Chapter 5

INVESTMENT BANKING AND SECURITIES ISSUANCE

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Contents

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Abstract

This chapter analyzes the securities issuance process, focusing on initial public offerings (IPOs) and seasoned equity offerings (SEOs). The IPO literature documents three empirical patterns: 1) short-run underpricing; 2) long-run underperformance (although this is contentious); and 3) extreme time-series fluctuations in volume and underpricing. While the chapter mainly focuses on evidence from the USA, evidence from other countries is generally consistent with the USA patterns. A large literature explaining the short-run underpricing of IPOs exists, with asymmetric information models predominating. The SEO literature documents 1) negative announcement effects; 2) the setting of offer prices at a discount from the market price; 3) long-run underperformance; and 4) large fluctuations in volume. In addition to long-run underperformance relative to other stocks, there is some evidence that issuers succeed at timing their equity offerings for periods when future market returns are low. When examining a large class of corporate financing activities, including equity offerings, convertible bond offerings, bond offerings, open market repurchases, stock- and cash-financed mergers and acquisitions, and dividend increases or decreases, several patterns emerge. In general, the announcement effects are negative for activities that provide cash to the firm, and positive for activities that pay cash out of the firm. Furthermore, the market generally underreacts, in that long-run abnormal returns are usually of the same sign as the announcement effect. In spite of the large expenditure of resources on analyst coverage, there is little academic work emphasizing the importance of the marketing of financial securities. Only recently have papers begun to focus on the corporate financing implications if firms face variations in the cost of external financing due to the mispricing of securities by the market.

Keywords

corporate finance, initial public offerings, seasoned equity offerings, underwriting, investment banking

JEL classification: G24, G32, G14

1. Introduction

1.1. Overview

This chapter analyzes the securities issuance process, largely taking the choice of what security to offer as given. Extensive attention is devoted to the controversies surrounding long-run returns on companies issuing equity, including both initial public offerings (IPOs) and seasoned equity offerings (SEOs). For IPOs, attention is also devoted to the mechanisms for selling IPOs, where considerable variation exists in global practices. Theories and evidence regarding the first-day returns on IPOs are also covered.

Most of this chapter is devoted to equity issues, even though fixed-income securities swamp equities in terms of the dollar value of issue volume. This is not because debt securities are unimportant, but because the pricing and distribution of fixed-income securities is generally much more straightforward. Specifically, credit risk is the main determinant of the relative yield on corporate bonds of a given maturity, and independent rating agencies such as Moody's provide credit ratings on bonds. In contrast, the payoffs on equities have substantial upside potential as well as downside risk, and are thus more sensitive to firm-specific information.

External financing is costly. When a firm decides to issue securities to the public, it almost always hires an intermediary, typically an investment banking firm. The issuing firm pays a commission, or gross spread, and receives the net proceeds when the securities are issued. In addition to the direct costs of issuing securities, an issuing firm that is already publicly traded frequently pays additional indirect costs through revaluations of its existing securities (the "announcement effect"). These indirect costs may, at times, be much larger than the direct costs. A major reason for writing this chapter is that the stock market's reaction to securities offerings conveys information about the firm's investment and financing activities. The interpretation of these reactions sheds light on broader issues such as market informational efficiency and the importance of adverse selection and moral hazard in corporate settings.

Investment banking firms are intermediaries that advise firms, distribute securities, and take principal positions. In the course of these activities, information is produced. Most investment banking firms are vertically integrated organizations that incorporate merger and acquisition (M&A) advisory services, capital raising services, securities trading and brokerage, and research coverage. Although there are distinctions, this chapter will use the terms investment bank, securities firm, and underwriter interchangeably. In Europe, universal banks have been permitted to perform both commercial and investment banking functions. In the USA, the Glass–Steagall Act separated commercial and investment banking functions from the 1930s to the 1990s. Commercial banks were permitted to take deposits from individuals that are guaranteed by the government (up to $100 000 per account-holder, as of 2003). In return for the government deposit guarantee, commercial banks were prohibited from certain activities, including taking equity positions in firms and underwriting corporate securities. The prohibition on underwriting securities was gradually relaxed, first for

debt securities and then for equity securities. In 1999, the Glass–Steagall Act was finally repealed, although deposit insurance remains.

The key difference between commercial banks and investment banks in the corporate financing function is that commercial banks primarily act as long-term principals, making direct loans to borrowers, whereas investment banks primarily act as short-term principals. Since investment banks are selling to investors the securities that firms issue, the marketing of financial securities is important. This is a topic that has no reason for coverage in a Modigliani–Miller framework, where markets are perfect and there is no role for marketing. An important tool in the marketing of financial securities, especially equities, is research coverage (forecasts and recommendations) by security analysts. Since the investment banking firm providing research reports also underwrites offerings, this is referred to as "sell-side" coverage. There is a perception that analyst coverage has become more important over time, partly because for many industries (i.e., biotechnology and technology companies), historical accounting information is of limited use in discerning whether new products and services will create economic value added. At the end of 2000, the Securities and Exchange Commission's Regulation FD (fair disclosure) went into effect. This regulation may affect the role of analysts, for it requires that information that a corporation provides to analysts must be publicly disclosed to others as well.

This chapter updates and extends previous surveys of the investment banking and securities issuance literature, notably Smith (1986) on the capital acquisition process, Eckbo and Masulis (1995) on seasoned equity offerings (SEOs), and Ibbotson and Ritter (1995) and Jenkinson and Ljungqvist (2001) on initial public offerings (IPOs). For those interested in a comprehensive analysis of the literature on IPOs, the Jenkinson and Ljungqvist book goes into extensive detail. Ritter and Welch (2002) focus on the recent IPO literature, especially papers dealing with share allocations. Both the Smith survey and the Eckbo and Masulis survey are grounded in an equilibrium market efficiency framework, and neither discusses long-run performance issues. The Eckbo and Masulis survey has an extensive discussion of rights issues (equity issues where existing shareholders are given the right to purchase new shares at a fixed exercise price). Rights issues will not be covered here, partly because rights issues are not common in the USA and their use in other countries has been rapidly declining, and partly due to the excellent existing analysis. Many other topics in security issuance are mentioned in passing or not discussed at all. For example, will technology change the securities issuance process? Given the burgeoning literature on various aspects of security issuance, any coverage that is less than book-length must, unfortunately, be selective.

Many important issues in corporate finance and macroeconomics are driven by the assumption that external finance is costly. Examples include theories of conglomerates (internal versus external capital markets), the effects of monetary policy (bank "capital crunches" and the "bank lending channel" of monetary policy transmission), financial development and growth, and financial accelerator models of business cycles. Because this literature is discussed by Jeremy C. Stein in Chapter 2 in this volume, this chapter

will not focus on these important issues. This chapter also is related to other topics in this volume, including Chapter 18 by Barberis and Thaler on behavioral finance and Chapter 15 by G.W. Schwert on anomalies and market efficiency.

This survey is somewhat USA-centric, largely reflecting the existing academic research literature. Although this is clearly a limitation, it is less of a limitation than it once was because capital markets are increasingly globally integrated, and USA institutional practices (in particular, book-building) and institutions are increasingly common throughout the world. As examples, Deutsche Bank's investment banking is headquartered in London; Credit Suisse First Boston, while nominally a Swiss firm, in 2000 was the lead manager on more IPOs in the USA than any other underwriter; and Goldman Sachs leads the league tables (market share tabulations) for M&A activity in Europe. Ritter (2003) provides a brief survey of the recent European IPO literature.

1.2. A brief history of investment banking and securities regulation

Until the 1970s, almost all investment banking firms were private partnerships, generally with a limited capital base. When underwriting large securities offerings, these partnerships almost always formed underwriting syndicates, in order to meet regulatory capital requirements, distribute the securities, and share risk. Many investment banking firms had "relationships" with corporations. In the 1970s, the investment banking industry began to change to a more "transactional" form, where corporations use different investment bankers for different services, on an as-needed basis. Investment banking firms have grown in size and scope, largely through mergers, and most of the larger firms have converted to publicly traded stock companies. A reason for the increase in size of investment banking firms is the increased importance of information technology, with large fixed costs and low marginal costs. With their new-found large capital bases and distribution channels, the historical rationale for forming syndicates to distribute securities has largely disappeared. Consistent with this, the number of investment banking firms participating in a given syndicate has shrunk noticeably over the last few decades. A syndicate is composed of one or more managing underwriters and from zero to over one hundred other syndicate members. The lead manager does most of the work and receives most of the fees [Chen and Ritter (2000)]. All of the managers usually provide research coverage. Indeed, this is the major reason why syndicates still exist. Frequently, after a deal is completed, a "tombstone" advertisement listing the syndicate members is published.

As a consequence of distributing the shares in an initial public offering, the lead underwriter knows where the shares are placed, which gives a natural advantage for making a market later on, since the underwriter knows whom to call if there is an order imbalance [Ellis, Michaely and O'Hara (2000)]. Advice on acquisitions and follow-on stock offerings frequently follows as well. The underwriter almost always assigns an analyst to follow the company and provide research coverage. Thus, securities underwriting capabilities are combined with M&A advisory capabilities, as well as

sales and trading capabilities. All of these activities are information-intensive activities. "Chinese walls", which are supposed to be as impregnable as the Great Wall of China, whereby proprietary information possessed in the M&A advisory function is not disclosed to stock traders, are supposed to exist. In the course of assisting in the issuance of securities, investment bankers perform "due diligence" investigations. In the M&A advisory role, they produce "fairness opinions". Investment bankers are thus putting their reputations on the line, certifying for investors that the terms of the deal are fair and that material information is reflected in the price [Chemmanur and Fulghieri (1994)].[1]

In the USA, federal government regulation of securities markets is based upon a notion of *caveat emptor* (buyer beware) with full disclosure. The USA Securities and Exchange Commission (SEC) regulates securities markets. In addition, self-regulatory organizations such as the New York Stock Exchange and the National Association of Securities Dealers impose requirements on members, and the threat of class action lawsuits on behalf of investors constrains the actions of issuers and underwriters. Prospectuses are required to contain all material information, with specific requirements for the amount and form of accounting disclosures. In Europe, there is no prohibition on underwriters producing research reports immediately preceding a securities offering. In the USA, firms going public and their underwriters are prohibited from disclosing projections that are not in the prospectus during the "quiet period", starting before a firm announces its IPO and ending 40 calendar days after the offer. An exception to this is that limited oral disclosures may be made during "road show" presentations, where attendance is restricted to institutional investors. In 1999, the SEC started permitting certain qualified individual investors to have access to webcasts of the road show.

Typically, the managing underwriters issue research reports with "buy" or "strong buy" recommendations as soon as the quiet period ends. Michaely and Womack (1999) present evidence that sell-side analysts affiliated with managing underwriters face conflicts of interest. The conventional wisdom is that analysts have become "cheerleaders". The three reasons for this are that 1) they are dependent upon access to corporate managers for information; 2) their compensation is tied to whether their investment banking firm is chosen as a managing underwriter on equity or junk-bond offerings, or as an advisor on M&A deals; and 3) the institutional clients that pay attention to a report are likely to be long in the stock. In 2002, new rules were announced in an attempt to limit the conflicts of interest and alert investors to the conflicts.

On the front page of a prospectus, the offer price and underwriting discount (commission) are disclosed. The underwriter is prohibited from distributing any

[1] A due diligence investigation involves quizzing management to uncover material information, some of it proprietary in nature, that is relevant for valuation purposes. A fairness opinion is a formal statement that the terms of an M&A deal or leveraged buyout are reflective of "fair" market valuation, including appropriate control premiums or liquidity discounts.

securities at a price above the stated offer price, although if the issue fails to sell out at the offer price, the underwriter may sell at a lower price. Because the underwriter cannot directly gain from any price appreciation above the offer price on unsold securities, while bearing the full downside of any price fall, there is every incentive to fully distribute the securities offered.

Based on the logic of the efficient markets hypothesis, beginning in 1982 the SEC began permitting publicly traded firms meeting certain requirements (basically, large firms) to issue securities without distributing a prospectus. Instead, SEC Rule 415 states that by filing a letter with the SEC disclosing the intention of selling additional securities within the next two years, a firm can sell the securities whenever it wants. Existing disclosures, such as quarterly financial statements, are deemed to be sufficient information to investors. The securities can be taken off the shelf and sold, in what are known as "shelf" issues. In practice, shelf issues are commonly done for bond offerings. Before selling equity, however, many firms prefer to hire an investment banker and conduct a marketing campaign (the road show), complete with a prospectus. From 1984–1992 there were virtually no shelf equity offerings, but they have enjoyed a resurgence since then [Heron and Lie (2003)].

1.3. The information conveyed by investment and financing activities

Smith's classic 1986 survey article *Investment Banking and the Capital Acquisition Process,* focused on announcement effects associated with securities offerings and other corporate actions. These transactions can be categorized on the basis of the leverage change and the implied cash flow change. For example, calling a convertible bond (forcing conversion into equity) decreases a firm's leverage and reduces its need for cash flow to meet interest payments, and repurchasing stock increases leverage and uses cash flow. The studies that he surveyed found that leverage-decreasing transactions on average are associated with negative announcement effects if new capital is raised (such as with equity issues). Leverage-increasing transactions on average are associated with positive announcement effects if no new capital is raised (such as with a share repurchase). As Smith pointed out, these patterns are difficult to reconcile with traditional tradeoff models of optimal capital structure. The patterns are consistent, however, with informational asymmetries and agency problems being of importance.

