Assumption Guidelines*.
- Analysis prepared using the Institute of Financial Planning and FP Canada Standards Council™ *Projection Assumption Guidelines*.

- Study prepared using the Institute of Financial Planning and FP Canada Standards Council™ *Projection Assumption Guidelines*.
- Calculation made using the Institute of Financial Planning and FP Canada Standards Council™ *Projection Assumption Guidelines*.

d) Deviation margins

Where appropriate, financial planners may deviate within plus or minus 0.5% from the rate of return assumptions and continue to be in compliance with the Guidelines.

In making a judgement call around whether to deviate 0.5% up or down, financial planners may consider the following factors:

- The impact of a variation in return on the expected lifestyle of clients. As an example, it would not be prudent to increase return assumptions to "force" a projection that secures a client's goal.
- The propensity of clients to buy high and sell low, thereby reducing their long-term rates of return. Where the propensity is high, one may consider reducing the expected rate of return on their portfolio.[1]

  The degree to which clients rely on professional financial advice in managing their investment portfolio, including regular rebalancing of their portfolio, which may increase their long-term rates of return.[2]

Any deviation in excess of 0.5% in either direction of the guidelines should be reasonable and supportable and be documented with a written explanation.

It is not unusual for significant fluctuations to occur in the market over a short period of time. For example, a financial planner may be preparing a financial plan at a point in time following a marked increase in the stock market, or planning may occur following a major decline in the stock market. Movements and fluctuations can also be seen in the release of Consumer Price Index results, such as a negative rate in May 2020 on a year over year basis and then a rate of 6.3% in December 2022 year over year. These historic fluctuations are shown in the CPI Results chart provided in the Addendum. In looking at a two-year rolling average, 74% of the time the inflation rate was at 3% or lower. As of December 2023, CPI has averaged 3.48% over the last five years and 2.58% over the last 10 years.

Based on the current economic conditions, financial planners may be tempted to drastically change just one assumption, such as increasing inflation to 4% for the entire retirement planning projection. By revising only the rate for inflation, the financial planner ignores the correlation that exists between inflation and interest rates and the cited asset classes. If inflation remains high, interest rates would typically go up, as would the return on equities over the long term. We recommend that financial planners use the projected economic assumptions as a whole and avoid attempting to personalize a forecast for the client by making a significant adjustment to a single variable. Presenting alternate scenarios and projections to the client may be a better approach.

---

[1] DALBAR. (2021). Reprinted from 2017. DALBAR QAIB: Investors are Still Their Own Worst Enemies [Press release]. Retrieved from https://www.ifa.com/articles/dalbar_2016_qaib_investors_still_their_worst_enemy/https://globenewswire.com/news-.

[2] Masters, S. J. (2003). Rebalancing. *The Journal of Portfolio Management*,*29*(3), 52-57.

In summary, for projections with a time frame of 10-plus years, it is recommended that the inflation rate calculated and provided in the Projection Assumption Guidelines be used. Adjusting or increasing the inflation rate to reflect the current economic data is not advised primarily for two reasons. First, the current experience of rapidly rising inflation is unlikely to continue over a longer-term time frame of 10-plus years. This rationale is supported by the CPI Rates chart provided in the Addendum. Second, increasing just the one data point, such as inflation, ignores the corresponding movements that would likely occur with interest rates, fixed income and equity-based assets.

e) Effective date of the Guidelines

The Guidelines for 2024 are effective as of April 30, 2024.

3. CONSIDERATIONS FOR ESTABLISHING THE GUIDELINES

a) Use of external sources

The Guidelines were established using a variety of reliable and publicly available data sources. They do not represent the individual opinions of the members of the Projection Assumption Guideline Committee, the Institute of Financial Planning or FP Canada Standards Council.

Using numerous sources of data also eliminates the potential bias that may be created by relying on any single source.

The **Addendum to the *2024 Projection Assumption Guidelines*** provides links to sources, data and calculations used in the development of the Guidelines. The Addendum is provided for transparency and replicability of the Guidelines by financial planners and firms.

Note that FP Canada Standards Council and the Institute of Financial Planning distributed a long-term expectations survey to source data used in the Guidelines. In the fall of 2023, the survey was sent to industry firms. The source data points from the survey are detailed in the Addendum. FP Canada and the Institute of Financial Planning thank all participants, including Aon, BMO Gam, Canada Life Assurance Company, CIBC, Guardian Capital, IG Wealth Management, Louisbourg, Normandin Beaudry, PWL Capital Inc., as well as all other contributors.

The Guidelines were prepared using geometric mean (GM) assumptions. For the purposes of Monte Carlo analysis, a conversion needs to be done from geometric to arithmetic mean (AM) assumptions. With this conversion of the GM assumptions from the Guidelines, the financial planner will need to identify an expected standard deviation. This conversion is applicable when the volatility is higher, as often seen with equity holdings. Since the Guidelines have adjusted the equity assumptions by 0.5 %, this adjustment needs to be added back to calculate the AM. Once the financial planner has identified a realistic standard deviation (σ), the following formula could be applied to arrive at the AM estimate:

For equities: AM (est) = GM from the Guidelines + 0.5 % + $\sigma^2/2$

For other assets: AM (est) = GM from the Guidelines + $\sigma^2/2$

b) Aim of stability

The fact that the Quebec Pension Plan (QPP) and Canada Pension Plan (CPP) actuarial reports are updated every three years ensures the Guidelines will remain stable.

As well, to ensure stability from year to year and more closely reflect the underlying data, the Guidelines will continue to be rounded to the nearest 0.1%,[3] as has been done since 2015 when the methodology was changed from rounding to the nearest 0.25%.

c) Incorporation of market based expected returns

While stability is an important consideration in setting the Guidelines, significant changes in expected returns may occur from year to year. To account for this, as of 2024, the market based expected returns reflected in asset prices are included in the Guidelines. Asset class yields have historically varied in their ability to predict future asset class returns. Fixed income yields have historically been strongly predictive of 10+ year fixed income returns, Shiller earnings yields, which is the ratio of 10-year smoothed real earnings to market prices, have been moderately predictive of 10+ year future equity returns, and cash yields have had low predictive power over future cash returns. This information is reflected in the Guidelines with the inclusion of a market based expected return figure in the calculation of fixed income and equity expected returns. Due to the stronger observed predictive power in fixed income, a 40% weight has been assigned to the market based expected return for this asset class. A market based expected return has not been included in the calculation for cash.

d) Limitations

The Guidelines cover the main asset classes—short-term assets, fixed income, Canadian domestic equities, foreign developed-market equities (including U.S. equities and Europe, Australia and Far East equities) and foreign emerging-market equities.

Guidelines are not provided for other asset classes, including global bonds, U.S. equities, small-capitalization equities, and value and growth equities, because these asset classes are not addressed in the CPP and QPP actuarial valuation reports. The guideline for foreign developed-market equities may be used as a proxy for U.S. equities.

Similarly, guidelines are not provided for changes in the real estate market, for the following reasons:

- Separate guidelines would be required for residential, commercial and industrial buildings.
- A regional index would be necessary (as the real estate market behaves differently in, for example, Halifax, Montréal, Toronto and Vancouver).

When making assumptions around real estate growth, it is important to consider an appropriate starting valuation for the property and to use an inflation-based assumption that is suitable based on the local market context.

---

[3] By rounding to the nearest .25%, a 3.10% result would generate a guideline of 3.00%, while a result of 3.15% would generate a result of 3.25%. By rounding to the nearest .1%, a 3.10% result would maintain the guideline of 3.10%, while a result of 3.15% would generate a guideline of 3.20%.

Guidelines are not provided for exchange rates, since the net long-term effect of changes in exchange rates is generally nil. Financial planners should develop sensitivity analysis to illustrate and assess the potential ramifications of changes in exchange rates. Clients who may require income in a foreign currency may wish to maintain assets in that foreign currency to avoid foreign exchange-rate risk.

It is also important to note that the Guidelines do not contemplate personal risk profiles. Since an individual's risk profile or change in risk profile may have consequences at least as significant as, or more significant than, the rate of return guidelines used in developing financial projections, sound personal risk assessments are critical.

e) Standard deviation

The Addendum provides historical data on standard deviation for information purposes. No guideline is provided on standard deviation for each asset class. For future standard deviation expectations, the CPP actuarial report provides tables for different portfolios with expected rates of return and standard deviation. Financial planners who run Monte Carlo analyses may add back the 0.50%[4] on the equity portion of the portfolio and make the conversion from geometric to arithmetic means using the expected standard deviation.

4. ASSUMPTIONS SUBJECT TO THE GUIDELINES

Two types of assumptions are subject to guidelines:

- financial assumptions (inflation, changes in the year's maximum pensionable earnings [YMPE or MPE], long-term returns on short-term investments, fixed income, Canadian domestic equities, foreign developed-market equities and foreign emerging-market equities and borrowing rates), and
- demographic assumptions (life expectancy).

a) Inflation

The inflation assumption is central to the preparation of medium- and long-term projections. The inflation assumption is made by combining the inflation assumptions from the following sources (each weighted at 25%):

- the average of the inflation assumptions for 30 years (2024 to 2053) used in the most recent QPP actuarial report[5]
- the average of the inflation assumptions for 30 years (2026 to 2055) used in the most recent CPP actuarial report[6]
- the results of the 2023 FP Canada/Institute of Financial Planning survey. The reduced average was used where the highest and lowest value were removed.
- the current Bank of Canada target inflation rate

---

4 Dupras, M. (2004, November). Retraite et Monte Carlo. *La Cible, 12*(4), 6-8.=

5 December 31, 2021 QPP actuarial report, published December 2022.

6 December 31, 2021 CPP actuarial report, published November 2022.

The result of this calculation is rounded to the nearest 0.10%.

A discussion was held about the use of separate inflation rates for older individuals or high earners. Two studies by Radu Chiru of Statistics Canada[7] demonstrate that there are small differences in inflation for these two groups of Canadians as compared to the Canadian population as a whole, but these differences are not deemed to be material.

Wage increases

The inflation assumption can be used to project wage increases by adding 1.00% to reflect productivity gains, merit and advancement.[8]

It may be appropriate to deviate from the Guidelines where a client reasonably expects higher or lower wage increases for the foreseeable future. As an example, where a client is reaching the end of his or her career or is in a position with no real chance of advancement, the financial planner may consider a wage increase equal to or less than inflation.

i. Year's maximum pensionable earnings (YMPE or MPE)

The year's maximum pensionable earnings (YMPE) is based on average increases in salaries. Therefore, the inflation assumption plus 1.00% should be used.

b) Nominal returns (before fees)

Rate of return assumptions have been established for short-term investments (91-day T-bills), fixedincome, Canadian domestic equities, foreign developed-market equities and foreign emerging-market equities. These assumptions represent gross nominal returns (including inflation).

The guidelines for short-term investments were set by combining assumptions from the following sources (each weighted at 33%):

- the average of the assumptions for 30 years (2023 to 2052) used in the most recent QPP actuarial report
- the average of the assumptions for 30 years (2035 to 2064) used in the most recent CPP actuarial report
- the results of the 2023 FP Canada/Institute of Financial Planning survey. The reduced average was used where the highest and lowest value were removed.

Note that for both the short-term and fixed income assumptions, the 50-year historical average rate was removed in 2020 as a data source in determining these assumptions. The decision was made to review the validity of this portion of the assumption calculation given its position as a significant outlier for both the short-term and fixed income calculation inputs. It is viewed that these historical variables may so significantly depart from future expectations that they should not be used in the current environment.

---

[7] Is Inflation Higher for Seniors? (2005) Catalogue no. 11-621-MWE2005027 and Does Inflation Vary with Income? (2005) Catalogue no. 11-621- MWE2005030.

[8] In the most recent CPP and QPP actuarial reports, a final margin of 0.9% between wage increases and inflation was applied in the CPP report and 0.8% was used in the QPP report

The guidelines for fixed income investments were set by combining assumptions from the following sources (using a 20% weight for each of the QPP, CPP and FP Canada/the Institute of Financial Planning Survey sources and a 40% weight for the YTM of the Canada Total Market Bond Index):

- the average of the assumptions for 30 years (2023 to 2052) used in the most recent QPP actuarial report
- the average of the assumptions for 30 years (2035 to 2064) used in the most recent CPP actuarial report
- the results of the 2022 FP Canada/ Institute of Financial Planning survey. The reduced average was used where the highest and lowest value were removed.
- the yield to maturity (YTM) of the Canada Total Market Bond Index

The guidelines for equity assets were set by combining assumptions from the following sources (each weighted at 20%):

- the average of the assumptions for 30 years (2023 to 2052) used in the most recent QPP actuarial report
- the average of the assumptions for 30 years (2026 to 2055) used in the most recent CPP actuarial report
- the results of the 2023 FP Canada/Institute of Financial Planning survey. The reduced average was used where the highest and lowest value were removed.
- the historic returns over the 50 years ending the previous December 31st (adjusted for inflation)
- the Shiller earnings yield

The historical component used is based on the S&P/TSX (Canadian equities) Index, the S&P 500 Composite Index (U.S. equities), the MSCI EAFE (Europe, Australia, Far East) Index and the MSCI Emerging Markets Index.

For the sake of consistency, the afore-mentioned indices, expressed in real returns (returns reduced by the total CPI inflation index as published by Statistics Canada), are increased by the future inflation assumption (before rounding).