There are several problems with interpreting announcement effects. First, and most mechanically, in an efficient market the announcement effect will measure the difference between the post-announcement valuation and what was expected beforehand. If investors had a high likelihood of an announcement occurring beforehand, this updating element is small, and the announcement effect vastly underestimates the impact of the event. Second, any financing activity implicitly is associated with an investment activity, and any investment activity is implicitly associated with a financing activity. Corporate financing and investment actions invariably convey information about both of these activities, due to the identity that

sources of funds = uses of funds. For example, if a firm raises external capital, the firm is implicitly conveying the information that internal funds will be insufficient to finance its activities (bad news). It is also conveying the information that it will be investing more than if it didn't finance externally. This may be good or bad news, depending upon the desirability of the investment. So the announcement effect depends upon the relative magnitude of multiple implicit and explicit pieces of information.

A substantial literature, dating back to the mid-1980s, documents that the market reacts negatively, on average, to the announcement of equity issues in the USA. Convertible bond issues generally are greeted with a moderate negative reaction. Bond offerings have slightly negative reactions, and share repurchases are greeted with positive announcement effects. In the last decade, researchers have examined the long-run performance of firms following these events. The long-run performance evidence shows that in general the market underreacts to the announcement.

Most of the literature on long-run performance has focused on *relative* performance, i.e., do issuing companies underperform a benchmark? Baker and Wurgler (2000), however, present empirical evidence that issuing firms display *market* timing ability. Using USA data on issues of debt and equity (IPOs and SEOs), they find that the fraction of external financing that is equity predicts the following calendar year's stock market return with greater reliability than either the market dividend yield or the market's market-to-book ratio. Baker and Wurgler's sample covers returns from 1928 to 1997. Interestingly, the fraction of equity issuance was highest in 1929, a year that included the October stock market crash. When the sample period is split in two, however, their results hold in both subperiods.

If firms can successfully time their equity offerings to take advantage of "windows of opportunity", they have a time-varying cost of external capital. How should this affect a firm's investment and financing policies? Stein (1996) addresses this important issue, and concludes that the normative answer depends upon the interaction of two assumptions. The first assumption is whether differences in the cost of external equity reflect misvaluations or differences in equilibrium expected returns. The second assumption is whether managers are trying to maximize short-run firm value or long-run firm value. If one assumes that a low expected return occurs because a stock is overvalued, then managers should issue stock but not invest in low return activities if they are focused on maximizing the wealth of long-term shareholders. On the other hand, if one assumes that low expected returns are rationally being forecast by investors, then a firm should issue stock and use a lower hurdle rate in choosing its investments, much as the neoclassical model of optimal investing and financing would recommend.

The remainder of this chapter discusses securities issuance. In Section 3, the short-run and long-run reactions to various corporate announcements will be summarized. In Section 4, initial public offerings will be analyzed in detail, with substantial focus on contractual mechanisms. But first, detailed attention is given to firms conducting seasoned equity offerings.

2. Seasoned equity offerings (SEOs)

When a firm that is already publicly traded sells additional stock, the new shares are perfect substitutes for the existing shares. For these transactions, the academic literature tends to use the term seasoned equity offering (SEO), as contrasted with an unseasoned equity offering, an IPO. Practitioners generally use the term follow-on offering, especially if the equity issue is within several years of the IPO. SEOs are also referred to as secondaries, although secondary offering is a term that can mean either a follow-on offering or shares being sold by existing shareholders, as opposed to a primary offer where the issuing firm is receiving the proceeds. (And on the subject of ambiguous terms, this chapter will use public ownership to mean stock that is traded in the market, rather than government ownership. Private ownership is used to mean non-traded stock, rather than being owned by the private sector).

2.1. Announcement effects

Numerous studies have documented that in the USA there is an announcement effect of –2%, on average, for SEOs. The most popular explanation among academics for this negative announcement effect is that of the Myers and Majluf (1984) adverse selection model. Myers and Majluf assume that management wants to maximize the wealth of its existing shareholders in the long run. At any point in time, however, the current market price may be too high or too low relative to management's private information about the value of assets in place. In other words, strong-form market inefficiency is being assumed. If management thinks that the current market price is too low, the firm will not issue undervalued stock, for doing so dilutes the fractional ownership of existing shareholders. If management thinks that the current stock price is too high, however, the firm will issue equity if debt financing is not an option. Rational investors, knowing this decision rule, therefore interpret an equity issue announcement as conveying management's opinion that the stock is overvalued, and the stock price falls. [2]

How this negative announcement effect should be interpreted is a subject of debate. If a firm is issuing shares equal to 20% of its existing shares, a downward revaluation of 2% for the existing shares is a dollar amount equal to 10% of the proceeds being raised. If this 2% drop is viewed as a cost of an equity issue, then external equity capital is very expensive. On the other hand, if this 2% drop would have occurred when the basis for management's opinion regarding firm value was disclosed in some other manner, then the downward revaluation is not a cost of the equity issue for long-term shareholders. It is a cost only to those shareholders who would have sold their shares in between the

[2] The Myers–Majluf predictions are very sensitive to the assumptions about the objective function of management, the portfolio rebalancing rules of investors, and the source of information asymmetries. Daniel and Titman (1995) discuss some of these issues in detail.

equity issue announcement and when the negative news would have otherwise been impounded into the share price. If this is the case, then the negative announcement effect is mainly a matter of indifference to a firm where long-term shareholder wealth maximization is the objective, and external equity is not inordinately costly.

As mentioned earlier, when a firm raises external equity capital, it not only conveys information about whether management thinks the firm is overvalued or not, but also suggests that something will be done with the funds raised. If the market interprets the equity issue as implying that a new positive net present value project will be undertaken, the announcement effect could be positive. On the other hand, if the market is concerned that the equity issue means that management will squander the funds on empire building, then the announcement effect could be interpreted as causally linked to the equity issue, in which case external equity is in fact very expensive. The rationale is that the additional equity resources are relaxing a constraint on management's tendency to engage in "empire-building", or growth for the sake of growth. In other words, agency problems between shareholders and managers are intensified.

A number of empirical studies have documented cross-sectional patterns in the equity issue announcement effect. In general, these results show that there is less of a negative reaction when a firm can convince the market that there is a good reason for issuing equity, and there is a more negative reaction when good motivations are not obvious. Jung, Kim and Stulz (1996) report that firms with a high q (market value-to-replacement cost), reflecting good investment opportunities, have an announcement effect that is insignificantly different from zero. Choe, Masulis and Nanda (1993) document that the announcement effect is less negative when the economy is in an expansionary segment of the business cycle, when there may be less adverse selection risk.

Korajczyk, Lucas and McDonald (1991) report that the announcement effect is less negative if it follows shortly after an earnings report, at which time there is presumed to be less asymmetric information. Houston and Ryngaert (1997) provide direct evidence that adverse selection concerns explain part of the negative announcement effect. They study bank mergers, where common stock is the dominant means of payment to the shareholders of target banks. Some merger agreements specify that the target shareholders will receive a fixed number of shares in the acquiring bank (a fixed ratio stock offer), and other merger agreements specify a variable number of shares that add up to a fixed dollar amount (a conditional stock offer). If target shareholders are concerned that the acquirer is offering overvalued stock, the conditional stock offer provides protection against price drops. Consistent with adverse selection concerns, the announcement effect is −3.3% for fixed ratio stock offers, but only −1.1% for conditional stock offers.

In general, studies find that larger issues have more negative effects. One problem with interpreting the relation between issue size and announcement effects is that if there is an unusually negative reaction, the issue size may be cut back by the time the deal is completed. Since existing empirical studies do not take this endogeneity into account, the empirical estimates of the effect of issue size on the announcement are

subject to a simultaneous equations bias. This bias results in an underestimate of the magnitude of the effect of issue size on the stock price. Thus, academics undoubtedly underestimate the degree to which the demand curve for a stock is negatively sloped.

On the issue date, SEOs are, on average, sold at a discount of about 3% relative to the market price on the day prior to issuing [Corwin (2003), Mola and Loughran (2003)]. Mola and Loughran report that the size of this discount has grown over time, and that there has been an increasing tendency to set the offer price at an integer. For example, in recent years a stock trading at $31.75 would very likely be priced at $30.00 or $31.00, whereas in the 1980s it would have been more likely to be priced at $31.00 or $31.50.

2.2. Evidence on long-run performance

The long-run performance of SEOs has been the subject of a number of studies, all of which find that firms conducting SEOs typically have high returns in the year before issuing. For example, Loughran and Ritter (1995) report an average return in the year before issuing of 72%. During the five years after issuing, however, the returns are below normal. Partly this is due to "market timing", and partly it is due to abnormal performance relative to a benchmark. The conclusions regarding abnormal performance are hotly debated, and sensitive to the methodology employed and the sample used. Figure 1 illustrates the evidence regarding average annual returns in the five years after issuing. The numbers show that, for 7760 SEOs from 1970–2000, the average annual return in the five years after issuing is 10.8%. Nonissuing firms of the same size (market capitalization) have average annual returns of 14.4%. Therefore, relative to a size-matched benchmark, issuers underperform by 3.6% per year for five years.

Using a size benchmark, however, introduces a confounding effect. Issuing firms tend to be growth firms, and nonissuers tend to be value firms. Thus, in addition to comparing issuers with nonissuers, growth firms are being compared with value firms. To remove this confounding effect, Table 1 also reports the average annual returns on issuing firms and nonissuers matched by both size and book-to-market ("style" matching). In so doing, some issuers are lost because of missing book value information. Table 1 shows that when issuers are compared to style-matched nonissuers, the underperformance narrows slightly to 3.4% per year in the five years after issuing. Statistical significance levels are not reported in Table 1, because the large degree of overlap in post-issue returns among the sample greatly decreases the number of independent observations.

Inspection of Table 1 shows that issuers do not underperform in the first six months after issuing. This is probably due to a combination of momentum effects and a desire to avoid litigation by making sure that earnings numbers meet analyst forecasts in the first two quarters after issuing. Negative earnings surprises are rare immediately following an SEO [Korajczyk, Lucas and McDonald (1991)]. In the roughly two years after this six month honeymoon, however, there is very substantial underperformance,

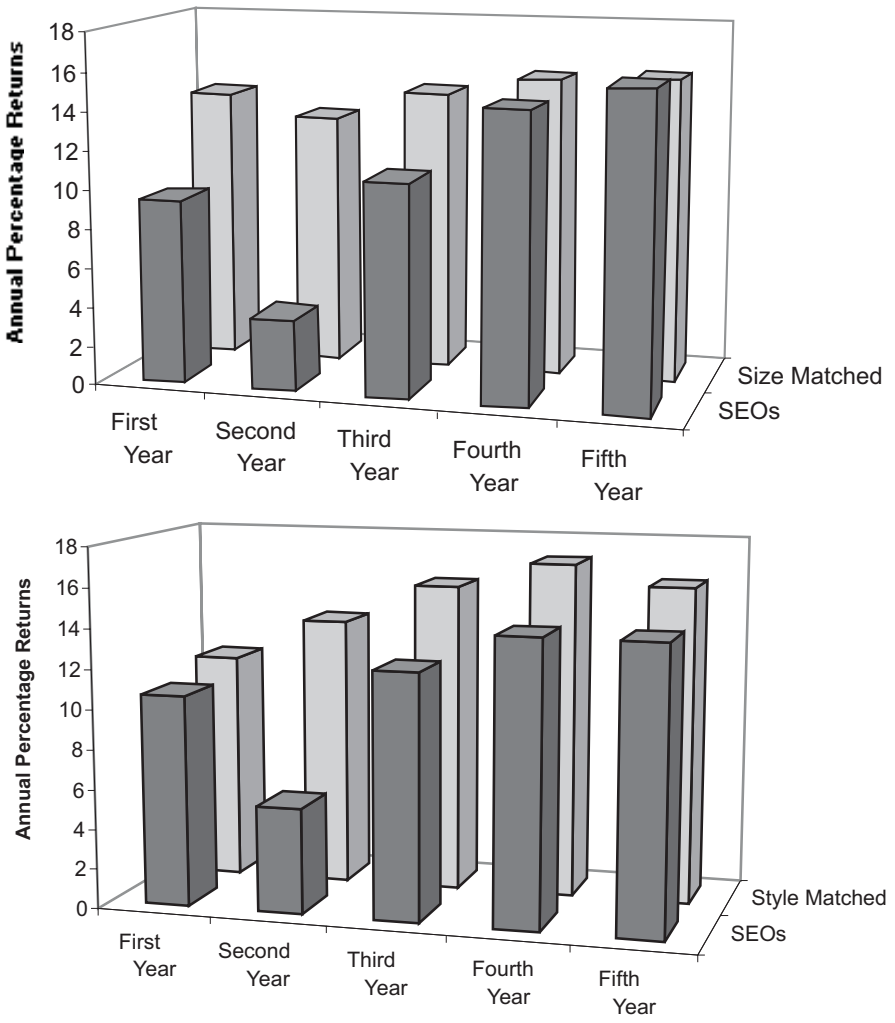

Fig. 1. Post-issue returns for firms conducting seasoned equity offerings (SEOs) in 1970–2000. The average annual return for each of the five years after issuing is shown for firms conducting SEOs and (top panel) size-matched nonissuing firms, and (bottom panel) style-matched nonissuing firms. The style matches are based upon size (market cap) and book-to-market matching. For each of the five post-issue years, the average annual return is calculated as an equally weighted average of the CRSP-listed issuers that are present at the beginning of the year. All matching firms have been CRSP-listed for at least five years at the time of the SEO with which they are matched, and have not conducted an SEO during this time. If an SEO is delisted before five years from the issue date, its annual return during the year of delisting is calculated by splicing in the CRSP value-weighted market return for the remainder of that year. Additional details are described in Table 1, where the numbers in this figure are reported. Returns are computed using CRSP returns ending on December 31, 2001.