The following considerations are also of note:

i. Short-term

The guideline of 2.4% for short-term investments represents a long-term assumption for short-term returns. As an example, consider the long-term return for a mutual fund holding 5.0% of its assets in short-term investments. Over the long term, these assets would be expected to generate an annual return equal to 2.4%.

For shorter-term financial projections (less than 10 years), financial planners may use actual rates of return on fixed-term investments held to maturity.

ii. Fixed income

The fixed income assumptions used in the most recent QPP and CPP actuarial reports have been adjusted to account for the opportunity of the QPP and CPP to buy and hold fixed income for significantly longer than the typical holding period of individuals. A margin of 0.75% is therefore deducted from the QPP and CPP actuarial assumptions to convert the long-term fixed income assumptions into a more relevant fixed income assumption for individual financial planning. The

projected fixed income rate of return can also be applied to preferred share holdings. Please note that this is not an opinion regarding the volatility of preferred shares versus fixed income and that preferred shares can have different characteristics that can impact their pricing.

iii. Canadian domestic equities

For investments in Canadian domestic equities, a safety margin of 0.50%.[9] is deducted from the result obtained by weighting the different data sources to compensate for the variability of the long-term returns. The adjustment aligns with the outcome of a Monte Carlo analysis that approximates the probability of future Canadian equity returns by running 300,000 trial runs, called simulations.

iv. Foreign developed-market equities and Foreign emerging-market equities

Foreign equities consist of U.S., Europe, Australia, Far East and foreign emerging-market equities. As done with the projected return for Canadian equities, a safety margin of 0.50% is deducted from the result obtained by weighting the different data sources to compensate for the variability of the long-term returns.

The projected rate for foreign developed-market equities can be used as a proxy for U.S. equities. No separate guideline is provided for U.S. equities, for the following reasons:

- CPP and QPP do not distinguish U.S. equities from foreign developed-market equities in their reports, however the reports indicate that U.S. equities are a part of their investment portfolio.
- The result of the 2023 FP Canada/Institute of Financial Planning survey is used. The reduced average was used where the highest and lowest value were removed. The value used is the average between MSCI EAFE Index and S&P 500 US Index.

Note, however, the historical returns used to develop the guideline for foreign developed-market equities include the MSCI EAFE Index Foreign Equities (Developed) and the S&P 500 Composite Index for U.S. equities on a 50/50 basis.

v. Type of equity return

In a non-registered investment account, projections must take account of income taxes. For significant sums, it might be appropriate to divide the return into two categories: dividends and capital gains. Historically, 25% to 50% of overall equity returns have been made up of dividends. It therefore seems reasonable to assume that 33% of the overall equity return will be made up of dividends and that the rest will be capital gains.[10]

---

9 Dupras, M. (2004, November). Retraite et Monte Carlo. *La Cible*, *12*(4), 6-8.

10 Projection Assumption Guidelines Committee analysis completed using the S&P/TSX total return index.

vi. Equity risk premiums

Since risk-taking must be rewarded, equity returns are developed by adding an equity risk premium to the long-term bond returns. Historical equity risk premiums have decreased over time due to several non-repeatable factors (mainly diversification and globalization) and are similar for Canadian and foreign-developed markets at 3.0% and 3.1% respectively. The equity risk premium for foreign emerging-market equities is expected to be higher than for developed-market equities, reflecting the additional risk inherent with investments in countries with emerging financial markets. It is important to note that the world economy has become increasingly financially integrated. Countries, financial institutions and businesses have become increasingly large, with a more sophisticated and interconnected range of activities. When one country experiences a financial crisis, it quickly propagates among others.

The removal of the 50-year historical average rate of the fixed income index, which was adopted in the 2020 Projection Assumption Guidelines, resulted in a projected return drop of 1% in this asset class. The primary reason for this adjustment and resulting lower rate was to avoid using too high of an expectation for clients who are fundamentally conservative investors. In doing so, with no similar adjustment to equities, the risk premium (Canadian equities minus fixed income) has jumped from an average of 2.4% (2009-2019) to 3.3% (2021-2023).

vii. Blend of forecasting and backcasting

The Guidelines consider both expected future economic behaviour based on assumptions provided in the QPP and CPP actuarial analyses, the 2023 FP Canada/Institute of Financial Planning survey, and the current earnings yield, as well as historical market performance. Projecting the future by relying solely on historical returns would suggest an expectation that the future will mirror the past, which is not always a reasonable expectation. Stock and bond returns can be decomposed into expected and unexpected components. The expected component reflects the discount rate, or the price of risk for holding risky assets, and the unexpected component materializes as valuations change over time. Looking only at historical returns, which reflect both expected and unexpected returns, may lead to biased estimates of expected returns. For example, a recent run-up in stock prices caused by increasing valuations will push historical returns up and expected returns down. This makes the historical return in the example an upward biased estimate of the expected return. A similar effect will be observed in the opposite direction after a falling market. For these reasons, a combination of forward-looking and backward-looking expected return estimates is likely to produce a more useful result.[11],[12],[13]

c) Considerations concerning fees[14]

The investment management fees paid by clients must be subtracted to obtain the net return. Depending on the type of asset management clients use (mutual funds, pooled funds, advisor-managed account, etc.), these fees typically range from 0.5% to 2.5%. When a client's portfolio is made up of a wide variety of mutual funds with different management expense ratios, an average fee ratio per asset

---

[11] Dimson, E., Marsh, P., & Staunton, M. (2006). The worldwide equity premium: A smaller puzzle. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.891620

[12] Fama, E. F., & French, K. R. (2002). The equity premium. *The Journal of Finance*, *57*(2), 637–659. https://doi.org/10.1111/1540-6261.00437

[13] Ilmanen, A. (2022). *Investing amid low expected returns: Making the most when markets offer the least*. John Wiley & Sons.

[14] Lussier, J. (2013). *Successful Investing Is a Process: Structuring Efficient Portfolios for Outperformance*. New Jersey: John Wiley & Sons.

class may be used. All fees, whether paid directly or indirectly, that impact potential returns must be considered in the calculation.[15] Transparency around fees is important, in terms of the amount of fees charged (direct or indirect), the impact of fees on investment performance and the value the financial planner brings to the planning engagement.

d) Borrowing rate

A great number of factors influence a client's borrowing rate, such as the type of loan and the client's credit history. However, consider the following relationships:

- There is a very strong correlation between the target overnight rate and the 91-day T-bill rate.
- The bank rate is set by adding 0.25% to the target overnight rate.
- The prime rate is set by adding 1.75% to the bank rate.

For an individual with an average credit rating, the borrowing rate assumption is equal to the return assumption for 91-day T-bills (short-term rate) plus 2.00%. While borrowing rates in Canada experienced steady increases from March 2022 to July 2023, the Guidelines are forward-looking and reflect expectations over the longer term. Primarily, the borrowing rate assumption was provided to help illustrate the potential impact of a borrowing to invest strategy over the long term. Borrowing rates can change and this change needs to be appropriately accounted for in projections. It is prudent professional practice to consider the potential for borrowing rates to increase for purposes of assessing the relative benefits and risks associated with leveraging. It is also sensible to use a long-term borrowing rate assumption when projecting the impact of debt on a client's financial position over the longer term. Actual borrowing costs may be more logically used for short-term projections. Borrowing to invest in fixed income could be at a loss if a lower interest rate is earned on the capital and a higher interest rate is paid on the loan, resulting in a negative return.

e) Life expectancy

There are several different mortality tables, each based on a specific target group. The following factors are examples of target group characteristics:

- gender
- smoker or non-smoker status
- place of residence (e.g., province, country)
- evidence of good health (for life insurance pricing)
- wealth[16]
- being retired

The 2014 Canadian Pensioners' Mortality Table[17], projected to 2024, may be used as the basis for assuming an individual's life expectancy. While the table reflects the average probability of survival for a subset of the Canadian population (i.e., members of Canadian pension plans), it can be appropriately

---

[15] Examples of these fees may include, but are not limited to, management expense ratio, advisory fees, custodian fees, trailing fees, commissions and transaction costs

[16] https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310001901

[17] 2014 Canadian Institute of Actuaries Canadian Pensioners' Mortality Report.

used to represent the life expectancy of the full Canadian population, given that its bias toward longer life expectancies provides a more conservative approach to developing projections.

Projection Period

It is recommended to assume a projection period for clients where the probability of outliving their capital is no more than 25%. Forecasting a longer projection period offers protection from future improvements in mortality and accounts for the greatest financial risk to an individual: longevity risk. It is also recommended that the greatest mortality age be used that corresponds to the client's circumstances, unless there is substantial information suggesting an adjustment should be made. This recommendation aligns with the expected growth in the number of centenarians in Canada.[18] Financial planners are encouraged to develop sensitivity analyses related to mortality (e.g., +/- 5 years), given the dramatic effects that may result when the projection period is changed by a relatively small number of years.

Probability of Survival

	10%	10%	10%	15%	15%	15%	20%	20%	20%	25%	25%	25%	30%	30%	30%	35%	35%	35%	40%	40%	40%	45%	45%	45%	50%	50%	50%
Current Age in 2024	**M**	**F**	**M/F**	M	F	M/F	M	F	M/F	M	F	M/F	M	F	M/F	M	F	M/F	M	F	M/F	M	F	M/F	M	F	M/F
20	99	101	102	97	100	101	96	98	100	95	97	99	94	97	98	93	96	98	92	95	97	91	94	96	90	93	96
25	99	101	102	97	99	101	96	98	100	95	97	99	94	96	98	93	95	97	92	95	97	91	94	96	90	93	95
30	99	101	102	97	99	101	96	98	100	95	97	99	94	96	98	93	95	97	92	94	97	91	93	96	90	92	95
35	98	101	102	97	99	100	96	98	99	95	97	99	94	96	98	93	95	97	92	94	96	91	93	96	90	92	95
40	98	100	102	97	99	100	96	98	99	95	97	98	94	96	98	93	95	97	92	94	96	91	93	96	90	92	95
45	98	100	101	97	99	100	95	98	99	94	97	98	93	96	98	92	95	97	91	94	96	90	93	95	89	92	95
50	98	100	101	96	99	100	95	98	99	94	96	98	93	95	97	92	95	97	91	94	96	90	93	95	89	92	95
55	98	100	101	96	99	100	95	97	99	94	96	98	93	95	97	92	94	96	91	93	96	90	92	95	89	91	94
60	98	100	101	96	98	100	95	97	99	94	96	98	93	95	97	92	94	96	91	93	96	90	92	95	89	91	94
65	97	100	101	96	98	100	95	97	99	94	96	98	93	95	97	92	94	96	91	93	96	90	92	95	89	91	94
70	97	100	101	96	98	99	95	97	99	94	96	98	93	95	97	92	94	96	91	93	96	90	92	95	89	91	94
75	97	100	101	96	98	99	95	97	99	94	96	98	93	95	97	92	94	96	91	93	96	90	93	95	90	92	94
80	98	100	101	96	98	100	95	97	99	94	96	98	93	95	97	93	95	96	92	94	96	91	93	95	90	92	95
85	98	100	101	97	99	100	96	98	99	95	97	98	94	96	98	94	95	97	93	95	96	92	94	96	92	93	95
90	99	101	102	98	100	101	97	99	100	97	98	99	96	97	99	95	97	98	95	96	98	94	96	97	94	95	97
95	101	102	103	100	101	102	100	101	102	99	100	101	99	100	101	98	99	100	98	99	100	98	98	100	97	98	99
100	105	105	106	104	104	105	103	104	105	103	103	104	103	103	104	102	103	104	102	102	103	102	102	103	102	102	103

[18] Statistics Canada. Centenarians in Canada, Age and sex, 2011 Census. Catalogue no. 98-311-X2011003. Retrieved from: http://www12.statcan.gc.ca/census-recensement/2011/as-sa/98-311-x/98-311-x2011003_1-eng.pdf

The table used to calculate the probability of survival is the CPM2014 Mortality Table, based on data from both public and private sector pension plans for 1999-2008, taken forward to 2024 using the CPM Improvement Scale B. For years beyond 2014, the same improvement scale was used to establish generational mortality rates. This mortality table and improvement scale were published by the Canadian Institute of Actuaries in February 2014.[19]

Based on the table, a 70-year-old Canadian would have a 25% chance of living to at least age 94 for a man and at least age 96 for a woman (25% column); by comparison, a 70-year-old Canadian would have a 10% chance of living to at least age 97 for a man and age 100 for a woman (10% column). A 70- year-old couple would have a 25% chance that one of the members of the couple will live to at least age 99 and a 10% chance that one of the members of the couple will live to at least age 101. Again, to be prudent, it is recommended that financial planners select a projection period where the probability of survival is no more than 25% (25% column).

With the example of the 70-year-old male/female couple, a projection period of 28 years (to age 98) could be used with the 25% probability that one of them may outlive their capital. It is important to remember that this table is intended to represent the average probability of survival for the entire population. People who are more financially comfortable and who have shown evidence of good health may find their life expectancy more toward the left end of the chart (the 10% survival group).

We are aware that the use of this mortality table will tend to overestimate life expectancy for people with fragile health or for smokers, for example. The financial planner should have a fulsome discussion with clients regarding their individual life expectancy before a long-term planning horizon is selected. Also, if these probabilities of survival are used to make different analyses than retirement income projections, such as to undertake scenario analysis for claiming public pensions at different ages, the financial planner will be able to use these probabilities of survival to make varying life expectancy assumptions to model different outcomes.

It is interesting to note that hereditary factors are not significant in predicting life expectancy,[20] while a client's income, education and lifestyle choices, such as the use of tobacco, can have a significant impact. Statistics Canada research published in 2015[21] found that non-smokers can expect to gain about three years of life expectancy, while the heaviest smokers stand to lose about nine years of life expectancy. In other words, average life expectancy for Canadians is reduced from 82 years to 73 years for adults who smoke.

It is also interesting to observe that as advancements in medical science occur, those who are younger today may have the opportunity to benefit from these advancements for a longer period than those who are older today. These effects can be seen in the 50% column in Probability of Survival table above by the initial decline in life expectancy as current age increases (e.g., a 30-year-old today has a higher life expectancy than their 60-year-old parent). This decline in life expectancy reverses at around age 80 because those who have already reached an older age today are more likely to continue to benefit from increased longevity.

---

[19] https://www.cia-ica.ca/app/themes/wicket/custom/dl_file.php?p=34827&fid=13818

[20] Wilhelmsen, L., Svärdsudd, K., Eriksson, H., Rosengren, A., Hansson, P. O., Welin, C., ... & Welin, L. (2011). Factors associated with reaching 90 years of age: a study of men born in 1913 in Gothenburg, Sweden. *Journal of internal medicine*, *269*(4), 441-451.

[21] https://www150.statcan.gc.ca/n1/pub/82-624-x/2012001/article/11676-eng.htm

5. GUIDELINES FOR 2024

The Projection Assumption Guidelines for 2024 are the following:

a) Inflation	2.1%
b) Return rates[22]	
Short-term:	2.4%
Fixed income:	3.4%
Canadian domestic equities:	6.4%
Foreign developed-market equities:	6.5%
Foreign Emerging-market equities:	8.3%
c) Borrowing rate	4.4%
d) YMPE, MPE growth rate or salary	3.1% (inflation + 1%)
e) Probability of Survival	*See table in 4 e)*

Note that the administrative and investment management fees paid by clients both for products and advice must be subtracted to obtain the net return.

[22] These are nominal rates.

6. ILLUSTRATIVE APPLICATION

By way of example only, for a projection prepared this year for a portfolio holding investments in various asset classes, where the fees are 1.3% annually, we could use the following return assumptions:

Portfolio return assumptions based on a varied asset allocation (Illustrative Example Only)

Asset Classes Allocation	Projected annual gross return for each asset class	% of portfolio holdings in each asset class	Projected annual portfolio return (before inflation and income taxes)
Short-term:	2.4%	5%	2.4% times 0.05 = 0.1%
Fixed income:	3.4%	45%	3.4% times 0.45 = 1.5%
Canadian domestic equities:	6.4%	40%	6.4% times 0.40 = 2.6%
Foreign developed-market equities	6.5%	10%	6.5% times 0.10 = 0.7%
Foreign emerging-market equities	8.3%	0%	0.0%
Totals	n/a	100%	4.9%
Less Assumed fees	n/a	n/a	-1.3 %
Net return after fees	n/a	n/a	3.6%

This illustrative application is presented to provide guidance around calculating the projected net return after fees. **It is not intended in any way to offer a suggestion or recommendation by itself concerning asset allocation weightings**.

As well, these assumptions also depend on the investor's profile not changing over the years. If a client's investor profile is likely to change, it might be preferable to consider using an "average target allocation."

It is important to note that actual net portfolio returns will depend on actual product and portfolio-related fees and any other investment-related fees.

7. FINANCIAL GUIDELINES FOR PREVIOUS YEARS

The following table lists the financial guidelines for previous years along with their effective dates (the current guidelines are shown for comparison purposes):

Year	Effective date	Inflation	Growth of the YMPE or MPE	Short-term Return	Fixed income Return	Canadian domestic equities Return	Foreign Developed-market equities*	Foreign Emerging-market equities*	Borrowing rate
2009	Feb. 17	2.25%	n/a	3.75%	4.75%	7.25%	n/a	n/a	5.75%
2010	April 12	2.25%	n/a	3.75%	5.00%	7.25%	n/a	n/a	5.75%
2011	April 8	2.25%	n/a	3.50%	4.75%	7.00%	n/a	n/a	5.50%
2012	April 12	2.25%	n/a	3.25%	4.50%	7.00%	n/a	n/a	5.25%
2013	April 30	2.25%	n/a	3.25%	4.25%	7.00%	n/a	n/a	5.25%
2014	April 25	2.00%	n/a	3.00%	4.00%	6.50%	n/a	n/a	5.00%
2015	April 30	2.00%	3.00%	2.90%	3.90%	6.30%	n/a	n/a	4.90%
2016	June 30	2.10%	3.10%	3.00%	4.00%	6.40%	6.80%	7.70%	5.00%
2017	July 31	2.00%	3.00%	2.90%	3.90%	6.50%	6.70%	7.50%	4.90%
2018	April 30	2.00%	3.00%	2.90%	3.90%	6.40%	6.70%	7.40%	4.90%
2019	April 30	2.10%	3.10%	3.00%	3.90%	6.10%	6.40%	7.20%	5.00%
2020	April 30	2.00%	3.00%	2.40%	2.90%	6.10%	6.40%	7.10%	4.40%
2021	April 30	2.00%	3.00%	2.30%	2.70%	6.20%	6.60%	7.80%	4.30%
2022	April 30	2.10%	3.10%	2.30%	2.80%	6.30%	6.60%	7.70%	4.30%
2023	April 30	2.10%	3.10%	2.30%	3.20%	6.20%	6.50%	7.40%	4.30%
2024	April 30	2.10%	3.10%	2.40%	3.40%	6.40%	6.50%	8.40%	4.40%

*2009-2015 reports suggested a maximum 1% increase to Canadian domestic equities for foreign developed-market and foreign emerging-market equities as a guideline.

Note that the administrative and investment management fees paid by clients for products and advice must be subtracted to obtain the net return.

EB-2024-0063
Evidence of Dr. Sean Cleary, CFA
Attachment AZ

Horizon Rpt – CMA Survey 2023

Horizon Actuarial Services, LLC®

Survey of Capital Market Assumptions

2023 Edition

Horizon Actuarial Services, LLC is proud to serve as the actuary to over 100 multiemployer defined benefit pension plans across the United States and across various industries. As actuary to these plans, we must develop assumptions regarding future investment returns on plan assets. We then use those assumptions as we determine the actuarial values of the benefits promised by these plans to their participants and beneficiaries, as well as to project plan funding and solvency levels years into the future.

At Horizon Actuarial, we are retirement and healthcare actuaries, not investment professionals. Therefore, when developing assumptions as to what returns a pension plan's assets might be expected to earn in the future, we seek input from our colleagues in the investment advisory community. Each year, as part of this survey, we ask different investment firms to provide their "capital market assumptions" – their expectations for future risk and returns for different asset classes in which pension plans commonly invest. The information gathered from this survey can help answer the common question: "Are my plan's investment return assumptions reasonable?"

There are many factors to consider when evaluating a plan's investment return assumptions, such as its asset allocation, the maturity of its participant population, and the purpose of the measurement. Any of these factors can make the expected return for one plan very different from others. Therefore, this report does not opine on the reasonableness of any one plan's investment return assumptions. Nevertheless, we hope this report will be a useful resource for trustees, actuaries, and investment professionals alike.

Horizon Actuarial sincerely thanks the 42 investment advisors who participated in this survey.

Atlanta ▪ Cleveland ▪ Denver ▪ Irvine ▪ Los Angeles
Miami ▪ San Diego ▪ San Francisco ▪ Washington, D.C.

www.horizonactuarial.com
Published: August 2023

Survey of Capital Market Assumptions: 2023 Edition

Table of Contents

Horizon Actuarial Services, LLC is an independent consulting firm specializing in providing actuarial and consulting services to multiemployer benefit plans. Horizon Actuarial does not provide investment, legal, or tax advice. Please consult with your investment advisor, legal counsel, or tax advisor for information specific to your plan's investment, legal, or tax implications.

Summary

Horizon Actuarial first conducted this survey in 2010, and it included 8 investment advisors. In 2012, we first published a report on the survey results, which included 17 advisors. The survey has expanded considerably in recent years; this 2023 edition of the survey includes assumptions from 42 different investment firms.

Readers of this survey are aware that expected returns have declined for all but a few asset classes from 2016 through 2022. The steepest declines were for fixed income investments such as US corporate bonds and Treasuries, where return expectations fell more than 100 basis points from 2019 to 2021. Due to recent increases in interest rates and lower equity valuations at the end of 2022, we see a reversal of this trend, with markedly higher expectations across asset classes in 2023. While overall expectations still aren't as high as they were in 2016, they are at their highest level since 2018.

As we have seen in prior surveys, expected returns are lower over the short term than over the long term, though the difference is the smallest it has been since we first conducted the survey. This trend is apparent when we focus on the 27 advisors who provided assumptions for both the short term (up to 10 years) and long term (20 years or more).

For less mature ongoing pension plans without solvency issues, we believe a horizon of 20 years or more is appropriate for evaluating the reasonableness of the long-term investment return assumption. A shorter horizon, such as 10 years, may be more appropriate for evaluating the return assumption for a plan that is more mature or has solvency issues. Even for plans with long-term investment horizons, it is important to understand the potential impact of lower expected returns over the short term. Therefore, this survey shows return expectations over horizons of both 10 years and 20 years.

For illustration, this report also constructs an asset allocation for a hypothetical multiemployer pension plan and uses the results from the survey to develop a range of reasonably expected returns for the plan. The expected returns for this 2023 edition were ***126 basis points higher over a 10-year horizon than they were last year***, and 94 basis points higher than they were in 2018. ***Over a 20-year horizon, expected returns are 88 basis points higher than last year***, and 5 basis points higher than they were five years ago in the 2018 edition of the survey.

If you have questions about how the results of this survey relate to your multiemployer plan, please contact your consultant at Horizon Actuarial or visit the "contact us" page on our website, www.horizonactuarial.com. For questions about the survey itself, please contact Ben Ablin at ben.ablin@horizonactuarial.com.

Survey Participants

Exhibit 1 below lists the 42 investment advisors whose capital market assumptions are included in the 2023 survey. This report does not attribute specific assumptions to individual firms, which is a precondition of the survey.

Originally, this survey was exclusive to the multiemployer plan community; it included assumptions only from investment advisors to multiemployer pension plans. The survey has expanded over the years, and it now includes assumptions from investment advisors outside of the multiemployer plan community.

A complete listing of the firms participating in the survey is provided below.

Exhibit 1

2023 Survey Participants	
AJ Gallagher	*Merrill*
Alan Biller	*Milliman*
AndCo Consulting	*Morgan Stanley*
Aon	*NEPC*
The Atlanta Consulting Group	*PFM Asset Management, LLC*
*Bank of New York Mellon**	*PIMCO*
*BlackRock**	*Principal*
Buck	*Research Affiliates, LLC**
Callan Associates	*Royal Bank of Canada*
Cambridge Associates	*RVK*
CapTrust	*Segal Marco Advisors*
Envestnet	*SEI*
Goldman Sachs Asset Management	*Sellwood Consulting*
Graystone Consulting	*Sterling Capital Management, LLC*
*Invesco**	*Truist Investment Advisory*
Investment Performance Services, LLC (IPS)	*UBS*
Janney Montgomery Scott, LLC	*The Vanguard Group*
*J.P. Morgan Asset Management**	*Verus*
Marquette Associates	*Voya Investment Management**
Meketa Investment Group	*Willis Towers Watson*
Mercer	*Wilshire*

**Assumptions obtained from published white paper.*

Investment Horizons

When evaluating the expected return assumption for an active, ongoing multiemployer pension plan, actuaries usually consider investment returns over a long-term investment horizon of 20 years or more. A shorter time horizon, say over the next 10 years, may be more appropriate when evaluating the return assumption for a mature plan, a plan that has high negative cash flows, or a plan that is projected to become insolvent.

It is also important to understand the sensitivity of plan funding to changes in future investment returns. For example, the actuary for an active, ongoing pension plan will typically set the plan's investment return assumption based on expectations over a long-term horizon. However, evaluating the sensitivity of funding results to short-term investment returns that are expected to be higher or lower than the long-term assumption also plays an integral role in the decision-making process.

Advisors provided their most recent capital market assumptions: expected returns for different asset classes, standard deviations (i.e., volatilities) for those expected returns, and a correlation matrix. The advisors also indicated the investment horizon(s) to which their assumptions apply. If the advisor develops separate assumptions for different time horizons, they provided multiple sets of assumptions, one for each time horizon.

In the 2023 edition of the survey, 15 advisors provided one set of assumptions, of which all 15 specified a time horizon of 10 years. The remaining 27 advisors provided assumptions over both shorter-term (5 to 10 years) and longer-term (20 years or more) horizons. Note that two of the advisors rely on the same assumptions as other survey participants. Each assumption set was only counted once, even if it was provided by more than one advisor. Each unique assumption set was given equal weight in the survey.

Exhibit 2 below summarizes the time horizons specified by each advisor.

Exhibit 2

Investment Time Horizons	
Time Horizon	**Total**
10 Years	15
Both Short- and Long-Term	27
Total	42

Short-Term vs. Long-Term

As noted in the previous section, survey participants provided expected returns over different time horizons. Given current market conditions, many investment advisors may expect returns for certain asset classes to be different in the short term versus over the long term.