Table 1
Mean percentage returns on SEOs from 1970–2000 during the first five years after issuing[a]

	1st 6 months	2nd 6 months	1st yr	2nd yr	3rd yr	4th yr	5th yr	Geometric mean yrs 1–5
SEO firms	6.7%	1.5%	9.4%	3.6%	10.9%	14.7%	15.9%	10.8%
Size-matched	6.1%	7.0%	14.0%	12.9%	14.4%	15.3%	15.5%	14.4%
Difference	0.6%	–5.5%	–4.6%	–9.3%	–3.5%	–0.6%	0.4%	–3.6%
Number	7502	7475	7504	7226	6603	5936	5188	7760
SEO firms	7.4%	2.2%	10.6%	5.3%	12.3%	14.2%	14.2%	11.3%
Style-matched	5.4%	5.6%	11.5%	13.6%	15.6%	16.9%	15.9%	14.7%
Difference	2.0%	–3.4%	–0.9%	–8.3%	–3.3%	–2.7%	–1.7%	–3.4%
Number	6638	6622	6638	6289	5711	5123	4448	6638

[a] All averages are equally weighted. For the first year, the returns are measured from the closing market price on the issue date until the 6th-month or one-year anniversary. All returns are equally weighted average returns for all seasoned equity offerings (SEOs) that are still traded on Nasdaq, the Amex, or the NYSE at the start of a period. If an issuing firm is delisted within an event year, its return for that year is calculated by compounding the CRSP value-weighted market index for the rest of the year. The matching firm is treated as if it delisted on the same date, and its return for the remainder of the year is calculated using the CRSP VW index. Thus, once an SEO is delisted, by construction there is no abnormal performance for the remainder of the year. For the size-matched returns, each SEO is matched with a nonissuing firm having the same market capitalization (using the closing market price on the first day of trading for the SEO, and the market capitalization at the end of the previous month for the matching firms). For the style-matched returns, each SEO is matched with a nonissuing firm in the same size decile (using NYSE firms only for determining the decile breakpoints) having the closest book-to-market ratio. For nonissuing firms, the Compustat-listed book value of equity for the most recent fiscal year ending at least four months prior to the SEO date is used, along with the market cap at the close of trading at month-end prior to the month of the SEO with which it is matched. Nonissuing firms are those that have been listed on the Amex–Nasdaq–NYSE for at least five years, without issuing equity for cash during that time. If a nonissuer subsequently issues equity, it is still used as the matching firm. If a nonissuer gets delisted prior to the delisting (or the 5th anniversary, or Dec. 31, 2001), the second-closest matching firm on the original SEO date is substituted, on a point-forward basis. For firms with multiple classes of stock outstanding, market cap is calculated based using only the class in the SEO for the SEO. For nonissuing firms, each class of stock is treated as if it is a separate firm. The sample size is 7760 SEOs from 1970–2000 when size-matching is used, excluding SEOs with an offer price of less than $5.00, ADRs, REITs, closed-end funds, and unit offers. All SEOs are listed on CRSP for at least 6 months, and after Nasdaq's inclusion, are listed within 6 months of going public. Returns are measured through December 31, 2001. For partial event-years that end on this date, the last partial year is deleted from the computations. In other words, for an SEO that issued on March 15, 2000, it's first-year return is included, but not the second-year return.

Table 2
Evidence on the long-run performance of SEOs, measured using buy-and-hold returns[a]

Study	Horizon, weighting[b]	Sample size	Sample period	Mean buy-and-hold return		Annualized difference
				SEOs	Matching	
USA data						
Mitchell & Stafford[c]	3 yr (EW)	4439	1961–1993	34.8%	45.0%	–2.7%
Eckbo, Masulis & Norli[d]	5 yr (EW)	3315	1964–1995	44.3%	67.5%	–4.8%
Jegadeesh[e]	5 yr (EW)	2992	1970–1993	59.4%	93.6%	–4.9%
Spiess & Affleck-Graves[f]	5 yr (EW)	1247	1975–1989	55.7%	98.1%	–6.1%
Brav, Geczy & Gompers[g]	5 yr (EW)	3775	1975–1992	57.6%	83.9%	–3.9%
Mitchell & Stafford[c]	3 yr (VW)	4439	1961–1993	41.1%	45.3%	–1.1%
Eckbo, Masulis & Norli[d]	5 yr (VW)	3315	1964–1995	51.6%	62.2%	–2.2%
Brav, Geczy & Gompers[g]	5 yr (VW)	3775	1975–1992	72.5%	97.5%	–3.4%
Japanese data						
Cai & Loughran[h]	5 yr (EW)	1389	1971–1992	74.1%	103.2%	–3.5%

continued on next page

as firm performance fails to live up to optimistic expectations. By year five, however, the abnormal returns are close to zero, suggesting that the underperformance does not persist forever.

Most of the empirical literature concerning the long-run performance of SEOs has used two procedures: buy-and-hold returns and 3-factor regressions. The results of studies using buy-and-hold returns with a style benchmark are reported in Table 2.[3]

Mitchell and Stafford have the lowest abnormal performance, which is presumably attributable to their sample being relatively intensive in utilities and SEOs listed on the New York Stock Exchange (NYSE) from the 1960s and early 1970s. Mitchell and Stafford (2000) report that the only issuers that underperform are small value firms. By contrast, Jegadeesh (2000) reports that it is growth firms among the issuers that

[3] Jegadeesh (2000) and Brav, Geczy and Gompers (2000) also adjust for momentum, in addition to size and book-to-market, with qualitatively unchanged results.

Table 2, notes

[a] The numbers reported in this table for matching firms are all based on size and book-to-market matching ("style" benchmarks). Most authors use buy-and-hold returns on individual stocks for their benchmarks, although some, such as Brav, Geczy and Gompers (2000), use portfolios and rebalance their benchmark monthly and then compound the monthly average returns. All of the benchmarks delete issuing firms from the universe of potential matches.

[b] EW is equally weighted, and VW is value weighted.

[c] For Mitchell and Stafford (2000, Table III) the compounded annual return difference of 2.7% assumes a 3.0 year mean holding period (they reinvest early delistings in an index). Their sample period is July 1961–December 1993 and they include utilities. The annualized difference is calculated as $[R_i^{\text{inverse}T} - R_b^{\text{inverse}T}] \times 100\%$ where R_i is the average gross buy-and-hold return on the issuing firms, R_b is the average gross compounded return on the benchmark, and inverse$T$ is the reciprocal of the average holding period length. For Mitchell and Stafford, R_i is 1.348, and the annualized difference is calculated as 1.348 to the 1/3 power minus 1.450 to the 1/3 power, and then converted to a percentage.

[d] Eckbo, Masulis and Norli (2000, Table 3, excluding utilities) truncate a firm's return if and when it conducts a subsequent SEO. The compounded difference in returns of 4.8% assumes a 3.5 year mean holding period.

[e] For Jegadeesh (2000, Table 2), a 4.5 year mean holding period is assumed, giving a compounded difference in returns of 4.8% per year for his sample period of 1977–1994, with returns truncated at Dec. 31, 1997.

[f] For Spiess and Affleck-Graves (1995, Table 3), a 4.5 year average holding period is assumed. They restrict their sample of SEOs to pure primary issues (offers where only the firm is selling shares), unlike the other studies, which include combination offers where both the firm and existing shareholders sell shares in the SEO.

[g] For Brav, Geczy and Gompers (2000, Table 3, Panel A), the compounded difference in annualized returns assumes a 4.5 year mean holding period. Their sample period is from 1975–1992, with returns ending on December 31, 1995, and includes utilities.

[h] For Cai and Loughran (1998, Table 2, Panel A), where Tokyo Stock Exchange-listed firms are used, the annualized difference is computed assuming a 5.0 year holding period, since very few of the sample firms delist early.

have the worst subsequent performance, and that large firms as well as small growth stocks underperform.

As discussed by Barber and Lyon (1997), Kothari and Warner (1997), Lyon, Barber and Tsai (1999), Brav (2000), and others, unbiased statistical significance levels are difficult to compute using buy-and-hold returns. Consequently, starting with Loughran and Ritter (1995), the long-run returns literature has commonly used 3-factor time-series regressions, introduced by Fama and French (1993), of the form

$$r_{pt} - r_{ft} = a + b(r_{mt} - r_{ft}) + s\text{SMB}_t + \upsilon\text{VMG}_t + e_{pt}, \tag{1}$$

where $r_{pt} - r_{ft}$ is the excess return over the risk-free rate on a portfolio in time period t, $r_{mt} - r_{ft}$ is the realization of the market risk premium in period t, SMB_t is the return on a portfolio of Small stocks Minus the return on a portfolio of Big stocks in period t, and VMG_t is the return on a portfolio of Value stocks Minus the return on a portfolio of Growth stocks in period t. Value and growth are measured using book-to-market ratios, and VMG is denoted HML in the literature (High book-to-market (value) Minus Low book-to-market (growth) stocks). The intercepts from these regressions are interpreted

Table 3
Equally weighted and value-weighted intercepts of Equation (1) on USA SEOs[a]

Studies	Sample size	Equally-weighted intercepts[b]	Value-weighted intercepts[b]
Mitchell and Stafford (2000, Table 9)[c], including utilities (July 1961–December 1993)	4911	–0.33 (–5.19)	–0.03 (–0.44)
Mitchell and Stafford (2000, Table 9)[c], excluding utilities (July 1961–December 1993)	3842	–0.37 (–5.58)	0.06 (0.77)
Eckbo, Masulis and Norli (2000, Table 10, Panel C), excluding utilities (March 1964–December 1997), Amex/NYSE only	1704	–0.12 (–0.65)	–0.17 (–1.12)
Eckbo, Masulis and Norli (2000, Table 10, Panel C), excluding utilities (February 1974–December 1997), Nasdaq only	2147	–0.42 (–2.37)	–0.12 (–0.19)
Jegadeesh (2000, Table IV)[d], (January 1975–December 1995)	2992	–0.45 (–5.07)	–0.33 (–2.84)
Loughran and Ritter (2000, Table 7)[e,g], (January 1973–December 1996)	6461	–0.47 (–5.42)	–0.32 (–3.00)
Loughran and Ritter (2000, Table 7)[e,g], purged (January 1973–December 1996)	6461	–0.61 (–6.08)	–0.35 (–3.38)
Brav, Geczy and Gompers (2000, Table 6)[f,g] (January 1976–December 1995)	4526	–0.37 (–4.81)	–0.14 (–1.36)
Brav, Geczy and Gompers (2000, Table 6)[f,g], purged (January 1976–December 1995)	4526	–0.40 (–4.65)	–0.17 (–1.63)

[a] A coefficient of –0.33 represents underperformance of 33 basis points per month, or –3.96% per year before compounding.
[b] *T*-statistics are in parentheses.
[c] Mitchell and Stafford use issuing firms from 1958–1993 and keep a firm in the portfolio for five years after issuing. Monthly returns from July 1961 through December 1993 are used in their regressions.
[d] Jegadeesh uses SEOs from 1970 to 1994, and keeps a firm in the portfolio for five years after issuing. The VW results that are reported for Jegadeesh are his EW "large firm" results.
[e] Loughran and Ritter use issuing firms from 1970–1996, and keep a firm in the portfolio for three years after issuing. They exclude utilities from their issuer portfolio.
[f] Brav, Geczy and Gompers use issuing firms from 1975–1992, and keep a firm in the portfolio for five years after issuing.
[g] The purged and unpurged numbers refer to whether the size and book-to-market factors are constructed exclusive (purged) or inclusive (unpurged) of firms that have issued equity within the prior five years.

as abnormal returns. In Table 3, the intercepts (and *t*-statistics) reported in various studies of abnormal performance following SEOs are listed.