For comparability, this survey groups expected returns into two time horizons: 10 years and 20 years. As pension plan actuaries, we often refer to the 10-year expected returns as "short-term" and the 20-year expected returns as "long-term." Note, however, that many investment firms consider 10-year expectations to be "long-term."

When comparing the expected returns for the 27 advisors who provided both short-term and long-term assumptions,[1] we see some interesting differences. See Exhibit 3 below. The expected returns shown below are annualized (geometric) over the indicated time horizons.

Exhibit 3

Average Expected Returns: Short-Term vs. Long-Term
Subset of 27 Survey Respondents

Asset Class	10-Year Horizon	20-Year Horizon	Difference
US Equity - Large Cap	6.96%	7.37%	0.41%
US Equity - Small/Mid Cap	7.46%	7.75%	0.29%
Non-US Equity - Developed	7.73%	7.78%	0.05%
Non-US Equity - Emerging	8.45%	8.59%	0.14%
US Corporate Bonds - Core	4.71%	4.76%	0.05%
US Corporate Bonds - Long Dur.	4.84%	5.00%	0.15%
US Corporate Bonds - High Yield	6.63%	6.54%	-0.09%
Non-US Debt - Developed	3.39%	3.52%	0.13%
Non-US Debt - Emerging	6.32%	6.40%	0.08%
US Treasuries (Cash Equivalents)	3.54%	3.23%	-0.32%
TIPS (Inflation-Protected)	4.11%	4.08%	-0.03%
Real Estate	5.68%	6.25%	0.57%
Hedge Funds	6.24%	6.18%	-0.06%
Commodities	5.05%	4.90%	-0.15%
Infrastructure	6.88%	7.06%	0.18%
Private Equity	9.67%	10.13%	0.45%
Private Debt	8.39%	8.24%	-0.15%
Inflation	2.52%	2.46%	-0.06%

The 10-year and 20-year returns shown above are the averages for the 27 advisors who provided both short-term and long-term assumptions.
Expected returns are annualized (geometric).

The consensus among these 27 advisors was that returns for most asset classes are expected to be lower in the short term compared to the long term. In general, the difference between long-term and short-term returns is more pronounced for domestic equity investments. The differences are also relatively large for certain alternative investments such as private equity and real estate.

As noted earlier, the results shown in Exhibit 3 are based on a subset of 27 advisors. If we include all 42 survey advisors, the results do not change dramatically for most asset classes. See Exhibit 4 below.

Exhibit 4

Average Expected Returns: Short-Term vs. Long-Term
All Survey Respondents

Asset Class	10-Year Horizon	20-Year Horizon	Difference
US Equity - Large Cap	6.90%	7.37%	0.48%
US Equity - Small/Mid Cap	7.38%	7.75%	0.38%
Non-US Equity - Developed	7.49%	7.78%	0.29%
Non-US Equity - Emerging	8.21%	8.59%	0.38%
US Corporate Bonds - Core	4.71%	4.76%	0.05%
US Corporate Bonds - Long Dur.	4.80%	5.00%	0.20%
US Corporate Bonds - High Yield	6.43%	6.54%	0.11%
Non-US Debt - Developed	3.42%	3.52%	0.10%
Non-US Debt - Emerging	6.29%	6.40%	0.11%
US Treasuries (Cash Equivalents)	3.38%	3.23%	-0.16%
TIPS (Inflation-Protected)	4.07%	4.08%	0.01%
Real Estate	5.95%	6.25%	0.30%
Hedge Funds	5.96%	6.18%	0.22%
Commodities	4.96%	4.90%	-0.05%
Infrastructure	7.00%	7.06%	0.06%
Private Equity	9.46%	10.13%	0.66%
Private Debt	8.16%	8.24%	0.08%
Inflation	2.55%	2.46%	-0.09%

10-year horizon results include all 42 survey respondents.
20-year horizon results include a subset of 27 survey respondents.
Expected returns are annualized (geometric).

The 10-year expected returns shown above include assumptions from all 42 advisors, while the 20-year expected returns include assumptions from only the 27 advisors who provided longer-term assumptions.

The differences between short- and long-term expectations are the smallest they have been since we first conducted this survey using two separate time horizons. Nonetheless, it remains important for actuaries to illustrate the effects of near-term underperformance on their clients' pension funds. Furthermore, it may be appropriate for actuaries to attribute more weight to nearer term expectations when setting the investment return assumption for mature plans whose liabilities have a shorter duration.

[1] In cases where an advisor indicated a time horizon shorter than 10 years, the shorter-term expected returns were combined with the longer-term expected returns to achieve a 10-year horizon. Similarly, if an advisor indicated a time horizon longer than 20 years, the longer-term expected returns were combined with the shorter-term expected returns to achieve a 20-year horizon.

Differing Opinions

Exhibit 5 below shows the distribution of expected returns and standard deviations (i.e., volatilities) for each asset class in the survey, as provided by the 42 individual advisors in the survey. The expected returns shown are geometric.

Note that the exhibit below focuses on a 10-year horizon in order to include assumptions from all 42 advisors. See Exhibits 17 and 18 in the appendix to this report for a more detailed look at the distribution of expected returns and standard deviations over both 10- and 20-year horizons. The ranges of expected returns by asset class can be found in the appendix as Exhibits 19 and 20.

A summary of the average survey assumptions can be found in the appendix to this report as Exhibit 16. This summary includes expected returns, standard deviations, and a correlation matrix.

The exhibit below shows that there are significant differences in expected returns and standard deviations among investment advisors. As the saying goes, "reasonable people may differ."

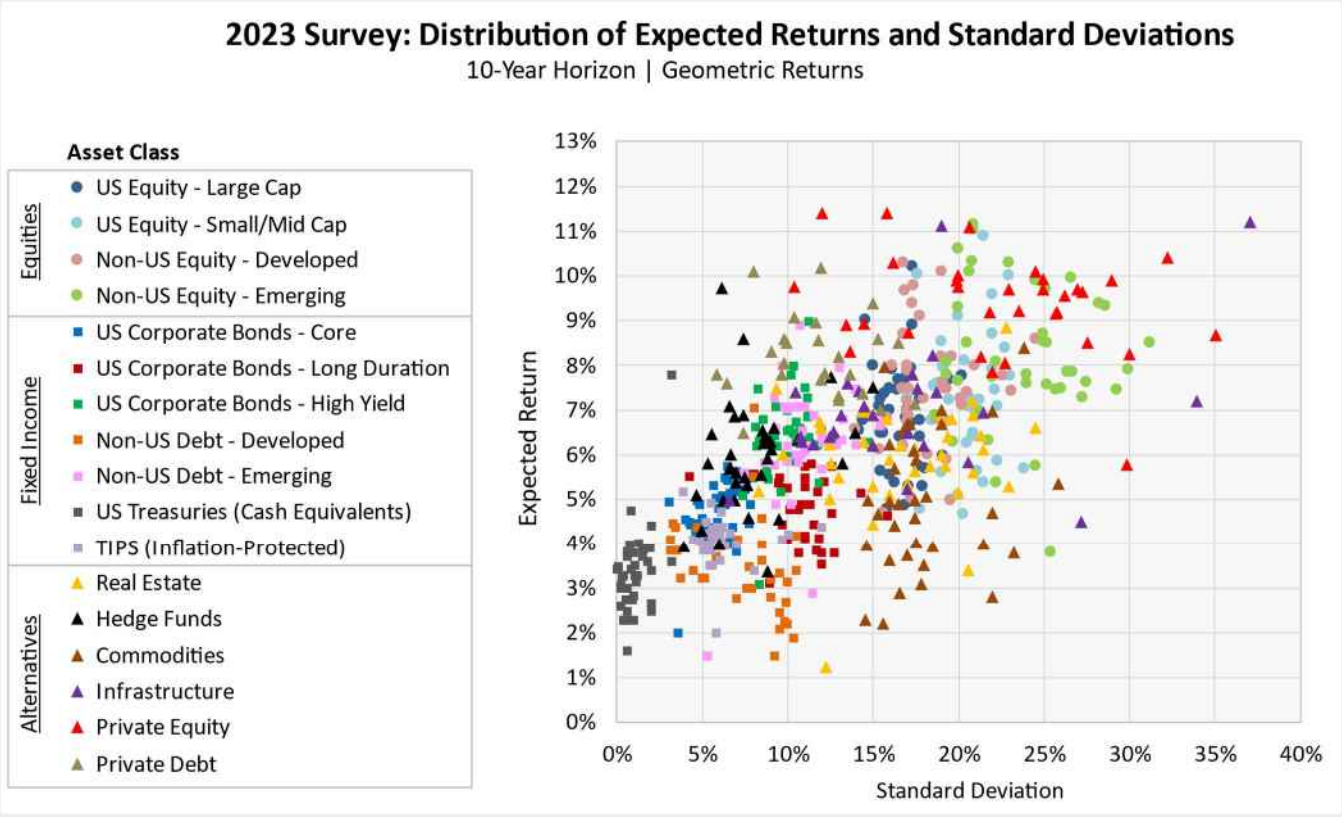
The differences in assumptions are more pronounced for alternative investments such as real estate, hedge funds, and private equity. A contributing factor may be differences in the underlying strategies different advisors apply to these alternative investments.

To contrast, the differences in expected returns and volatilities are smaller for more traditional investments, such as US equity and US fixed income.

Another reason for the significant differences among investment advisors may be the effective date of the assumptions. Ideally, this survey would compile and compare assumptions that all have the same effective date. However, this is not feasible when aggregating results from 42 advisors who update their assumptions on different schedules.

The vast majority of advisors specified effective dates on or around January 1, 2023. However, a few specified effective dates as early as October 1, 2022 and a few specified dates as late as March 31, 2023.

Exhibit 5



Changing Outlooks: 2019 to 2023

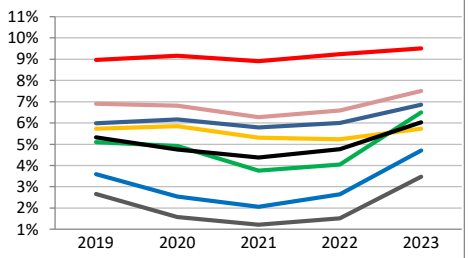
In recent years, there has been much discussion about whether it is reasonable to expect that future investment returns will be as high as they have been historically. Citing various reasons such as increased equity prices, tightening credit spreads, and the persistence of historically low interest rates, many advisors lowered their expectations gradually from year-to-year before reducing them considerably from 2019 to 2021.

With interest rates on the rise and lower equity valuations at the end of 2022, we have seen a sharp reversal of this trend, with markedly higher expectations across asset classes in 2023.

Exhibit 6 below shows average expected returns over a 10-year horizon for selected asset classes each year from 2019 to 2023. For consistency, this exhibit includes only the 31 advisors who provided short-term assumptions in each of these years.

Exhibit 6

Average Expected Returns (10-Year Horizon)



	2019	2020	2021	2022	2023
Private Equity	9.0%	9.2%	8.9%	9.2%	9.5%
Non-US Eq. (Dev)	6.9%	6.8%	6.3%	6.6%	7.5%
US Eq. (Large Cap)	6.0%	6.2%	5.8%	6.0%	6.9%
Real Estate	5.7%	5.9%	5.3%	5.2%	5.7%
US Bonds (HY)	5.1%	4.9%	3.8%	4.0%	6.5%
Hedge Funds	5.3%	4.7%	4.4%	4.8%	6.0%
US Bonds (Core)	3.6%	2.5%	2.1%	2.6%	4.7%
US Treasuries	2.7%	1.6%	1.2%	1.5%	3.5%

Figures are average geometric returns for selected asset classes for the 31 advisors who provided short-term assumptions in each of the surveys from 2019 through 2023.

For this subset of advisors, average expected returns over a 10-year horizon declined for most asset classes from 2019 to 2021, then increased slightly in 2022 before increasing dramatically in 2023. The sharpest increases in 2023 were for fixed income classes, such as US Treasuries, core US bonds, and high-yield US bonds.

Expectations for US large cap equities also increased sharply from 2022 to 2023, with an increase of 90 basis points from 6.0% to 6.9%. Increases for other classes were generally smaller.

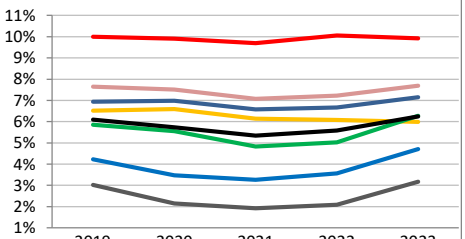
Expectations for all but one of the asset classes shown (real estate) have increased over the five-year period shown.

Exhibit 7 below shows how average expected returns have changed for the same asset classes for a subset of 15 advisors who provided assumptions each year from 2019 to 2023 over a 20-year horizon.

Note that the expected returns shown in Exhibits 6 and 7 are not directly comparable with those in other sections or previous surveys because we include only a subset of advisors who participated in each of the last 5 years.

Exhibit 7

Average Expected Returns (20-Year Horizon)



	2019	2020	2021	2022	2023
Private Equity	10.0%	9.9%	9.7%	10.1%	9.9%
Non-US Eq. (Dev)	7.6%	7.5%	7.1%	7.2%	7.7%
US Eq. (Large Cap)	6.9%	7.0%	6.6%	6.7%	7.2%
Real Estate	6.5%	6.6%	6.1%	6.1%	6.0%
US Bonds (HY)	5.8%	5.5%	4.8%	5.0%	6.3%
Hedge Funds	6.1%	5.7%	5.3%	5.6%	6.3%
US Bonds (Core)	4.2%	3.5%	3.3%	3.6%	4.7%
US Treasuries	3.0%	2.1%	1.9%	2.1%	3.2%

Figures are average geometric returns for selected asset classes for the 15 advisors who provided long-term assumptions in each of the surveys from 2019 through 2023.

Although the expected returns are generally higher over a 20-year horizon than a 10-year horizon, the trends over the 5-year period are very similar. Namely, steep declines in return expectations for fixed income investments from 2019 to 2021, followed by a small rebound in 2022 and a dramatic increase in 2023.

Just as the sharpest declines from 2019 to 2021 were for fixed income classes such as core US bonds, high-yield US bonds, and US Treasuries, the largest increases from 2022 to 2023 were for these same asset classes.

While there were increases in expectations over a 20-year horizon for most of the asset classes shown from 2019 to 2023, expectations for a few asset classes experienced declines in expectations over this period. The largest decline was for real estate (from 6.5% to 6.0%). There was also a modest decline for private equity (from 10.0% to 9.9%).

Evaluating the Return Assumption

Multiemployer pension plans are usually invested in a well-diversified mix of stocks, bonds, real estate, and alternative investments structured to meet the goals of the Trustees. This typically involves maximizing returns over the long term while minimizing return volatility.

The actuary of a multiemployer pension plan must consider the plan's asset allocation and, based on expectations of future returns, develop an assumption for what plan assets are projected to earn over the long term. This assumption is then used (along with others) to determine the actuarial present value of the benefits promised by the plan to its participants and beneficiaries.

The actuary will often seek input on future return expectations from the plan's investment advisor in developing the plan's investment return assumption. However, as noted earlier, different investment advisors often have widely differing opinions on what future returns will be. Therefore, it can be beneficial to keep in mind other advisors' expectations when setting the investment return assumption.

In the following exhibits, we will evaluate the investment return assumption for a hypothetical multiemployer pension plan. Exhibit 8 below shows the asset allocation for this hypothetical plan. The asset allocations are arbitrary, except for the fact that we made sure to include at least a small allocation to every asset class in the survey.

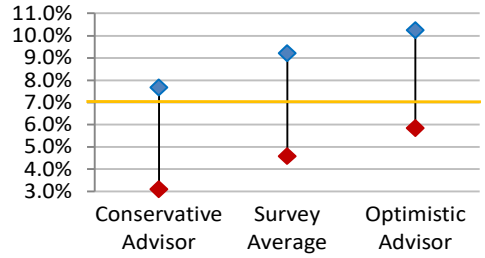
Exhibit 8

Asset Class - Hypothetical Plan	Weight
US Equity - Large Cap	20.0%
US Equity - Small/Mid Cap	10.0%
Non-US Equity - Developed	7.5%
Non-US Equity - Emerging	5.0%
US Corporate Bonds - Core	7.5%
US Corporate Bonds - Long Duration	2.5%
US Corporate Bonds - High Yield	5.0%
Non-US Debt - Developed	5.0%
Non-US Debt - Emerging	2.5%
US Treasuries (Cash Equivalents)	5.0%
TIPS (Inflation-Protected)	5.0%
Real Estate	7.5%
Hedge Funds	5.0%
Commodities	2.5%
Infrastructure	2.5%
Private Equity	5.0%
Private Debt	2.5%
TOTAL PORTFOLIO	**100.0%**

Exhibit 9 shows expected annualized (geometric) returns for the hypothetical plan over a 10-year horizon. These results may be appropriate for modeling sensitivities of future funding results to short-term investment returns, or for evaluating the return assumption for a plan with severely negative cash flows or solvency issues.

Exhibit 9

Annualized Expected Returns
Hypothetical Multiemployer Pension Fund
10-Year Horizon

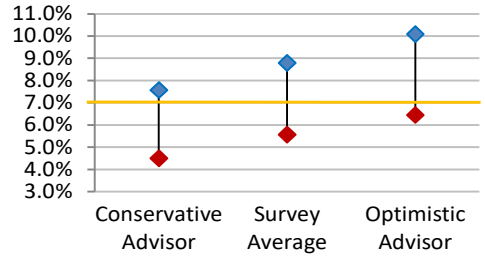


	Conservative Advisor	Survey Average	Optimistic Advisor
75th percentile	7.66%	9.20%	10.24%
25th percentile	3.09%	4.58%	5.84%
Probability of Meeting or Exceeding:			
7.50% per Year	26.5%	42.9%	56.5%
7.00% per Year	31.6%	48.7%	62.5%
6.50% per Year	37.0%	54.5%	68.1%

Exhibit 10 shows expected annualized (geometric) returns for the hypothetical plan over a 20-year horizon based on assumptions from the 27 advisors who provided longer-term assumptions. These results may be more appropriate for evaluating the return assumption for a less mature plan with no projected solvency issues.

Exhibit 10

Annualized Expected Returns
Hypothetical Multiemployer Pension Fund
20-Year Horizon



	Conservative Advisor	Survey Average	Optimistic Advisor
75th percentile	7.57%	8.78%	10.09%
25th percentile	4.50%	5.56%	6.44%
Probability of Meeting or Exceeding:			
7.50% per Year	26.0%	44.5%	61.1%
7.00% per Year	33.6%	52.8%	68.0%
6.50% per Year	41.9%	61.0%	74.3%

Evaluating the Return Assumption (cont.)

It is important to keep in mind that the expected returns shown in Exhibits 9 and 10 apply only to the hypothetical asset allocation shown in Exhibit 8. The expected returns will be different – perhaps significantly – for different asset allocations. The following are points to consider when reviewing the results in Exhibits 9 and 10:

Range of Reasonable Assumptions: When setting the investment return assumption for pension valuations, actuaries traditionally constructed a range of reasonable assumptions and then selected a best-estimate point within that range. Actuaries would often consider the reasonable range to be the middle 50 percent of possible results, bounded by the 25th and 75th percentiles.

The applicable actuarial standards of practice were updated in 2013, and the updated standards de-emphasize use of the reasonable range when setting the investment return assumption. Nevertheless, considering this range remains instructive; it may be difficult for an actuary to justify an assumption outside of this range.

Based on the average assumptions in this 2023 survey, the middle 50 percent range for this hypothetical pension plan is very wide: 5.56% to 8.78% over the next 20 years. Note that the range is even wider for a 10-year horizon: 4.58% to 9.20%. This is due to the fact that, while returns may be volatile from one year to the next, deviations will be lower when returns are annualized (in other words, smoothed out) over longer horizons.

Probability of Meeting/Exceeding the Benchmark: For example, say that the actuary for this hypothetical pension plan expects its investment returns to be 7.00% per year, represented by the gold lines in Exhibits 9 and 10. Based on the average assumptions in this 2023 survey, there is a 52.8% probability the plan will meet or beat its 7.00% benchmark on an annualized basis over a 20-year period. The probability is lower, 48.7%, that the plan will meet or beat its benchmark over the next 10 years.

Also note that over a 20-year period, the probability that the annualized investment return will exceed 7.50% (arbitrarily, 50 basis points above the benchmark return) is 44.5%. The probability that the annualized return will exceed 6.50% (50 basis points below the benchmark) is 61.0%. These probabilities are a bit lower when focusing on a 10-year horizon rather than a 20-year horizon.

Purpose of the Measurement: It is important to note that this survey focuses on the investment return assumption, which may (or may not) be the same as the assumption used to discount a plan's projected benefit payments to measure its liabilities. The applicable standards of practice emphasize that the actuary should consider the purpose of the measurement (e.g., contribution budgeting, defeasance or settlement, market measurements, pricing) as a primary factor in choosing a discount rate.

Optimistic and Conservative Assumptions: As previously noted, different investment advisors may have widely varying future capital market expectations. Therefore, it may also be interesting to consider the range of expected returns based on the assumptions provided by the most conservative and most optimistic advisors in the survey.

For this hypothetical asset allocation, the assumptions from the most conservative advisor indicate that the probability of beating the 7.00% benchmark assumption over the next 20 years is 33.6%. Using assumptions from the most optimistic advisor results in a probability of 68.0%. Again, reasonable people may differ.

Limitations: The following are some important limiting factors to keep in mind when reviewing these results.

- The asset classes in this survey do not always align perfectly with the asset classes provided by the investment advisors. Adjustments were made to standardize the different asset classes provided.
- Many of the advisors develop their future assumptions based on investment horizons of no more than 10 years, and returns are generally expected to be lower in the short term. The typical multiemployer pension plan will have an investment horizon that is much longer than 10 years.
- The return expectations are generally based on market returns. In other words, they do not reflect any additional returns that may be earned due to active asset managers outperforming the market ("alpha").
- The return expectations do not adjust for plan size. Specifically, they do not take into account the fact that certain investment opportunities are more readily available to larger plans, as well as the fact that larger plans may often receive more favorable investment fee arrangements than smaller plans.
- The ranges of expected annualized returns were constructed using basic, often simplified, formulas and methodologies. More sophisticated investment models – which may consider various economic scenarios, non-normal distributions, etc. – could produce significantly different results.

Use of the Survey: This survey is not intended to be a substitute for the expectations of individual portfolio managers, advisors, or actuaries performing their own independent analyses. The actuarial standards of practice provide for various methods of selecting and supporting the investment return assumption. This survey is intended to be used in conjunction with these methods, with appropriate weighting of various resources based on the plan actuary's professional judgment.

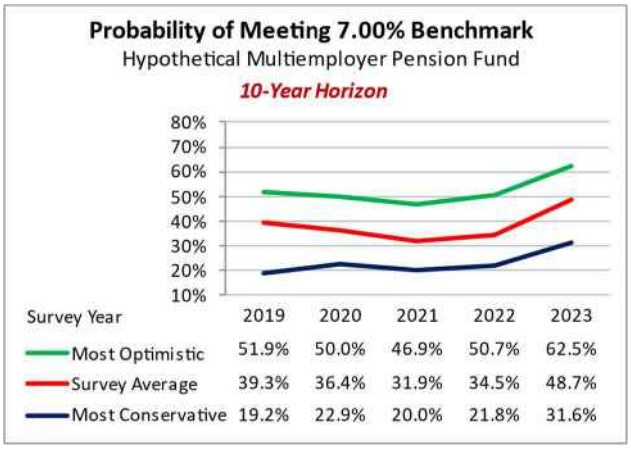
Comparison with Prior Surveys

Exhibits 6 and 7 showed how expected returns for certain asset classes have changed over the past few years. Similarly, Exhibits 11 and 12 below show how return expectations for the hypothetical multiemployer pension plan whose asset allocation is shown in Exhibit 8 have changed from 2019 to 2023.

Both exhibits show the probabilities that the hypothetical pension plan will meet or exceed its 7.00% benchmark return on an annualized basis over the given time horizon. Exhibit 11 focuses on expected returns over a 10-year period and Exhibit 12 focuses on expected returns over a 20-year period. Probabilities are shown for the survey average for each year from 2019 through 2023. For comparison, probabilities are also shown for the most conservative and optimistic advisors in each survey.

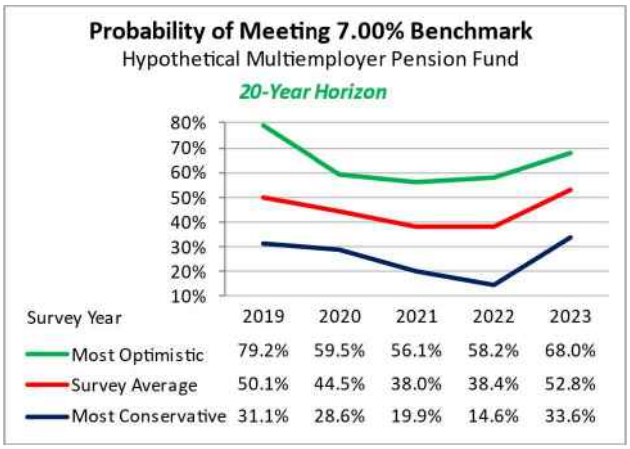
See Exhibit 14 in the appendix for a more complete range of expected returns over a 20-year horizon for each survey from 2014 through 2023.

Exhibit 11



Survey Year	2019	2020	2021	2022	2023
Most Optimistic	51.9%	50.0%	46.9%	50.7%	62.5%
Survey Average	39.3%	36.4%	31.9%	34.5%	48.7%
Most Conservative	19.2%	22.9%	20.0%	21.8%	31.6%

Exhibit 12



Survey Year	2019	2020	2021	2022	2023
Most Optimistic	79.2%	59.5%	56.1%	58.2%	68.0%
Survey Average	50.1%	44.5%	38.0%	38.4%	52.8%
Most Conservative	31.1%	28.6%	19.9%	14.6%	33.6%

As shown in Exhibit 11, the probability that this hypothetical pension plan would meet or beat a benchmark return of 7.00% over a 10-year horizon stayed relatively flat from 2019 to 2022 and increased sharply in 2023. Exhibit 12 shows that the probability this hypothetical pension plan would meet or beat a benchmark return of 7.00% over a 20-year horizon declined from 2019 to 2022 before rebounding to 2019 levels in 2023.