Comparing the numbers in Tables 2 and 3, the results seem somewhat sensitive to what time period is examined, and what sample selection criteria are used. Evidence shows that SEOs from the heavy-volume period of 1970–1972 did very poorly in the bear market of 1973–1974, and failed to recover in the small stock rally of 1975–

1976. The Loughran and Ritter (1995, 2000) studies, as well as this chapter's Table 1, include these SEOs from the early 1970s in the post-issue returns, whereas Jegadeesh (2000), Eckbo, Masulis and Norli (2000), and Brav, Geczy and Gompers (2000) exclude them.[4] Thus, in January 1976, the Brav, Geczy, and Gompers issuing firm portfolio only includes issuing firms from 1975, whereas the Loughran and Ritter portfolio includes equity issuers from 1971–1975, including over 500 issuers listed, or subsequently listed, on Nasdaq. Issuing firms also did especially poorly during the bursting of the tech stock bubble in 2000. Thus, the different abnormal return estimates from various studies that are reported in Table 3, where the same methodology is used in every study, are largely due to differing sample periods. The Eckbo, Masulis and Norli finding of minimal abnormal returns after SEOs can partly be attributable to high returns on a small number of NYSE-listed issuing firms in the 1960s, which have a large impact on their conclusions, for these studies weight each period equally.[5]

This sensitivity of the performance results to the sample period used is not unique to issuing companies. Two of the best-known empirical patterns in finance are that growth stocks tend to underperform value stocks and that small firms outperform large firms [Fama and French (1992), Davis, Fama and French (2000)]. But if 1975–1982 is excluded, the "small firm" effect disappears, and if the sample period includes just 1983–1999, small firms underperform. In the 1990s, large growth firms had higher returns than any other style category. So just as the size and book-to-market effects vary across subperiods, it should be no surprise that the relative performance of issuing firms varies in different subperiods.

2.3. Reasons for underperformance

The evidence on the long-run performance of firms conducting SEOs is that issuing firms have relatively low returns in the 3–5 years after issuing. A number of

[4] Eckbo, Masulis and Norli (2000) exclude Nasdaq-listed issuers prior to 1974. Mitchell and Stafford (2000) exclude Nasdaq-listed issuers prior to 1973. Nasdaq started in February 1971, but CRSP does not start covering Nasdaq stocks until December 1972.

[5] Eckbo, Masulis and Norli (2000) find that large firms conducting SEOs in the 1960s subsequently outperformed a multifactor benchmark. Their sample excludes SEOs by Nasdaq firms prior to 1974, and includes only a small portion of Amex-NYSE issuers in the 1960s and early 1970s, apparently because their sample for this period required *Wall Street Journal* announcement dates when it was originally constructed. Their sample period is 32 years long (1964–1995), but over 80% of their sample is from the second half. In 1964–1979, 53% of their issuers are utilities, whereas in 1980–1995, only 13% are utilities. Because they do not include many SEOs from the 1960s, the portfolio for their multifactor regressions is frequently tiny when utility firms are excluded (Tables 6, 8, 9 and 10). For example, in November 1964, they have only four firms in the portfolio. In November 1965, the portfolio has increased to only ten firms, and a year after that, it has only 19 firms. In November 1967, only 23 firms are present. By contrast, some months in the 1980s and 1990s have close to 1000 firms in their issuer portfolio. While they adjust the standard errors for the resulting heteroscedasticity, the coefficient estimates weight each period equally.

Table 4
Multi-factor regressions[a] with an equally-weighted portfolio of USA SEOs, January 1973–December 2000

	a	b_t	b_{t-1}	s_t	v_t	R^2
(1)[b]	–0.52 (–2.84)	1.37 (34.65)				78.2%
(2)[b]	–0.60 (–3.28)	1.36 (35.16)	0.14 (3.60)			78.9%
(3)[b]	–0.52 (–5.53)	1.20 (53.43)		0.89 (30.87)	–0.01 (–0.36)	94.6%

[a] All regressions use 336 observations where the dependent variable is the monthly percentage return on a portfolio of SEOs that have gone public during the prior 36 months. A coefficient of –0.52 represents underperformance of 52 basis points per month, or –6.24% per year before compounding. The explanatory variables are described on p. 267.
[b] T-statistics are in parentheses.

explanations have been advanced for these low returns. These ideas also apply to IPOs, where the empirical evidence on long-run underperformance is discussed in Section 4 of this chapter.

One possibility is that the underperformance of issuing firms may be just a manifestation of a misspecified model for what the returns should have been. Fama (1998) refers to this as the "bad model" problem. Eckbo, Masulis and Norli (2000), for example, present evidence that a 6-factor asset-pricing model can explain the performance of issuing firms. They argue that the decreased leverage associated with an equity issue lowers the sensitivity of the stock price to inflation shocks, and the extra shares outstanding make the stock more liquid. In general, they argue that issuing firms have low risk as a result of the equity issue, and therefore should have low returns.

This raises the question of just how risky companies conducting SEOs really are. Fama–French (1993) 3-factor regressions typically find that SEOs have near-average systematic risk, a high sensitivity to the size factor, but a surprisingly modest sensitivity to the book-to-market factor. This presents a misleading picture, however.

Table 4 reports several single-factor and multifactor regressions. None of the factors are purged of issuing firms, so the intercepts underestimate the degree of abnormal performance. Row (1) reports a simple one-factor regression where the intercept is the "Jensen alpha". The intercept is a statistically significant negative 52 basis points per month. Row (2) includes a lagged market excess return, which is highly significant. Summing the contemporaneous and lagged betas [see Fama and French (1992) for another paper using this procedure] gives a systematic risk estimate of 1.50, which shows that SEOs expose investors to a high degree of market risk.

Row (3) of Table 4 reports Fama–French 3-factor regression coefficients. The estimate of systematic risk is 1.20, considerably lower than the 1.50 value of the summed betas in row (2). The reason for this difference is that the size factor catches some of the systematic risk. Small stocks tend to have higher betas than big stocks, so SMB tends to have a positive factor return in rising markets. In other words, SMB is not orthogonal to the market excess return. Indeed, if one runs regression (2) with

SMB as the *dependent* variable, the summed beta is 0.33. That is, small stocks expose an investor to a beta that is 0.33 higher than large stocks do. Since issuing firms tend to underrepresent the largest stocks, part of the high level of systematic risk that they expose an investor to is captured by the size effect.

Market efficiency requires that, if one uses the appropriate benchmark, there should be no abnormal returns on average after an event. As Loughran and Ritter (2000) point out, tests of market efficiency are always joint tests of a (theoretically motivated) model of market equilibrium and the existence of abnormal returns. Since matching by size and book-to-market is empirically motivated, rather than theoretically motivated, the abnormal returns reported in Tables 1–4 are not evidence for or against market efficiency. Still, it is hard to imagine that the relatively low post-issue returns on issuing firms can be attributed to low risk, since row (2) of Table 4 shows that issuing firms expose investors to a very high level of systematic risk.

Eckbo, Masulis and Norli (2000) argue that the decreased leverage after an equity issue lowers the systematic risk of equity issuers. Denis and Kadlec (1994), however, report that once various statistical biases are accounted for, there is no change in the equity beta for issuing firms, even though theoretically there should be a change if operating risk doesn't change. It is, however, entirely conceivable that lower leverage is more than offset by increased operating risk, if issuing companies embark on aggressive expansion plans with the money raised in an SEO.

Another possible explanation of the negative abnormal returns on issuers is that the findings are just due to chance, possibly because a few industries that had heavy issuance activity failed to live up to expectations. Although the sample sizes involve thousands of firms, the number of independent observations is considerably smaller. In Table 5 of Section 3, however, it is shown that over a wide variety of corporate financing-related events, there is a persistent pattern of underreaction. Thus, the chance explanation requires not only that SEOs just happened to underperform, but that underreaction just happened to occur in a large variety of other events.

Jung, Kim and Stulz (1996) examine a number of explanations for the decision to issue equity or debt. They interpret their evidence on debt and equity issues as consistent with an agency model. In particular, firms that issue equity when they could apparently issue debt have more negative announcement returns, the lower is their market-to-book ratio. The agency explanation is that managers will tend to squander corporate resources if given the opportunity, although this may not be intentional.

Another possibility is that investors and managers are systematically overoptimistic at the time of issue. After all, for most of the issuers, good things have been happening to the stock price in the year prior to issue. Issuers tend to be firms that have recently outperformed other firms in their industry, which in turn has outperformed the market, in a rising market. Profitability is increasing [Loughran and Ritter (1997)]. As Heaton (2002) notes, managers tend to be too optimistic, which then leads to a tendency to overinvest. Worse, competitors may be overinvesting, too, resulting in decreasing profit margins in the years after issuing. In

general, managers of issuing firms act as if they are very confident about the prospects of their firms [Lee (1997)]. In their study of Tokyo Stock Exchange-listed firms conducting SEOs and convertible bond issues, Kang, Kim and Stulz (1999) report post-issue underperformance of the same magnitude as for the USA. The underperformance is present whether it is a private placement or a public issue. They interpret their evidence as consistent with the managerial overoptimism hypothesis.

Insight regarding whether investors are systematically disappointed in the post-issue performance of SEOs can be gained by examining the market reaction to earnings announcements. This has been done by Jegadeesh (2000) and Denis and Sarin (2001), who report that there are economically significant negative earnings announcement effects from the second quarter after the SEO until at least three years later. While this evidence does not identify the cause of the disappointment, it suggests that a misspecification of the model of expected returns is unlikely to be the sole cause of measured underperformance.

A less innocuous explanation for low post-issue returns is that issuing firms either intentionally or unintentionally manipulate their earnings prior to the SEO. Consistent with this hypothesis, the issuing firms that are most aggressive in their use of accruals to boost earnings have the worst subsequent performance [Rangan (1998) and Teoh, Welch and Wong (1998)].

In sum, the evidence suggests that both managers and investors are systematically too optimistic about the prospects of issuing firms when equity issues occur. If the market learns, this would predict that equity issue announcement effects should be more negative than they historically have been. There is no evidence, however, that this is occurring.

If firms are able to issue overvalued equity, the whole logic of the Myers and Majluf (1984) rationale for the reluctance of firms to issue equity is thrown into question. The Myers and Majluf model is based on the assumption that opportunities to issue overvalued equity are not present. Graham and Harvey (2001) present survey evidence from corporate executives that perceived misvaluations and recent stock price runups are among the most important determinants of the decision to issue equity. If firms can in fact issue overvalued equity, at least at certain times, then a new "windows of opportunity" model of capital structure is in need of development. Baker and Wurgler (2002) document that a firm's capital structure is strongly related to past market valuations, suggesting that capital structure is a cumulative outcome of past attempts to time the equity market.

3. Short-run and long-run reactions to corporate financing activities

Table 5 summarizes the empirical evidence on the short-run and long-run reaction to various corporate financing actions. This table is analogous to Table 1 in Fama (1998). The tables differ, however, in that Fama includes a variety of announcements

having nothing to do with cash flows or corporate financing.[6] Underreaction is present when the abnormal returns in the announcement and post-announcement periods are the same. Overreaction occurs when the abnormal returns in the announcement period and the post-issue announcement period differ, and the announcement abnormal return is bigger in magnitude than the totality of the post-announcement abnormal returns. Misreaction occurs when the announcement and post-announcement returns are of opposite sign and the announcement effect is smaller than the totality of the post-announcement abnormal returns. Fama groups misreactions and overreactions together, and argues that the empirical evidence is as likely to show overreaction as underreaction.

The patterns in Table 5, however, show a tendency toward underreaction. That is, negative announcement effects tend to be followed by negative long-run abnormal returns, and positive announcement effects tend to be followed by positive long-run abnormal returns. This is true with USA SEOs, convertible bonds, bonds, open-market share repurchases, cash-financed acquisitions, and stock-financed acquisitions. The only apparent exceptions are Japanese SEOs, equity carveouts, private placements of equity, bank loans, and dividend decreases, where there are misreactions. There is no evidence of overreaction.

In general, the patterns suggest that corporate actions that use cash enhance shareholder value, and corporate actions that raise cash lower shareholder value. This pattern was first discussed by Smith (1986), but the magnitude of the effect is underestimated if one focuses only on announcement returns. The pattern is consistent with tendencies towards empire building by managers (investment in negative net present value projects) that are not fully anticipated by the market.

Kadiyala and Rau (2003) present evidence that significantly negative long-term abnormal returns are present only in subsamples of firms announcing after negative prior information (such as negative earnings surprises). Similarly, they report that long-run positive abnormal returns are present only in subsamples with prior positive information (such as positive earnings surprises). Thus, the assumption that the market efficiently impounds the information conveyed by a corporate financing action at the announcement must be called into question.

If the market is systematically underreacting to the information conveyed by corporate financing announcements, why don't arbitrageurs take advantage of the opportunity to make abnormal profits? As Shleifer and Vishny (1997) argue, "arbitrage" is in fact risky. As an example, think about the risks associated with shorting issuing firms, if one is of the opinion that firms that issue equity are overvalued. In the late 1990s, the firms that issued stock in the USA were

[6] Among the events that have been studied that are not corporate financing-related are insider trading, stock splits, and analyst buy and sell recommendations. Fama does not list all of these. Studies of these events have found underreaction. Studies that have found different signs for the announcement and long-term abnormal returns include those of listing changes (from Nasdaq to the NYSE, for instance) and proxy fights. Fama's table includes IPOs, classifying the first-day return as an announcement effect.