For example:

- Based on the average assumptions from the 2023 survey, the probability of this hypothetical plan meeting or exceeding an annualized return of 7.00% over the next 10 years is 48.7%. The probability was considerably lower (39.3%) five years ago when the 2019 survey was conducted.

- Based on the average assumptions from the 2023 survey, the probability of this hypothetical plan meeting or exceeding an annualized return of 7.00% over the next 20 years is 52.8%. This represents a sharp increase from last year when the probability was 38.4%, and a modest increase from 2019 when the probability was 50.1%. The increase from 2022 to 2023 was driven by increases in expectations across asset classes, with fixed income expectations rising the most.

Other points of note when comparing the results from the 2023 survey to those from prior years:

- The results for the most conservative advisor over a 10-year horizon hovered around 20.0% from 2019 to 2022 before increasing to 31.6% in 2023. Over a 20-year horizon, the results for the most conservative advisor reached a low of 14.6% in 2022, before rebounding to 33.6% in 2023. In other words, the most conservative advisor in 2022 projected about a 1 in 7 chance of meeting the 7.00% benchmark over a 20-year horizon while the most conservative advisor in 2023 projects a mere 1 in 3 chance of meeting the same benchmark return.

- The results for the most optimistic advisor over a 10-year horizon have risen to 62.5% in 2023. Over a 20-year horizon, the results for the most optimistic advisor are even higher at 68.0% or better than a 2 in 3 chance of meeting the 7.00% benchmark.

- Note that the most conservative and most optimistic advisors are not necessarily the same from year to year or for different time horizons.

Glossary

The following are basic definitions of some of the investment terminology used in this report.

Expected Return

The *expected return* is the amount, as a percentage of assets, that an investment is expected to earn over a period of time. Expected returns in this survey are generally market returns that do not reflect value added or fees due to active management. Returns for asset classes where passive investments are not available (e.g., hedge funds and private equity) are generally net of fees.

Arithmetic vs. Geometric Returns

An *arithmetic* return is the average return in any one year. A *geometric* return is the annualized return over a multi-year period. In general, it is more appropriate to focus on geometric returns when evaluating expected returns over multi-year horizons. However, arithmetic returns are also important. For example, the expected return of a portfolio is calculated as the weighted average of arithmetic returns, not geometric returns.

This survey focuses on geometric returns. Many advisors provide both arithmetic and geometric expected returns. For advisors who provided expected returns only on an arithmetic basis, we converted them to geometric returns for consistency. The following formula was used to make this conversion.

$$E[R_G] = ((1 + E[R_A])^2 - VAR[R])^{1/2} - 1$$

In this formula, $E[R_G]$ is the expected geometric return, $E[R_A]$ is the expected arithmetic return, and VAR[R] is the variance of the expected annual (arithmetic) return.

Standard Deviation

The *standard deviation* is a measure of the expected volatility in the returns. Generally, the standard deviation expresses how much returns may vary in any one year. Assuming that returns are "normally distributed," there is about a 68% probability that the actual return for a given year will fall within one standard deviation (higher or lower) of the expected return. There is about a 95% probability that the actual return will fall within two standard deviations of the expected return.

Correlation

The degree to which the returns for two different asset classes move in tandem with one another is their *correlation*. For example, if two asset classes are perfectly correlated, their correlation coefficient will be 1.00; in other words, if one asset class has a return of X% in a given market environment, then the other asset class is expected to also have a return of X%. A portfolio becomes better diversified as its asset classes have lower (or even negative) correlations with each other.

Methodology

The following is a high-level description of the methodology used in compiling the survey results.

Standardized Asset Classes

Not all investment advisors use the same asset classes when developing their capital market assumptions. Some are very specific (more asset classes), while others keep things relatively simple (fewer asset classes).

We exercised judgment in classifying each advisor's capital market assumptions into a standard set of asset classes. In the event that an advisor did not provide assumptions for a given asset class, the average assumptions from the other advisors was used when developing expected returns for that advisor.

Investment Horizons

This survey considers "short-term" expected returns to apply to a 10-year investment horizon, and "long-term" expected returns to apply to a 20-year horizon.

In this 2023 edition of the survey, 15 of the 42 advisors provided only short-term assumptions, indicating a horizon of no more than 10 years. Included in this group is one advisor who provided assumptions over a horizon of seven years.

All 27 advisors who provided long-term assumptions over horizons of 20 years or more also provided short-term assumptions. In cases where such an advisor indicated a horizon shorter than 10 years, the shorter-term expected returns were combined with the longer-term expected returns to achieve a 10-year horizon. If an advisor indicated a time horizon longer than 20 years, the longer-term expected returns were combined with the shorter-term expected returns to achieve a 20-year horizon.

No Adjustment for Alpha

No adjustment was made to reflect the possible value added by an active investment manager outperforming market returns (earning "alpha").

Normally-Distributed Returns

This survey assumes that investment returns will be normally distributed according to the capital market assumptions provided. The survey also assumes that the investment return in one year does not affect the investment return in the following year.

Equal Weighting

Each unique assumption set was given equal weight in developing the average assumptions for the survey, regardless of factors such as total assets under advisement, research methodology, etc.

Exhibit 13

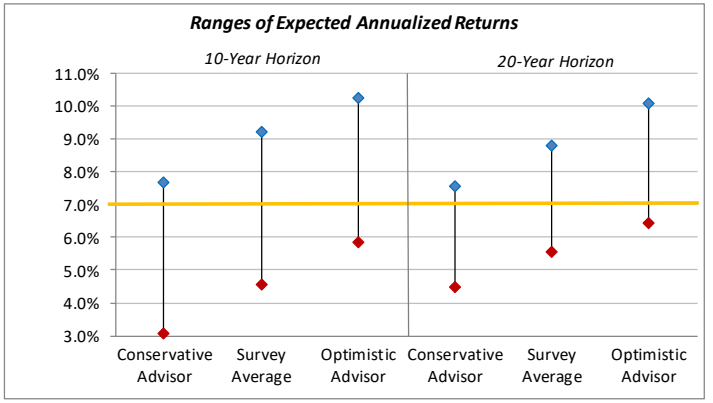
The following exhibit evaluates the investment return assumption for a hypothetical multiemployer pension plan. It reflects the same hypothetical asset allocation as shown in Exhibit 8, and it provides more detail than Exhibits 9 and 10. Note that the most conservative and optimistic advisors for the 10-year horizon are not necessarily the same as the most conservative and optimistic advisors for the 20-year horizon. This hypothetical pension plan has a benchmark return of 7.00% per year, which is indicated by the gold line in the exhibit below.

Hypothetical Multiemployer Plan

2023 Survey of Capital Market Assumptions

		Average Survey Assumptions		
Asset Class	Portfolio Weight	10-Year Horizon	20-Year Horizon	Standard Deviation
US Equity - Large Cap	20.0%	6.90%	7.37%	16.64%
US Equity - Small/Mid Cap	10.0%	7.38%	7.75%	20.51%
Non-US Equity - Developed	7.5%	7.49%	7.78%	18.26%
Non-US Equity - Emerging	5.0%	8.21%	8.59%	23.87%
US Corporate Bonds - Core	7.5%	4.71%	4.76%	5.85%
US Corporate Bonds - Long Duration	2.5%	4.80%	5.00%	10.91%
US Corporate Bonds - High Yield	5.0%	6.43%	6.54%	10.01%
Non-US Debt - Developed	5.0%	3.42%	3.52%	7.31%
Non-US Debt - Emerging	2.5%	6.29%	6.40%	10.93%
US Treasuries (Cash Equivalents)	5.0%	3.38%	3.23%	1.09%
TIPS (Inflation-Protected)	5.0%	4.07%	4.08%	6.17%
Real Estate	7.5%	5.95%	6.25%	16.72%
Hedge Funds	5.0%	5.96%	6.18%	8.06%
Commodities	2.5%	4.96%	4.90%	18.02%
Infrastructure	2.5%	7.00%	7.06%	17.10%
Private Equity	5.0%	9.46%	10.13%	22.57%
Private Debt	2.5%	8.16%	8.24%	11.73%
Inflation	N/A	2.55%	2.46%	1.90%
TOTAL PORTFOLIO	**100.0%**	*Expected returns are geometric.*		

	10-Year Horizon			*20-Year Horizon*		
	Conservative Advisor	**Survey Average**	**Optimistic Advisor**	**Conservative Advisor**	**Survey Average**	**Optimistic Advisor**
Expected Returns						
Average Annual Return (Arithmetic)	5.92%	7.44%	8.53%	6.52%	7.70%	8.94%
Annualized Return (Geometric)	5.37%	6.89%	8.04%	6.03%	7.17%	8.27%
Annual Volatility (Standard Deviation)	10.73%	10.84%	10.31%	10.18%	10.70%	12.09%
Range of Expected Annualized Returns						
75th Percentile	7.66%	9.20%	10.24%	7.57%	8.78%	10.09%
25th Percentile	3.09%	4.58%	5.84%	4.50%	5.56%	6.44%
Probabilities of Exceeding Certain Returns						
7.50% per Year, Annualized	26.5%	42.9%	56.5%	26.0%	44.5%	61.1%
7.00% per Year, Annualized	31.6%	48.7%	62.5%	33.6%	52.8%	68.0%
6.50% per Year, Annualized	37.0%	54.5%	68.1%	41.9%	61.0%	74.3%



Considerations and Limitations

- Allocations may be approximated if certain asset classes are not included in the survey.
- Many investment advisors provided only shorter-term assumptions (10 years or less).
- Assumptions are generally based on indexed returns and do not reflect anticipated alpha.
- Assumptions do not reflect investment opportunities or fee considerations available to larger funds.

SOURCE: Horizon Actuarial 2023 Survey of Capital Market Assumptions

Expected returns over a 10-year horizon include all 42 survey participants.

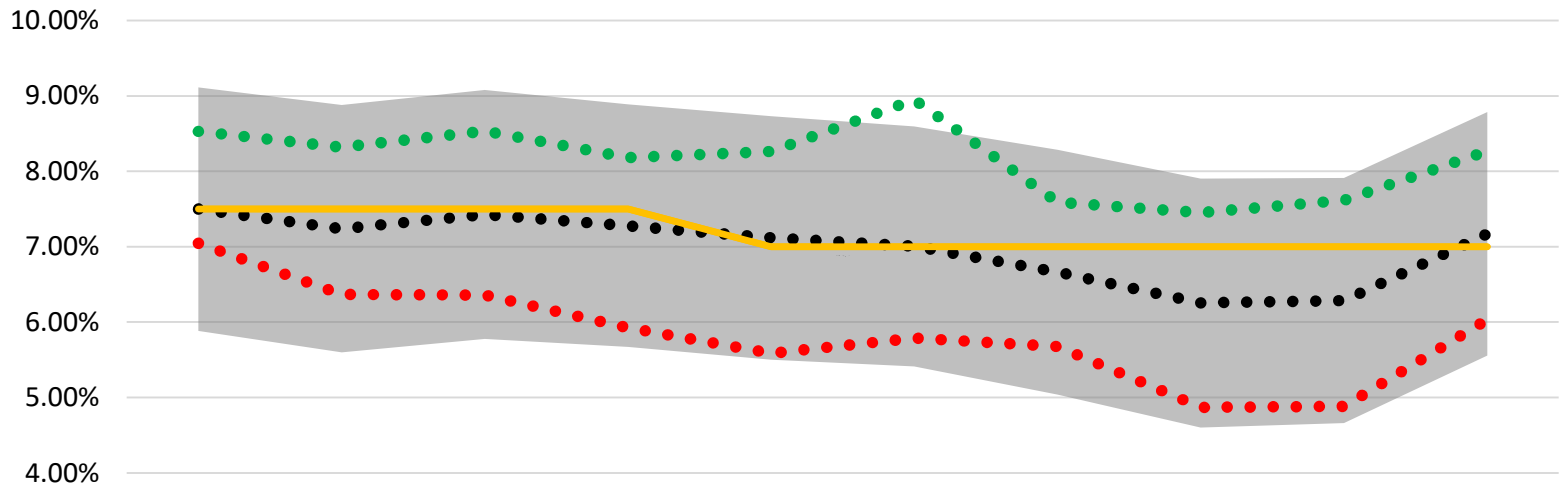
Expected returns over a 20-year horizon are based a subset of 27 survey participants who provided long-term assumptions.

Exhibit 14

The following exhibit shows the range of expected annualized returns for each of the surveys from 2014 to 2023 over a 20-year horizon. The results for 2019 through 2023 reflect the same hypothetical asset allocation as shown in Exhibit 13. Note that the hypothetical asset allocation was modified slightly in 2019 to include a small allocation to private debt. Please refer to the 2018 survey for the hypothetical asset allocation used to develop the results for 2014 through 2018. Similar to Exhibit 13, the benchmark return for this hypothetical plan is indicated by the gold line. The most conservative advisor in each survey is indicated by the red dotted line and the most optimistic advisor in each survey is indicated by the green dotted line. The black dotted line shows the survey average return and the gray shaded region shows the 25th – 75th percentile of returns assuming a normal distribution using the survey average return and survey average standard deviation.

Range of Expected Annualized Returns: 2014 - 2023 Surveys

Hypothetical Multiemployer Plan | Geometric Returns | 20-Year Horizon



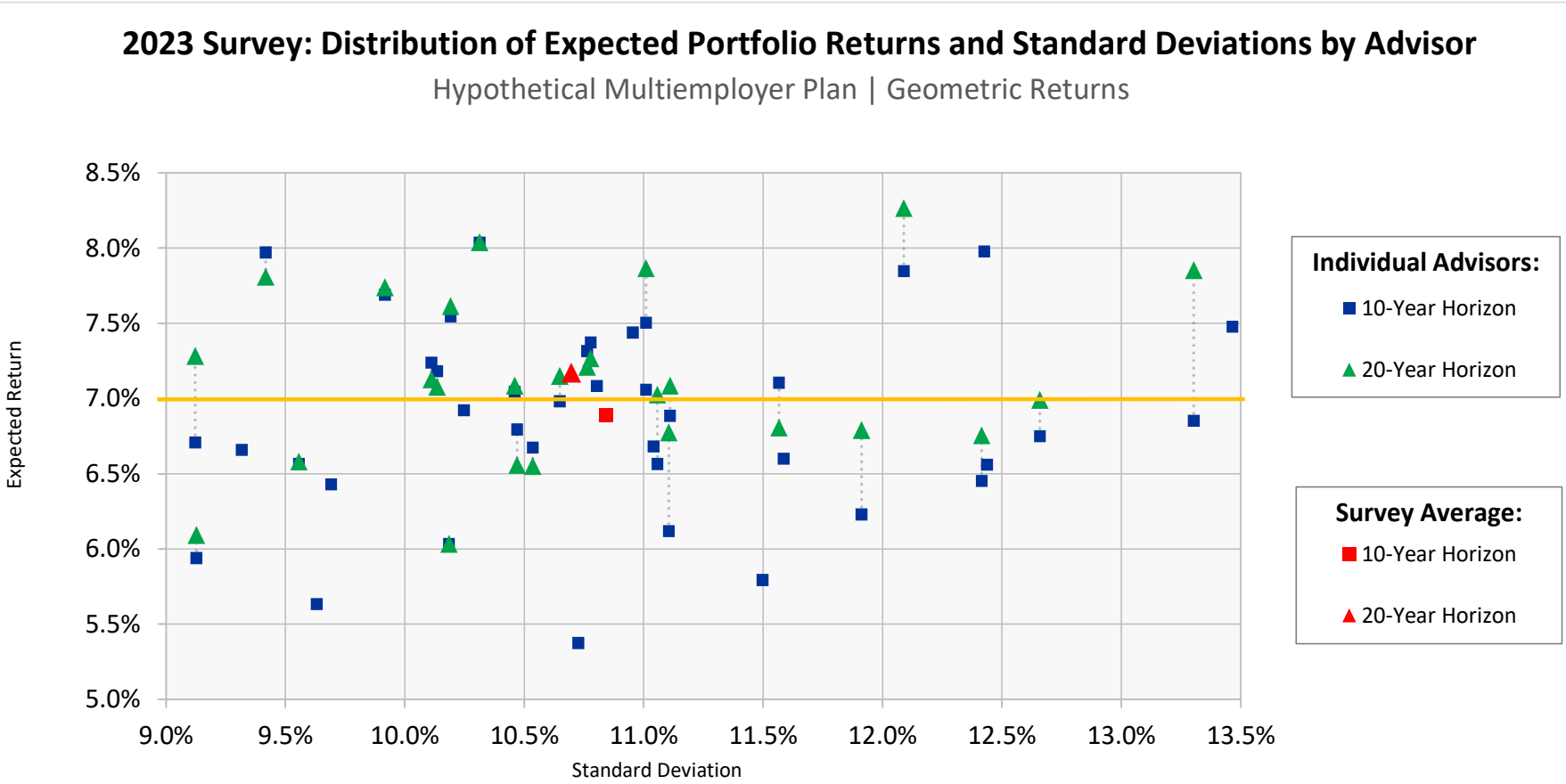
Survey Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Benchmark Return	7.50%	7.50%	7.50%	7.50%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%
Survey Average	7.50%	7.24%	7.43%	7.28%	7.12%	7.01%	6.66%	6.25%	6.29%	7.17%

25-75th Percentile · · · Survey Average — Benchmark Return · · · Conservative Advisor · · · Optimistic Advisor

SOURCE: Horizon Actuarial 2023 Survey of Capital Market Assumptions
Expected returns over a 20-year horizon are based a subset of 27 survey participants who provided long-term assumptions.

Exhibit 15

The following exhibit shows the distribution of expected annualized returns and annual standard deviations for the same hypothetical asset allocation that is shown in Exhibit 13. The expected annualized return and annual standard deviation of the hypothetical asset allocation are shown separately for each advisor who participated in the survey. Individual advisors are shown separately by investment horizon, and the short- and long-term assumptions for advisors who provided both are connected by a dotted line. The survey average assumptions are shown in red. Similar to Exhibit 13, the benchmark return of 7.00% for this hypothetical plan is indicated by the gold line. The exhibit shows that there are a wide variety of investment return assumptions that could be considered to be reasonable for any given asset allocation.



SOURCE: Horizon Actuarial 2023 Survey of Capital Market Assumptions
Expected returns over a 10-year horizon include all 42 survey participants.
Expected returns over a 20-year horizon are based a subset of 27 survey participants who provided long-term assumptions.

Exhibit 16

The following exhibit provides the average capital market assumptions for all 42 investment advisors in the 2023 survey. Each unique assumption set was given equal weight in determining the average assumptions. For reference, expected returns are shown over 10-year and 20-year horizons. Expected returns are also provided on both an arithmetic basis (one-year average) and geometric basis (multi-year annualized). The standard deviations (volatilities) and correlations apply to both arithmetic and geometric expected returns.

Horizon Actuarial 2023 Survey of Capital Market Assumptions

Average Survey Assumptions

		Expected Returns					***Correlation Matrix***															
		10-Year Horizon		20-Year Horizon		Standard																
	Asset Class	Arith.	Geom.	Arith.	Geom.	Deviation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	US Equity - Large Cap	8.19%	6.90%	8.67%	7.37%	16.64%	1.00																
2	US Equity - Small/Mid Cap	9.33%	7.38%	9.72%	7.75%	20.51%	0.89	1.00															
3	Non-US Equity - Developed	9.05%	7.49%	9.38%	7.78%	18.26%	0.81	0.77	1.00														
4	Non-US Equity - Emerging	10.86%	8.21%	11.39%	8.59%	23.87%	0.68	0.66	0.76	1.00													
5	US Corporate Bonds - Core	4.88%	4.71%	4.93%	4.76%	5.85%	0.26	0.22	0.24	0.24	1.00												
6	US Corporate Bonds - Long Duration	5.38%	4.80%	5.56%	5.00%	10.91%	0.25	0.21	0.24	0.21	0.86	1.00											
7	US Corporate Bonds - High Yield	6.91%	6.43%	7.03%	6.54%	10.01%	0.64	0.65	0.61	0.60	0.47	0.39	1.00										
8	Non-US Debt - Developed	3.71%	3.42%	3.81%	3.52%	7.31%	0.17	0.13	0.27	0.22	0.60	0.57	0.26	1.00									
9	Non-US Debt - Emerging	6.86%	6.29%	7.00%	6.40%	10.93%	0.50	0.47	0.53	0.60	0.55	0.48	0.61	0.43	1.00								
10	US Treasuries (Cash Equivalents)	3.39%	3.38%	3.23%	3.23%	1.09%	(0.06)	(0.07)	(0.05)	(0.04)	0.16	0.07	(0.05)	0.16	0.05	1.00							
11	TIPS (Inflation-Protected)	4.27%	4.07%	4.29%	4.08%	6.17%	0.14	0.11	0.15	0.18	0.64	0.57	0.32	0.49	0.40	0.16	1.00						
12	Real Estate	7.34%	5.95%	7.48%	6.25%	16.72%	0.56	0.55	0.50	0.42	0.25	0.24	0.45	0.18	0.38	(0.01)	0.19	1.00					
13	Hedge Funds	6.29%	5.96%	6.54%	6.18%	8.06%	0.68	0.69	0.68	0.64	0.24	0.21	0.60	0.14	0.48	(0.01)	0.16	0.43	1.00				
14	Commodities	6.53%	4.96%	6.55%	4.90%	18.02%	0.33	0.34	0.40	0.40	0.07	0.02	0.34	0.11	0.25	(0.02)	0.19	0.25	0.38	1.00			
15	Infrastructure	8.56%	7.00%	8.38%	7.06%	17.10%	0.64	0.60	0.60	0.54	0.29	0.32	0.54	0.24	0.45	(0.03)	0.21	0.47	0.52	0.38	1.00		
16	Private Equity	11.92%	9.46%	12.77%	10.13%	22.57%	0.73	0.71	0.66	0.60	0.16	0.17	0.50	0.12	0.39	(0.07)	0.08	0.45	0.60	0.30	0.55	1.00	
17	Private Debt	8.84%	8.16%	8.89%	8.24%	11.73%	0.51	0.52	0.49	0.46	0.14	0.16	0.61	0.06	0.36	(0.07)	0.08	0.35	0.54	0.29	0.42	0.54	1.00
	Inflation	2.56%	2.55%	2.47%	2.46%	1.90%																	

Expected returns over a 10-year horizon include all 42 survey participants.

Expected returns over a 20-year horizon are based a subset of 27 survey participants who provided long-term assumptions.

Exhibit 17

Earlier in this report, Exhibit 5 showed the distribution of expected returns and standard deviations for all 42 advisors who provided short-term assumptions. The exhibit below shows the same distribution, broken out by asset type: equities, fixed income, and alternatives. Note that the average expected return and standard deviation from the 2023 survey are listed in brackets for each asset class. Also note that every advisor did not provide expectations for every asset class.

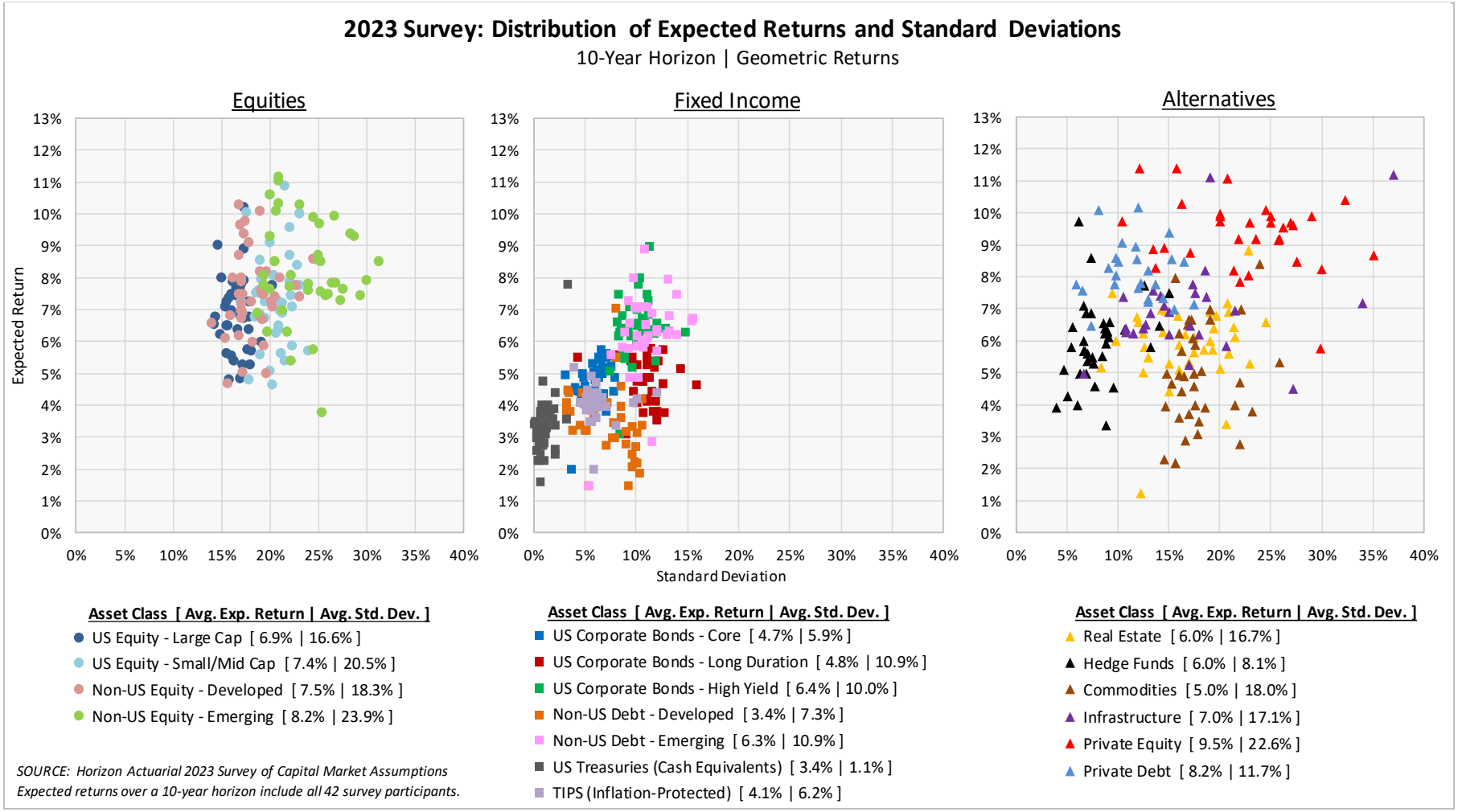


Exhibit 18

Exhibit 17 showed the distribution of expected returns and standard deviations over an investment horizon of 10 years. The exhibit below shows the same distribution, but for a horizon of 20 years. Note that while Exhibit 17 included all 42 advisors in the survey, the exhibit below only includes assumptions for the 27 advisors who provided longer-term assumptions (horizons of 20 years or more). Also note that every advisor did not provide expectations for every asset class.