Table 5
Equally-weighted short-run and long-run reactions to corporate financing activities

Action	Study	Sample size	Sample period	Abnormal returns[a]	
				Announcement effect	Annualized long-run performance
USA data					
Seasoned equity offerings[b]	Bayless and Chaplinsky	1884	1974–90	–2.3%	n.a.
	Heron and Lie	3658	1980–98	–2.5%	n.a.
	Clarke, Dunbar and Kahle	3092	1984–96	–1.7%	–5.5%
	Table 1 (p. 265)	6638	1970–00	n.a.	–3.4%
Equity carveouts[c]	Vijh (parent)	336	1980–97	+1.9%	n.a.
	Vijh (parent)	300	1981–95	n.a.	–1.9%
	Vijh (subsidiary)	628	1981–95	n.a.	+3.1%
Private placements of equity[d]	Hertzel et al.	591	1980–96	+2.4%	–8.2%
Convertible bonds[e]	Kim and Stulz	270	1970–87	–1.7%	n.a.
	Lee and Loughran	986	1975–90	n.a.	–3.9%
	Eckbo, Masulis and Norli	459	1964–95	n.a.	–2.8%
	Spiess and Affleck-Graves	400	1975–89	n.a.	–6.3%
	McLaughlin et al.	828	1980–93	n.a.	–3.1%
Investment grade	Lee and Loughran	247	1975–90	n.a.	–2.3%
Junk	Lee and Loughran	566	1975–90	n.a.	–5.2%
Bonds[f]	Jung, Kim and Stulz	276	1977–84	–0.1%	n.a.
	Howton, Howton and Perfect	937	1983–93	–0.5%	n.a.
	Eckbo, Masulis and Norli	981	1964–95	n.a.	–2.0%
	Spiess and Affleck-Graves	392	1975–89	n.a.	–1.9%
Bank loans[g]	Billett et al.	1306	1980–89	+0.6%	–7.9%
Open market repurchases[h]	Guay and Harford	1062	1981–93	+2.1%	n.a.
	Ikenberry et al.	1239	1980–90	+3.5%	+1.9%
	Mitchell and Stafford	2292	1961–93	n.a.	+3.4%

continued on next page

Table 5, *continued*

Action	Study	Sample size	Sample period	Abnormal returns[a]	
				Announcement effect	Annualized long-run performance
M&A (acquirer)[i]					
Cash-financed	Travlos	100	1972–81	+0.2%	n.a.
	Loughran and Vijh	314	1970–89	n.a.	+2.4%
	Mitchell and Stafford	1039	1961–93	n.a.	+1.6%
Stock-financed	Travlos	60	1972-81	–1.5%	n.a.
	Loughran and Vijh	405	1970–89	n.a.	–3.5%
	Mitchell and Stafford	1029	1961–93	n.a.	–2.2%
Dividend changes[j]					
Decreases	Grullon et al.	677	1967–93	–3.7%	+1.7%
Substantial increases	Grullon et al.	3287	1967–93	+1.3%	+4.5%
	Guay and Harford	2943	1981–93	+1.2%	n.a.
International data[k]					
Japanese SEOs	Kang, Kim and Stulz	888	1980–88	+1.2%	–9.8%
ADR SEOs	Foerster and Karolyi	151	1982–96	n.a.	–3.2%

[a] n.a., not available. For announcement effects, a 2-day or 3-day window is typically reported. For long-run performance, the annualized difference is calculated as $[R_i^{\text{inverse}T} - R_b^{\text{inverse}T}] \times 100\%$ where R_i is the average gross buy-and-hold return on the issuing firms, R_b is the average gross compounded return on the benchmark, and inverse$T$ is the reciprocal of the average holding period length. For example, a 50% buy-and-hold return over 4.0 years is converted to an annualized 10.7% by taking 1.50 to the $\frac{1}{4}$ power, and then converting to a percentage return. Unless otherwise reported, for the long-run performance numbers, the benchmark is a size- and book-to-market matched (style-matched) sample.

[b] Bayless and Chaplinsky (1996, Table I). Heron and Lie (2003, Table 2) using a weighted average of primary and mixed offerings. Clarke, Dunbar and Kahle (2001, Table 2) for announcement and long-run returns. They report a 3-year buy-and-hold abnormal return of –14.3%. Annualized abnormal returns have been calculated assuming a 2.7 year average holding period.

[c] Vijh (2002, Table 4) for announcement returns, and Vijh (1999, Table 4) for long-run returns. An equity carveout is an IPO of a subsidiary that remains partly owned by the parent corporation. For the long-run returns, the geometric means of the average annual excess return with respect to a style benchmark are used.

continued on next page

Table 5, notes

[d] Hertzel, Lemmon, Linck and Rees (2002, Tables I + II) use Amex, Nasdaq, and NYSE firms conducting private placements and report 3-year buy-and-hold returns. Annualized abnormal returns have been calculated assuming a 2.7 year average holding period.

[e] Kim and Stulz (1992, Table 3) for domestic issues. Lee and Loughran (1998, Tables 2 + 3) use Amex, Nasdaq, and NYSE issuers and report annual returns in the five post-issue years. For the investment grade/junk returns, where only buy-and-hold returns are reported, annualized returns have been calculated assuming a 4.5 year average holding period. Eckbo, Masulis and Norli (2000, Table 12) use Amex and NYSE issuers, and report 5-year buy-and-hold returns. A 4.0 year average holding period is assumed to annualize their buy-and-hold returns. Spiess and Affleck-Graves (1999, Table 3) use Amex, NYSE, and Nasdaq issuers, excluding utilities and financial institutions, and report 5-year buy-and-hold returns. A 4.5 year average holding period is assumed to calculated annualized returns. McLaughlin, Saffieddine and Vasudevan (1998, Table 5) report 3-year buy-and-hold returns. A 3.0 year average holding period is assumed to calculate annualized returns.

[f] Jung, Kim and Stulz (1996, Table 1) also report long-run returns, but only using a size benchmark. Howton, Howton and Perfect (1998, Table 2) where the day −1 and 0 abnormal returns are added. Lee and Loughran (1998, Table 2) use Amex, Nasdaq, and NYSE issuers, and report annual returns in the 5 post-issue years. Eckbo, Masulis and Norli (2000, Table 12) use Amex and NYSE issuers, and report 5-year buy-and-hold returns. A 4.0 year average holding period is assumed. Spiess and Affleck-Graves (1999, Table 3) use Amex, Nasdaq, and NYSE issuers, excluding utilities and financial institutions, and report 5-year buy-and-hold returns. A 4.5 year average holding period is assumed to calculate annualized returns.

[g] Billett, Flannery and Garfinkel (2001, Tables I + III) report 5-year buy-and-hold returns. A 4.5 year average holding period is assumed to calculate annualized returns.

[h] Guay and Harford (2000, Table 2) report announcement period returns. Ikenberry, Lakonishok and Vermaelen (1995, Table 2) for announcement effects, and Table 3 for annualized long-run performance. Mitchell and Stafford (2000, Table 4) report 3-year buy-and-hold returns. A 3.0 year holding period is assumed.

[i] Mergers and acquisitions. Travlos (1987, Table III) uses a 2-day announcement return. Loughran and Vijh (1997, Table II) where their style-matched buy-and-hold returns have been annualized assuming a 4.5 year holding period. Mitchell and Stafford (2000, Table 2) report 3-year buy-and-hold returns. A 3.0 year holding period is assumed.

[j] Grullon, Michaely and Swaminathan (2002, Table 11) report 3-year buy-and-hold excess returns for Amex and NYSE firms changing their dividends. The raw buy-and-hold returns, supplied by the authors, have been annualized to compute the annual abnormal return. A 34-month average holding period has been assumed. The dividend increases are between 12.5% and 500%. Guay and Harford (2000, Table 2) report announcement period returns for Amex, Nasdaq, and NYSE firms. A substantial dividend increase is a bigger dividend increase than the prior year.

[k] Kang, Kim and Stulz (1999, Table 4, Panel B) report the difference in buy-and-hold returns ("excess returns") between issuers and style-matched nonissuers, after deleting the bottom and top 5% of excess returns. Annualized return differences have been computed by taking a weighted average of the private, public, and rights 5-year excess returns of −65.41%, assuming that the average buy-and-hold return for nonissuers was 100% and for issuers 34.59%. These buy-and-hold returns are then annualized, assuming a 4.5 year average holding period, and the difference in annualized returns is reported. The announcement return has $N = 68$ from Table 6. Foerster and Karolyi (2000, Table 3) report an average 36-month buy-and-hold return of 14.27%, and an average style-adjusted return of −10.97%, for foreign firms issuing American Depository Receipts (ADRs) in the USA for which a local market size and book-to-market matched firm was available.

disproportionately technology and telecommunications firms. From October 1998 to February 2000, these stocks greatly outperformed the market. Even if one hedged industry risk by going long in such firms as Hewlett-Packard, IBM, and AT&T, the issuing firms greatly outperformed the nonissuing firms by enormous amounts for month after month. Of course, in the long run the arbitrageur would have been right, as the issuing firms underperformed by an enormous amount in the two years beginning in March 2000. But few arbitrageurs have the ability to maintain their positions due to limited capital, and the limited patience of their investors, when they underperform by enormous amounts for month after month.

In empirical work examining the market reaction to corporate financing activities, it has been common to separate utilities and financial stocks from firms in other industries. The rationale has been that utilities were regulated, and many of their actions were highly predictable. Furthermore, in the 1970s utilities were tremendously overrepresented among firms raising external capital. Due to the deregulation of electrical and gas utilities in the late 1990s, and telecommunication firms in the 1980s, this industry segmentation presumably will not be done in future empirical work using samples from the late 1990s and later. In foreign markets, there were relatively few utilities that were not government owned before the 1990s, and thus few were publicly traded.

4. Initial public offerings (IPOs)

4.1. Overview

Ibbotson and Ritter (1995), Ritter (1998) and Ritter and Welch (2002) survey the IPO literature, focusing on three empirical patterns that have generated a large academic literature. These three patterns are i) short-run underpricing; ii) cycles in the number of IPOs and in the average first-day returns; and iii) long-run underperformance. This chapter will focus on several other aspects as well: why firms go public, mechanism design, the compensation of investment bankers and the role of analyst coverage, stabilization activities, and the variation in IPO volume across countries. Jenkinson and Ljungqvist (2001) cover these topics in book-length detail.

Pagano, Panetta and Zingales (1998) ask "Why do firms go public"? There are many tradeoffs, but the literature does not have a full model that can explain i) at what stage of a firm's lifecycle it is optimal to go public; and ii) why the volume of IPOs varies dramatically across time and across countries. In other words, private firms seem to face both life-cycle considerations and market-timing considerations in the decision of when to go public. The market-condition considerations can be viewed as time-varying relative costs of debt versus equity and private versus public funding costs.

When a firm goes public, its ownership structure changes, and as a public firm, the pre-issue shareholders are able to sell their shares (subject to regulations and lock-up provisions) in the future, allowing them to cash out if they so desire. Thus,

undiversified portfolios become more liquid. Corporate control considerations are present, too [Zingales (1995)]. If a startup firm has been financed by venture capitalists, typically the VCs have at least partial control over the entrepreneurs. Black and Gilson (1998) argue that, by going public, the entrepreneurs are able to regain control as the VCs distribute the shares to the limited partners (the investors in the VC partnership). If a firm has a large "need" for external capital, public markets may be a cheaper source of funds because of the lack of a liquidity discount that investors in a private firm would demand [see Chemmanur and Fulghieri (1999)]. Alternatively, public market investors may be irrationally overoptimistic about an industry's prospects at some point. Firms take advantage of these "windows of opportunity" by issuing stock at these times [see Lerner (1994) for evidence on private vs. public financing in the biotech industry].

Because of the uncertainties about future cash flows, especially for young firms, the valuation of IPOs is difficult. Consequently, underwriters frequently use comparable firm multiples to come up with a preliminary price, or price range, to value a firm going public. The logic of comparable firm multiples is that if a similar firm sells at a price-to-earnings multiple of 20, and the firm going public has $2 million in earnings, then it should be valued at $40 million. In practice, underwriters typically use forecasts of the current or next year's numbers, rather than historical accounting numbers, in their multiples [Kim and Ritter (1999)]. Depending upon the industry, the multiples used include price-to-earnings, enterprise value-to-sales, enterprise value-to-EBITDA (earnings before interest, taxes, and depreciation and amortization), and industry-specific multiples. Enterprise value is defined as the market value of equity plus the book value of debt, representing unlevered firm value.

Purnanandam and Swaminathan (2002) examine the pricing of IPOs using comparable firms, and find that on average IPOs have an offer price 50% higher than predicted on the basis of industry peers. While this finding may be attributable to the higher expected growth of IPOs, their more interesting finding is that the more overpriced the IPO is relative to its comparables, the worse is the long-term performance.

In using comparable firm multiples, one factor that is typically not taken into account is the size of the public float. That is, if a scarcity premium exists, then the smaller the fraction of the shares outstanding that are not closely held, the higher the price should be. In other words, if the supply of shares to the public is smaller, the demand for the stock will result in a higher price. At this point, the academic literature is devoid of direct tests to see whether this is in fact a relevant valuation factor, although the negative stock returns when lockup provisions expire is consistent with the notion that the size of the public float does matter.