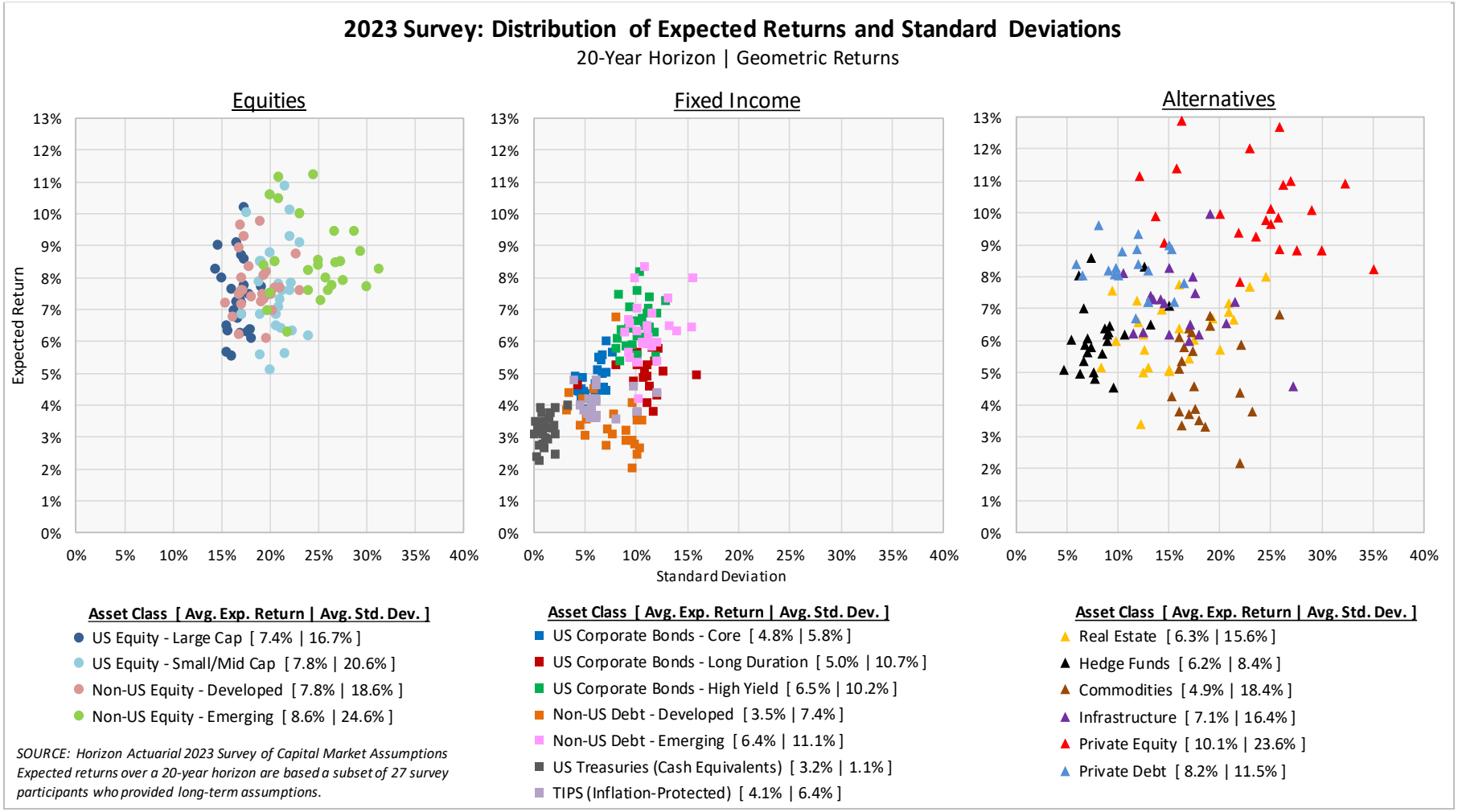
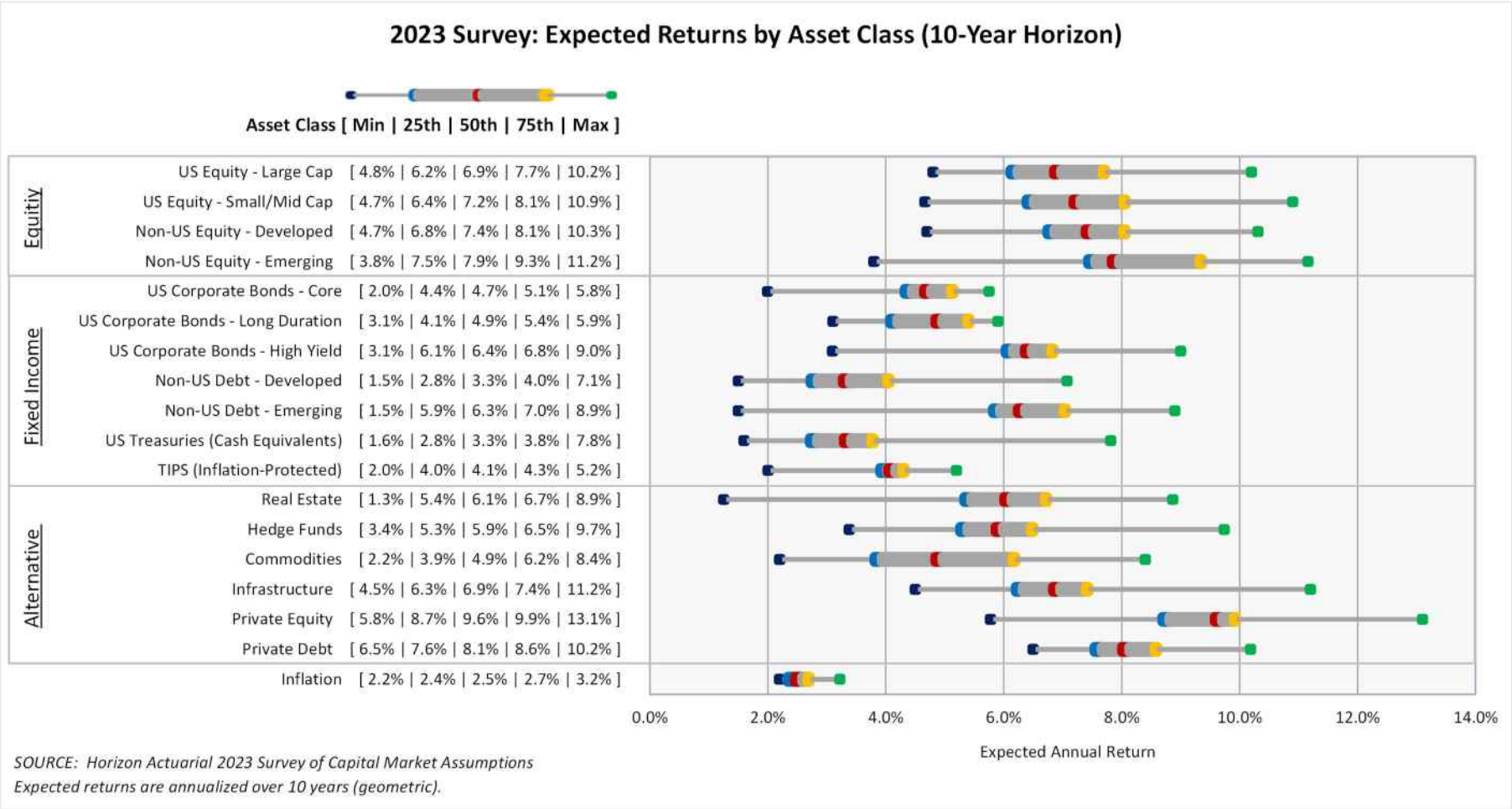


Exhibit 19

The exhibit below shows the ranges of expected annual returns for different asset classes over a 10-year investment horizon. The ranges shown below include assumptions for all 42 advisors in the 2023 survey. Expected returns shown below are annualized (geometric).

To illustrate the distribution of expected returns, the exhibit shows the range of the middle 50 percent of results: the range between the 25th and 75th percentiles. It also shows the median expected return for each asset class: the 50th percentile. Note that the expected returns for the *median* advisor shown below are not the same as the *average* expected returns shown elsewhere in the report. In most cases, however, the differences between median and average expected returns are relatively small.

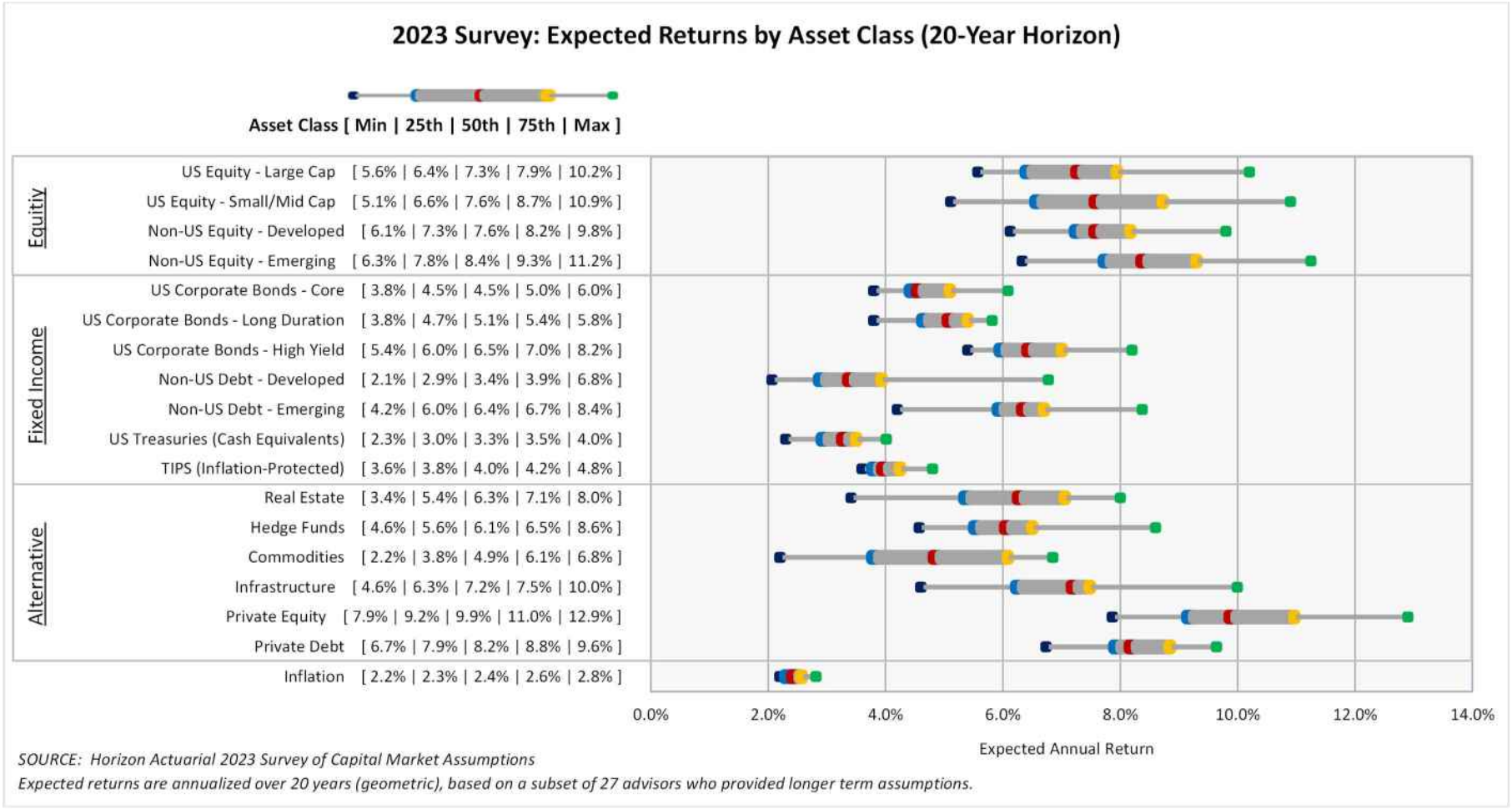


SOURCE: Horizon Actuarial 2023 Survey of Capital Market Assumptions
Expected returns are annualized over 10 years (geometric).

Exhibit 20

The exhibit below shows the ranges of expected annual returns for different asset classes over a 20-year investment horizon. The ranges shown below are based on the assumptions for 27 advisors who provided longer-term assumptions (horizons of 20 years or more). Expected returns shown below are annualized (geometric). Note that the ranges of expected returns are somewhat narrower when the investment horizon is longer.

To illustrate the distribution of expected returns, the exhibit shows the range of the middle 50 percent of results: the range between the 25th and 75th percentiles. It also shows the median expected return for each asset class: the 50th percentile. Note that the expected returns for the *median* advisor shown below are not the same as the *average* expected returns shown elsewhere in the report. In most cases, however, the differences between median and average expected returns are relatively small.



SOURCE: Horizon Actuarial 2023 Survey of Capital Market Assumptions

Expected returns are annualized over 20 years (geometric), based on a subset of 27 advisors who provided longer term assumptions.