Given the fixed costs of going public and maintaining a liquid market, an IPO should be big enough so that there is sufficient liquidity in the public market. But the offer should be small enough so that the issuing firm does not raise more cash than it can profitably use. This leads to the concept of staged financing, as discussed by, among others, Mayers (1998). If an offer is too big there may be free cash flow problems, where funds are squandered. A closely related idea is the notion that abandonment options are valuable. That is, the optimal financing of a young firm with an uncertain

future is to provide it with a limited amount of money at each stage of financing. As this money is about to run out, at each stage financiers can decide whether to provide more funds, and on what terms. If the firm's prospects continually live up to optimistic scenarios, the original shareholders can retain a larger percentage of the equity because subsequent rounds of financing are raised at ever-higher prices.

4.2. Short-run underpricing of IPOs

On average, the closing market price on the first day of trading of an IPO is higher than the offer price. In every country with a stock market, IPOs are underpriced. Table 6 reports the extent of underpricing for 38 countries. All of the average first-day returns weight each IPO equally. Thus, privatizations of state-owned enterprises with very large proceeds have less of an impact than if proceeds-weighted averages were reported.[7]

4.3. Alternative mechanisms for pricing and allocating securities

Loughran, Ritter and Rydqvist (1994) and Chowdhry and Sherman (1996) document that the average first-day return varies systematically with the mechanism used to price and distribute IPOs. The highest average first-day returns come in countries where government regulators impose formulas based on accounting information for setting the offer price, although the frequency of these constraints is declining. In general, the mechanisms used for pricing and allocating IPOs can be categorized as auctions, fixed-price offers, or book-building. Although different prices are sometimes paid by different investors (for example, sometimes individual investors pay less than institutional investors), uniform price mechanisms in which every investor pays the same price are most common.

In auctions, a market-clearing, or slightly below market-clearing, price is set after bids are submitted. Since there is little if any excess demand at the offer price, in general shares are allocated to all successful bidders. A fixed-price offer has the offer price set prior to requests for shares being submitted. If there is excess demand, shares are typically rationed on a pro rata or lottery basis, although frequently requests for large numbers of shares are cut back more than requests for moderate numbers. In other words, if there is discrimination in the allocation of shares, it is normally done solely on the basis of order size. Thus, there is no way for the underwriter to reward investors who provide information. In many countries, with a fixed-price offer investors must submit the money to purchase the requested shares, without knowing whether they will receive many shares. In Hong Kong, for example, the February 2000 offering of tom.com was oversubscribed by 66,900% (669 times the number of shares offered).

[7] Megginson and Netter (2001) provide references on the large number of studies concerning privatizations.

Table 6
Average initial returns for 38 countries[a]

Country	Source[b]	Sample size	Time period	Average initial return
Australia	Lee, Taylor and Walter; Woo	381	1976–1995	12.1%
Austria	Aussenegg	76	1984–1999	6.5%
Belgium	Rogiers, Manigart and Ooghe; Manigart	86	1984–1999	14.6%
Brazil	Aggarwal, Leal and Hernandez	62	1979–1990	78.5%
Canada	Jog and Riding; Jog and Srivastava; Kryzanowski and Rakita	500	1971–1999	6.3%
Chile	Aggarwal, Leal and Hernandez; Celis and Maturana	55	1982–1997	8.8%
China	Datar and Mao; Gu and Qin (A shares)	432	1990–2000	256.9%
Denmark	Jakobsen and Sorensen	117	1984–1998	5.4%
Finland	Keloharju; Westerholm	99	1984–1997	10.1%
France	Husson and Jacquillat; Leleux and Muzyka; Paliard and Belletante; Derrien and Womack; Chahine	571	1983–2000	11.6%
Germany	Ljungqvist	407	1978–1999	27.7%
Greece	Kazantzis and Thomas	129	1987–1994	51.7%
Hong Kong	McGuinness; Zhao and Wu	334	1980–1996	15.9%
India	Krishnamurti and Kumar	98	1992–1993	35.3%
Indonesia	Hanafi	106	1989–1994	15.1%
Israel	Kandel, Sarig and Wohl; Amihud and Hauser	285	1990–1994	12.1%
Italy	Arosio, Giudici and Paleari	164	1985–2000	23.9%
Japan	Fukuda; Dawson and Hiraki; Hebner and Hiraki; Hamao, Packer, and Ritter; Kaneko and Pettway	1689	1970–2001	28.4%
Korea	Dhatt, Kim and Lim; Ihm; Choi and Heo	477	1980–1996	74.3%
Malaysia	Isa; Isa and Yong	401	1980–1998	104.1%
Mexico	Aggarwal, Leal and Hernandez	37	1987–1990	33.0%
Netherlands	Wessels; Eijgenhuijsen and Buijs; Ljungqvist, Jenkinson and Wilhelm	143	1982–1999	10.2%
New Zealand	Vos and Cheung; Camp and Munro	201	1979–1999	23.0%
Nigeria	Ikoku	63	1989–1993	19.1%
Norway	Emilsen, Pedersen and Saettern	68	1984–1996	12.5%
Philippines	Sullivan and Unite	104	1987–1997	22.7%

continued on next page

Table 6, *continued*

Country	Source[b]	Sample size	Time period	Average initial return
Poland	Aussenegg	149	1991–1998	35.6%
Portugal	Almeida and Duque	21	1992–1998	10.6%
Singapore	Lee, Taylor and Walter	128	1973–1992	31.4%
South Africa	Page and Reyneke	118	1980–1991	32.7%
Spain	Ansotegui and Fabregat	99	1986–1998	10.7%
Sweden	Rydqvist	251	1980–1994	34.1%
Switzerland	Kunz and Aggarwal	42	1983–1989	35.8%
Taiwan	Lin and Sheu; Liaw, Liu and Wei	293	1986–1998	31.1%
Thailand	Wethyavivorn and Koo-Smith; Lonkani and Tirapat	292	1987–1997	46.7%
Turkey	Kiymaz	138	1990–1996	13.6%
UK	Dimson; Levis; Ljungqvist	3122	1959–2001	17.4%
USA	Ibbotson, Sindelar and Ritter	14,840	1960–2001	18.4%

[a] Average initial returns are constructed in different manners from study to study, although all weight each IPO equally. In general, in countries where market prices are available immediately after offerings, the one-day raw return (offer price to close) is reported. In countries where there is a delay before unconstrained market prices are reported, market-adjusted returns over an interval of several weeks are reported.

[b] See references listed in Loughran, Ritter and Rydqvist (1994) and updated at http://bear.cba.ufl.edu/ritter/interntl.htm. Where more than one set of authors is listed as a source of information, a combined sample has been constructed.

In general, the longer the time that elapses between when a fixed offer price is set and trading begins, the higher is the average first-day return. Partly this is because the longer the time until completion, the higher is the probability that market conditions will deteriorate and the offering will fail. To reduce the probability of a failed offering, a lower offer price is set. Conditional on the offer succeeding, the expected underpricing is relatively high.

Book-building (also known as firm commitment in the USA) is a mechanism in which underwriters canvas potential buyers and then set an offer price. A key feature of book-building is that the underwriter has complete discretion in allocating shares. As part of the marketing campaign, a road show is usually conducted, in which management makes presentations in order to shift the demand schedule for the company's stock. These presentations are made either to groups of institutional investors or, for very important money managers such as Fidelity, in one-on-one meetings at the offices of the money managers. After stimulating demand, underwriters then try to set an offer price at which there is excess demand and allocate the securities

to investors based upon various criteria. Historically, these criteria include attempting to allocate a portion to both institutional and individual investors. Institutional investors who might be expected to buy and hold the securities, based upon their existing portfolio holdings, would be favored. Also, investors who were willing to buy issues when demand was weak would be rewarded with favorable allocations when demand was strong [Cornelli and Goldreich (2001)]. This intertemporal pooling lessens the winner's curse problem (described below), and in equilibrium results in less underpricing than if shares were allocated on a pro rata basis when there is excess demand. There is a dark side to favoritism in the allocation of shares, however.

During the 1999–2000 internet bubble, the average first day return equaled an unprecedented 65% in the USA. During this period, IPOs were increasingly allocated as if they were the reward for providing profitable business to an underwriter. Indeed, in 1999, a number of USA underwriters began to allocate IPOs largely on the basis of commissions paid. In December 2000, *Wall Street Journal* articles [see Smith and Pulliam (2000)] revealed that some institutions were paying commissions of 50 cents per share (compared to a normal 5 cents) on trades of hundreds of thousands of shares in order to get IPOs. Furthermore, some underwriters were allocating shares in part on the basis of commitments to buy additional shares once the stock started trading, a practice known as "laddering" which is explicitly prohibited. Some of these practices have been going on for decades to some degree, but the incidence and magnitudes intensified as the amount of money left on the table exploded in 1999 and 2000 to roughly $30 billion in each year, as contrasted with numbers less than one-tenth that amount in most earlier years. Money left on the table is defined as the number of shares offered multiplied by the increase from the offer price on the first day of trading.

Auctions have been used in many countries, including France, Israel, Japan, Taiwan, and the USA, for pricing and allocating IPOs. In general, auctions have been associated with low, but positive, average first-day returns. These first-day returns are generally lower than when fixed-price offers or book-building is used, as illustrated in Table 7.

It is noteworthy that in Japan auctions continue to be permissible, but after book-building was permitted beginning in 1997, issuers have invariably chosen to use book-building instead. This is true not only for Japan, but for many other countries as well [Sherman (2001)]. In the USA, WRHambrecht and Co. introduced auctions for selling IPOs in 1999. After four years, their market share of IPOs is still below one percent. In France, Table 7 shows that the differences in first-day returns between the different procedures are not as striking as in Japan and Taiwan. This may partly reflect the endogeneity of the contract choice decision, since smaller offers are more likely to use auctions.

Biais and Faugeron (2002), Sherman (2001), and others argue that book-building is a superior mechanism for selling IPOs relative to auctions. Their argument is that book-building can be viewed as a dynamic auction conducted by underwriters, with the advantage that underwriters can use their discretion in allocating shares to reward regular investors who provide reliable information about valuation to the underwriters. However, they do not discuss the tradeoff with agency problems between underwriters

Table 7
Average initial returns on French, Japanese, and Taiwanese IPOs, by selling mechanism

Selling mechanism	Time period	Number of IPOs	Average first-day return
France[a]			
Fixed price	1992–1998	24	8.9%
Auctions	1992–1998	99	9.7%
Bookbuilding	1992–1998	135	16.9%
Japan[b]			
Fixed price	1970–1988	441	32.5%
Auctions	1989–1997	733	14.1%
Bookbuilding	1997–2000	368	43.7%
Taiwan[c]			
Fixed price	1986–1995	241	34.6%
Auctions	1995–1998	52	7.8%

[a] Derrien and Womack (2003, Table 1).
[b] Loughran, Ritter and Rydqvist (1994), Pettway and Kaneko (1996), Hamao, Packer and Ritter (2000) and Kaneko and Pettway (2003), including TSE, Nasdaq-Japan, Mothers, and OTC-listed IPOs.
[c] Lin and Sheu (1997) and Liaw, Liu and Wei (2000, Table VII). The Taiwanese auction average initial return is computed as the closing market price on the first day that price limits are not binding relative to the quantity-weighted average offer price in the discriminatory auction tranche, adjusted for market movements between the auction date and the date of the closing market price. In the IPOs, 50% of the shares are sold in a fixed price offering after the auction has been conducted. This tranche has an average market-adjusted first-day price gain of 22.3%.

and issuers. This tradeoff is analogous to the problem with high-powered compensation contracts for corporate executives: stock options may align the incentives of managers and shareholders, but self-dealing is a problem if a board of directors awards excessive numbers of stock options. At this point, the popularity of book-building relative to auctions has not been fully explained.

In addition to allowing underwriters to reward investors providing information, discretion in allocating shares has another potential use. Stoughton and Zechner (1998) and Mello and Parsons (1998) argue that giving underwriters discretion in allocating IPOs allows the creation of a block, where the blockholder has incentives to monitor the firm that atomistic shareholders do not have. This monitoring provides a positive externality for other shareholders in that firm value is increased due to lessened agency problems between management and shareholders. Brennan and Franks (1997), on the other hand, argue that management has a different objective function. If management values control, creating excess demand in the IPO allows shares to be allocated to atomistic shareholders, entrenching management. Booth and Chua (1996) argue that a large number of small shareholders has a different advantage. With more shareholders,

there will be greater liquidity, and if the market values greater liquidity, then a higher share price will result. The empirical evidence suggests that underpricing is not used to allocate shares to a more dispersed investor clientele. Aggarwal, Prabhala and Puri (2002) present evidence that a larger fraction of shares are allocated to institutions when there is greater underpricing.

4.4. Explanations of underpricing

It is useful to think of the IPO process as a game involving three players: issuing firms, investment bankers, and investors. The objectives of the three players are quite different. A number of reasons for the short-run underpricing of IPOs have been advanced which give different weights to the objectives of the three players. In general, these reasons are not mutually exclusive, and their relative importance differs across countries, contractual mechanisms, and time.

4.4.1. Dynamic information acquisition

Investment bankers where book-building is used may underprice IPOs to induce regular investors to reveal information during the pre-selling period, which can then be used to assist in pricing the issue [Benveniste and Spindt (1989)]. Benveniste and Spindt present a model with both regular (informed) and occasional (uninformed) investors. The regular investors can be thought of as institutions, and the occasional investors as individuals. Each regular investor observes private information, which is not known to the issuing firm and its underwriter. Benveniste and Spindt solve a mechanism design problem, and show that state-contingent underpricing and discriminatory allocations are part of the optimal contract, both for a one-time sale and for repeat interactions. Their solution is pricing and allocation rules that closely resemble book-building, with regular investors given favorable allocations in hot issues. In order to induce regular investors to truthfully reveal their valuations, the investment banker compensates investors through underpricing. In order to induce truthful revelation for a given IPO, the investment banker must underprice issues for which favorable information is revealed by more than those for which unfavorable information is revealed. This leads to a prediction that there will only be a partial adjustment of the offer price relative to the file price range contained in the preliminary prospectus. In other words, those IPOs for which the offer price is revised upwards will be *more* underpriced than those for which the offer price is revised downwards. This pattern is in fact present in the data, as shown in Table 8.

4.4.2. Prospect theory

Perhaps the most puzzling aspect of the underpricing phenomenon is that in some circumstances issuers do not object to severe underpricing, even though pre-issue shareholders could have retained a larger fraction of the equity if the same amount

Table 8
IPOs categorized by the final offer price relative to the file price range[a,b], 1980–2001

Time period	IPOs (*N*)	Average first-day return	Mean first-day returns			% of First-day returns > 0		
			Below	Within	Above	Below	Within	Above
1980–1989	1971	7.4%	0.6%	7.8%	20.5%	32%	62%	88%
1990–1994	1632	11.2%	2.4%	10.8%	24.1%	49%	75%	93%
1995–1998	1752	18.1%	6.1%	13.8%	37.6%	59%	80%	97%
1999–2000	803	65.0%	7.9%	26.8%	119.0%	59%	77%	96%
2001	80	14.0%	7.2%	12.5%	31.4%	70%	83%	92%
1980–2001	6238	18.8%	3.3%	12.0%	52.7%	47%	72%	94%

[a] Ritter and Welch (2002, Tables I + III).
[b] IPOs are categorized by whether the offer price is below, within, or above the original file price range. For example, an IPO would be classified as within the original file price range of $10.00–$12.00 if its offer price is $12.00. Initial public offerings with an offer price below $5.00 per share, unit offers, ADRs, closed-end funds, REITs, bank and S&L IPOs, and those not listed by CRSP within six months of the offer date are excluded.

of money had been raised by selling fewer shares at a higher price. This was most apparent during the internet bubble of 1999 and early 2000, when over a dozen young USA companies agreed to offer prices that resulted in first-day returns exceeding three hundred percent. For example, Akamai Technologies sold 9 million shares at $26.00 per share and saw a first-day closing price of over $145 per share, leaving over $1 billion on the table. At the pricing meeting, their lead underwriter, Morgan Stanley, told the executives of the firm that a market price of over $100 was anticipated. Loughran and Ritter (2002) provide an explanation for this issuer complacency about severe underpricing using prospect theory.

Prospect theory, developed by Kahneman and Tversky (1979), is a descriptive theory of behavior that asserts that people focus on changes in their wealth, rather than the level of their wealth. Loughran and Ritter apply this to IPOs by noting that most of the money left on the table is by the minority of firms where the offer price is revised upwards during the book-building process, consistent with the numbers in Table 8. For these issuing firms, the executives are seeing a personal wealth increase relative to what they had expected based on the file price range, even as they agree to leave money on the table. Loughran and Ritter argue that the issuing firm's executives bargain less hard for a higher offer price in this circumstance than they otherwise do. Unlike the dynamic information acquisition explanation of conditional underpricing, prospect theory does not make a distinction between public information and private information. Thus, prospect theory can explain why offer prices do not fully adjust to market movements during the book-building period, a pattern documented by a number of authors.

Loughran and Ritter also provide an explanation for why underwriters prefer to underprice IPOs rather than charge higher gross spreads. They argue that issuers

pay less attention to the opportunity cost of underpricing than the direct cost of gross spreads. If underwriters can allocate underpriced IPOs to buy-side clients who are competing for favorable allocations by overpaying for other services, part of the profits that investors receive on underpriced IPOs will wind up in the pockets of the underwriters.

Although Loughran and Ritter's application of prospect theory can rationalize why IPOs with unexpectedly strong demand are underpriced more, they do not explain why issuers choose underwriters with a history of severe underpricing in the first place. Presumably, the perceived importance of analyst coverage gives some prestigious underwriters the ability to attract issuers even though in the 1990s these underwriters underpriced offerings substantially. [See Rajan and Servaes (1997), Michaely and Womack (1999) and Bradley, Jordan and Ritter (2003) for evidence on IPOs and analyst recommendations].

4.4.3. Corruption

Loughran and Ritter (2003) argue that an agency problem between the decision makers at issuing firms (the top executives and venture capitalists) and other pre-issue shareholders (including the limited partners of venture capital firms) also contributes to a willingness to hire underwriters with a history of leaving large amounts of money on the table. While underpricing results in excessive dilution of all pre-issue shareholders, an underwriter with other hot IPOs to allocate can make side payments to the decision makers of an issuing firm. This is done by setting up a personal brokerage account for these individuals, and then allocating hot IPOs to these accounts, a practice known as "spinning". If shares are not allocated on a discretionary basis, the opportunity to give the decision makers preferential access is not present. This may account for part of the higher underpricing observed with book-building than with auctions that is documented in Table 7.

Table 8 shows that underpricing was much more severe in 1999–2000 than previously. Loughran and Ritter (2003) argue that underwriters competed for IPO business during this period partly through promising to allocate hot IPOs to the personal brokerage account of the chief executive of an issuing firm. The executive would be willing to hire an underwriter that was expected to underprice the firm's IPO because, in return, the executive would receive other hot IPOs. Consistent with this hypothesis, in August 2002, documents were released by the US House of Representatives Financial Services Committee showing that Salomon Smith Barney allocated hot IPOs to the chief executives of many telecommunications firms during 1996–2000. During this period, Salomon Smith Barney had a large market share of equity underwriting and M&A business in this industry.

4.4.4. The winner's curse

With fixed-price offers, potential investors face an adverse selection, or "winner's curse," problem. Since a more or less fixed number of shares are sold at a fixed offering

price, rationing will result if demand is strong. Rationing in itself does not lead to underpricing, but if some investors are at an informational disadvantage relative to others, some investors will be worse off. If some investors are more likely to attempt to buy shares when an issue is underpriced, then the amount of excess demand will be higher when there is more underpricing. Other investors will be allocated a smaller fraction of the most desirable new issues, and a larger fraction of the least desirable new issues. They face a winner's curse: if they get all of the shares which they ask for, it is because the informed investors don't want the shares. Faced with this adverse selection problem, the less informed investors will only submit purchase orders if, on average, IPOs are underpriced sufficiently to compensate them for the bias in the allocation of new issues.

Numerous studies have attempted to test the winner's curse model, both for the USA and other countries. While the evidence is consistent with there being a winner's curse, other explanations of the underpricing phenomenon exist. Evidence from several countries indicates that while large investors (institutions) are better informed than small investors (individuals), the main winner's curse problem is not that institutions crowd out individuals in hot offerings. Instead, in hot offerings, strong institutional demand makes it difficult for any given institution to get shares, and strong individual demand makes it difficult for any given individual to get shares. Indeed, in Finland [Keloharju (1993)] and Singapore [Lee, Taylor and Walter (1999)], small investors are favored over large investors when there is strong excess demand. In general, with book-building, favoritism in the allocation of shares can be used to minimize the winner's curse problem. This can be accomplished by intertemporal pooling: buyers of deals with weak demand can be favored in allocations on other deals when there is strong demand.

4.4.5. Informational cascades

If potential investors pay attention not only to their own information about a new issue, but also to whether other investors are purchasing, bandwagon effects, or informational cascades, may develop [Welch (1992)]. If an investor sees that no one else wants to buy, he or she may decide not to buy even when in possession of favorable information. To prevent this from happening, an issuer may want to underprice an issue to induce the first few potential investors to buy, and induce a cascade in which all subsequent investors want to buy irrespective of their own information.

An interesting implication of the informational cascades explanation, in conjunction with the dynamic information acquisition hypothesis, is that positively sloped demand curves can result. In the market feedback hypothesis, the offering price is adjusted upwards if regular investors indicate positive information. Other investors, knowing that this will only be a partial adjustment, correctly infer that these offerings will be underpriced. These other investors will consequently want to purchase additional shares, resulting in a positively sloped demand curve. The flip side is also true: because investors realize that a cut in the offering price indicates weak demand from other investors, cutting the offer price might actually scare away potential investors. And if

the price is cut too much, investors might start to wonder why the firm is so desperate for cash. Thus, an issuer faced with weak demand may find that cutting the offer price won't work, and its only alternative is to postpone the offering, and hope that market conditions improve.

4.4.6. Lawsuit avoidance

The frequency and severity of future class action lawsuits can be reduced by underpricing, since only investors who lose money are entitled to damages. Underpricing the IPO, however, is a very costly way of reducing the probability of a future lawsuit. Furthermore, other countries in which securities class actions are unknown, such as Finland, have just as much underpricing as in the USA. Hughes and Thakor (1992) model the necessary conditions under which underpricing would be an efficient method for avoiding lawsuits. Fear of lawsuits has been mentioned as one rationale for why internet IPOs were underpriced so much in 1999–2000. This explanation would have greater plausibility if the managing underwriters did not have their analysts issue "buy" or "strong buy" recommendations after the stock price went up by hundreds of percent once it started trading.

4.4.7. Signalling

Several signalling models [Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989)] have formalized the notion that underpriced IPOs "leave a good taste" with investors, allowing the firms and insiders to sell shares in the future at a higher price than would otherwise be the case. In these models, issuing firms have private information about whether they have high or low values. They follow a dynamic issue strategy, in which the IPO will be followed by a seasoned offering. As Daniel and Titman (1995) point out, signalling by leaving money on the table in the IPO is a relatively inefficient way to signal. Thus, it is not clear that this will occur in equilibrium unless the strategy space is somehow restricted.

Furthermore, various empirical studies such as Michaely and Shaw (1994) find that the hypothesized relation between initial returns and subsequent seasoned new issues is not present, once one holds other variables constant, casting doubt on the empirical relevance of signalling as a reason for underpricing. One problem that the signaling stories have is the extreme swings in equity issuing volume. In order for it to be sensible for a firm to underprice its IPO in order to profit in an SEO, there must be some reasonable assurance that the "window" will be open when the firm wants to return to the market. Yet in some market environments, such as the late summer and early autumn of 1998, and all of 2001, equity issuance ground almost to a halt, irrespective of the merits of individual firms.

4.4.8. The IPO as a marketing event

Closely related to the signaling idea is the notion that publicity is generated by a high first-day return. This publicity could generate additional investor interest [Chemmanur

(1993) and Aggarwal, Krigman and Womack (2002)] or additional product market revenue from greater brand awareness [Demers and Lewellen (2003)]. Presumably the product market benefits would be greater for firms selling to consumers, which generates a cross-sectional prediction. One has to wonder how expensive this advertising is compared to traditional advertising venues. There is one piece of evidence, however, that is consistent with the IPO as a marketing event. Habib and Ljungqvist (2001) note that the smaller the fraction of the firm sold, the lower is the opportunity cost of a big first day runup. In 1999–2000, many of the internet IPOs with large first-day price jumps sold less than 20% of the shares in their IPOs.

4.4.9. Summary of explanations of new issues underpricing

In addition to the above explanations, there are other reasons for underpricing that may apply in some circumstances. All of the above explanations for new issues underpricing involve rational strategies by buyers. The quantitative importance of some of them, such as the dynamic information acquisition story and the winner's curse story, are lessened when one admits the possibility of intertemporal pooling. Several other explanations have also been proposed involving irrational strategies by investors. Any model implying that investors are willing to overpay at the time of the IPO also implies that there will be poor long-run performance.

Although their relative importance varies depending upon the institutional setup, all of the above explanations for the underpricing of IPOs have some element of truth to them. Furthermore, the underpricing phenomenon has persisted for decades, and in all countries, with no signs of its imminent demise. Indeed, during the internet bubble of 1999–2000, average first day returns rose to unprecedented levels in most of the developed capital markets. This suggests that the relative importance of different theories of underpricing has changed over time. It is possible that in the 1980s, when the average first-day return in the USA was 7%, the Benveniste and Spindt (1989) dynamic information acquisition model and Rock's (1986) winner's curse model can explain much of the underpricing. In the 1990s, when the average first-day return was much higher, behavioral and agency explanations of underpricing likely became more important. Studies of changes in underwriter market share [Beatty and Ritter (1986), Nanda and Yun (1997), Dunbar (2000)] find that underwriters whose IPOs experience negative returns on the first day generally lose market share. High first-day returns, however, generally don't show up in lost market share, although obviously there is a limit before issuers become upset [Krigman, Shaw and Womack (2001)]. Otherwise, underpricing would be even greater than it is.

4.5. Underwriter compensation

The direct compensation that underwriters receive for taking a firm public is primarily in the form of the underwriting discount, or gross spread. In the USA and most other countries, a firm selling securities to the public pays investment bankers both the

buying and selling commissions, so that buyers do not have to pay commissions when buying a new issue. The conventional wisdom is that there are fixed costs of selling securities, so that economies of scale exist for issuing firms (see Lee, Lochhead, Ritter and Zhao (1996), although Altinkilic and Hansen (2000) caution that large offerings are typically conducted by established, easy-to-value firms). Logic would suggest that the gross spread should also be higher on riskier deals than safer deals. Chen and Ritter (2000), however, document that in the late 1990s, almost all IPOs raising between $20–80 million in the USA paid gross spreads of exactly 7.0%. Possible explanations for this clustering of gross spreads are a subject of debate. Issuing firms pay additional implicit costs in that IPOs are typically underpriced. Ljungqvist, Jenkinson and Wilhelm (2003) present evidence that for the IPOs of foreign firms, USA investment bankers charge higher direct fees, but leave less money on the table than non-USA underwriters.

Gande, Puri and Saunders (1999) provide evidence that commercial bank entry into underwriting debt issues has been associated with a reduction in gross spreads paid by issuing firms. There is no evidence that the same effect is occurring with IPOs, however. When one looks at the gross spreads paid on SEOs, economies of scale are evident, with considerable cross-sectional variation in the fees. Unlike IPOs, there is very little clustering in the gross spreads paid. Unlike the pattern with equity IPOs, where prestigious investment bankers charge the same gross spread as less prestigious underwriters, Livingston and Miller (2000) report that prestigious underwriters charge less on investment grade bond issues than do less prestigious underwriters.

4.6. Stabilization activities

Stabilization, or price support, activities are legally allowed manipulation practices at the time of securities offerings. In the USA, these practices are governed by the SEC's Regulation M. These practices include allowing underwriters to overallot securities, and then cover the resulting short position by retiring some of the securities and/or exercising an overallotment option (also known as a Green Shoe option, after the first IPO to use one). Almost all IPOs give the underwriter the option of selling up to an additional 15% shares. In about two-thirds of IPOs, this overallotment option is exercised in full. Penalty bids are also permitted, in which the lead underwriter will take back the commission from a broker whose client immediately resells ("flips") the securities that he or she has been allotted. This encourages the broker to allocate the securities to a buy-and-hold investor in the first place, and creates incentives to dissuade the client from selling in the market. Aggarwal (2003) and Loughran and Ritter (2003), among others, report that first-day trading volume is higher when there is strong demand.

Aggarwal (2000) reports that it is common for underwriters to sell up to 135% of an issue if weak aftermarket demand is expected. Since at most 115% of the issue can be sold, this commits the syndicate to covering their naked short position of 20%

of the offer size.[8] If strong aftermarket demand is expected, leading to a price rise, underwriters generally do not take a naked short position. Zhang (2003) offers a path dependency explanation for why underwriters allot extra shares to investors expressing an interest, rather than allowing them to satisfy their demand by buying shares in the aftermarket. He argues that investors are more likely to hold on to shares that they have been allocated, than to buy and hold these shares if they must buy them in the market.

4.7. Hot-issue markets

Ibbotson and Jaffe (1975) and subsequent authors have identified significant autocorrelation of both the monthly number of IPOs and the monthly average first-day returns on IPOs. Ibbotson and Jaffe define a hot issue market to be a month in which the average first-day return is higher than the median. Months of high average first-day returns tend to be followed by rising volume [Lowry and Schwert (2002)]. The autocorrelation of both volume and average first-day returns are high: for example, during the 1990s, Loughran and Ritter (2002) report that every month between March 1991 and August 1998 had an average first-day return of *below* 30%, whereas every month from November 1998 to March 2000 had an average first-day return of *above* 30%. (Each month had at least ten IPOs.) Furthermore, they report, as have previous authors, that the first-day returns are predictable based upon lagged market returns.

Loughran and Ritter's (2002) prospect theory argument that issuing firms don't object to underpricing when it occurs simultaneously with an unexpected increase in their wealth can explain part of the autocorrelation of first-day returns. Since offer prices do not fully respond to market movements during the book-building period, all of the IPOs that are in their book-building period when there is a market runup will have a higher expected first-day return.

As puzzling as the cycles in the monthly average first-day returns are, the extreme swings in the volume of IPOs are equally of interest. The IPO market seems to be hypersensitive to changes in market conditions. Rather than just lowering offer prices by 20% when the market drops by 20%, volume tends to dry up. SEO volume also experiences large changes.

In October 1996, 106 firms went public. During the four years from 1974 to 1977, a total of 93 firms went public in the USA, an average of about two per month. In contrast to this fifty-to-one ratio of monthly volume, aggregate corporate investment fluctuates by a factor of two-to-one. Lowry (2003) addresses why IPO volume fluctuates so much. She examines three hypotheses: changes in the adverse-selection costs of issuing

[8] The size of the naked short position that is permitted is determined by the Agreement Among Underwriters on each deal, rather than by any regulation. A common feature of the agreement is a 20% limit on the size of any naked short position.

equity, changes in the aggregate capital demands of private firms, and changes in the level of investor optimism. Lowry concludes that changes in aggregate capital demands and in investor optimism are the primary determinants of changes in IPO volume over time.

4.8. Market activity across countries

The volume of IPOs varies substantially from country to country. Pagano, Panetta and Zingales (1998) report that the industry market-to-book ratio is the single most important determinant of the decision to go public for Italian firms. Subrahmanyam and Titman (1999) argue that the ease of going public depends upon the costs of acquiring information in an economy. They argue that each publicly traded firm creates a positive externality by making it easier to value comparable firms. Benveniste, Busaba and Wilhelm (2002) also view information spillovers as an important reason for industry clustering in IPO volume. While information externalities are undoubtedly important, probably the biggest problem that less-developed countries have in developing functioning public capital markets is in the corporate governance area. In some countries, such as Brazil and Sweden, it is the norm that shares issued to the public have inferior voting rights. If investors rationally are concerned about their ability to receive a return on the capital that they are providing to issuing firms, the valuation that they are willing to pay will be constrained. It is not clear that an issuing firm can receive a higher valuation by making a credible commitment to promise better corporate governance in a country where corporate governance problems are severe. La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997) report that the number of IPOs varies systematically across countries, with countries having a legal system based upon British common law having more IPOs. Holmen and Hogfeldt (2003) show that in Sweden firms typically issue shares with inferior voting rights in the IPO, and if the shares with superior voting rights are eventually sold, they are always sold as a block.

It should be noted that in the late 1990s, several trends were going on in the worldwide IPO market. First, industry sector became more important, irrespective of the country of headquarters. For instance, worldwide there was an internet stock price bubble in 1999 and early 2000, with high first-day returns everywhere. Second, all but the smallest IPOs in almost all countries increasingly used book-building, rather than alternative mechanisms for pricing and allocating IPOs [Sherman (2001)]. This convergence of issuing mechanisms is part of the general trend towards the integration of world capital markets. Large and moderate size deals now frequently have both a domestic and an international tranche. Third, in Europe tech stocks increasingly went public on Germany's Neuer Markt, even if they weren't from Germany. Easdaq and the various markets for growth companies (of which Germany's Neuer Markt was by far the largest) competed for new tech stock listings. The historical strong correlation between which country a company was from and where it listed has been breaking down, making it more difficult to assign IPOs to countries. Fourth, the new exchanges have changed the focus of listing requirements from accounting criteria

such as profitability and assets to corporate governance and disclosure requirements. In Europe's traditional stock markets, a high level of disclosure has not been required. For example, Germany's Daimler Benz (now Daimler Chrysler) had never reported its cash reserves until it did so prior to seeking a joint listing on the NYSE in 1995. Fifth, for a variety of reasons, Europe's IPO market, relatively moribund for decades, came alive in the 1990s. For the first time in modern history, more European firms went public than American firms in both 1998 and 1999 [Jenkinson and Ljungqvist (2001)].

4.9. Long-run performance

When measuring the long-run abnormal returns on IPOs, the same performance measurement issues as with SEOs come up. As G.W. Schwert notes in his chapter in this Handbook, there is a tendency for anomalies to disappear once they have been identified. Whether this is because the original anomaly occurred by chance during some sample period, or because the market learns and begins to price securities differently, is unclear.

In Table 9, the annual returns on IPOs in the five years after issuing are reported, along with benchmark returns using either size or style matching. The style matches are based upon size (market cap) and book-to-market matching. The numbers reported in Table 9 are displayed in Figure 2. As first documented by Ritter (1991), Table 9 shows that IPOs have underperformed other firms of the same size by an average of 3.8% per year during the five years after issuing, not including the first-day return. When size- and book-to-market (style) matching is used, however, the underperformance shrinks to 2.2% per year for the IPOs. Thus, unlike SEOs, there is only modest evidence of underperformance once a style benchmark is used [Brav and Gompers (1997), Gompers and Lerner (2003)].

As shown by Brav, Geczy and Gompers (2000, Table 1), most IPOs fall in the extreme small growth category. Whether or not they issue, firms in this style category have had extremely low returns for the last several decades. As with SEOs, the tendency of IPO volume to be high near market peaks results in greater investment in IPOs prior to periods of low market returns. Lowry (2003) reports that high IPO volume is a reliable predictor of low equally weighted market returns during the following year. This pattern shows up in Figure 2, where the first year return on both the IPOs and their benchmarks tend to be lower than in subsequent years.

The relatively modest underperformance relative to a style benchmark shown in Table 9 and Figure 2 highlights the distinction between relative performance and absolute performance. IPOs do not dramatically underperform relative to a style benchmark, but firms apparently display some ability to time their IPOs for periods when future returns on small growth firms are low. Furthermore, the mystery of why small growth firms have such low returns on average remains unanswered. One unexplored area of research is the effect of market manipulation. The lowest returns are on the very smallest IPOs. These stocks are most likely to be taken public by

Table 9
Percentage returns on IPOs from 1970-2000 during the first five years after issuing[a]

	1st 6 months	2nd 6 months	1st yr	2nd yr	3rd yr	4th yr	5th yr	Geometric mean yrs 1–5
IPO firms	7.0%	–0.1%	7.0%	7.0%	10.4%	14.0%	12.6%	10.2%
Size-matched	4.7%	5.6%	10.4%	14.5%	15.1%	16.5%	13.4%	14.0%
Difference	2.3%	–5.7%	–3.4%	–7.5%	–4.7%	–2.5%	–0.8%	–3.8%
Number	7042	7023	7042	6839	5964	5175	4358	7437
IPO firms	7.4%	0.3%	7.8%	9.7%	11.3%	13.3%	10.6%	10.5%
Style-matched	2.5%	4.5%	7.9%	12.6%	14.4%	17.8%	11.2%	12.7%
Difference	4.9%	–4.2%	–0.1%	–2.9%	–3.1%	–4.5%	–0.6%	–2.2%
Number	6719	6702	6719	6371	5543	4772	3993	6834

[a] For the first year, the returns are measured from the closing market price on the first day of issue until the 6th-month or one-year anniversary. All returns are equally-weighted average returns for all IPOs that are still traded on Nasdaq, the Amex, or the NYSE at the start of a period. If an issuing firm is delisted within a year, its return for that year is calculated by compounding the CRSP value-weighted market index for the rest of the year. For the size-matched returns, each IPO is matched with a nonissuing firm having the same market capitalization (using the closing market price on the first day of trading for the IPO, and the market capitalization at the end of the previous month for the matching firms). For the (size and book-to-market) style-matched returns, each IPO is matched with a nonissuing firm in the same size decile (using NYSE firms only for determining the decile breakpoints) having the closest book-to-market ratio. For the IPOs, book-to-market ratios are calculated using the first recorded post-issue book value and the post-issue market cap calculated using the closing market price on the first CRSP-listed day of trading. For nonissuing firms, the Compustat-listed book value of equity for the most recent fiscal year ending at least four months prior to the IPO date is used, along with the market cap at the close of trading at month-end prior to the month of the IPO with which it is matched. Nonissuing firms are those that have been listed on the Amex–Nasdaq–NYSE for at least five years, without issuing equity for cash during that time. If a nonissuer subsequently issues equity, it is still used as the matching firm. If a nonissuer gets delisted prior to the delisting (or the fifth anniversary, or Dec. 31, 2001), the second-closest matching firm on the original IPO date is substituted, on a point-forward basis. For firms with multiple classes of stock outstanding, market cap is calculated using only the class in the IPO for the IPO. For nonissuing firms, each class of stock is treated as if it is a separate firm. The sample size is 7437 IPOs from January 1970–December 2000 when size-matching is used, excluding IPOs with an offer price of less than $5.00, ADRs, REITs, closed-end funds, and unit offers. All IPOs are listed on CRSP for at least 6 months, and after Nasdaq's inclusion, are listed within 6 months of going public. Returns are measured through December 31, 2001. For partial event-years that end on this date, the last partial year is deleted from the computations. In other words, for an IPO that issued on March 15, 2000, its first-year return is included, but not the second-year return.

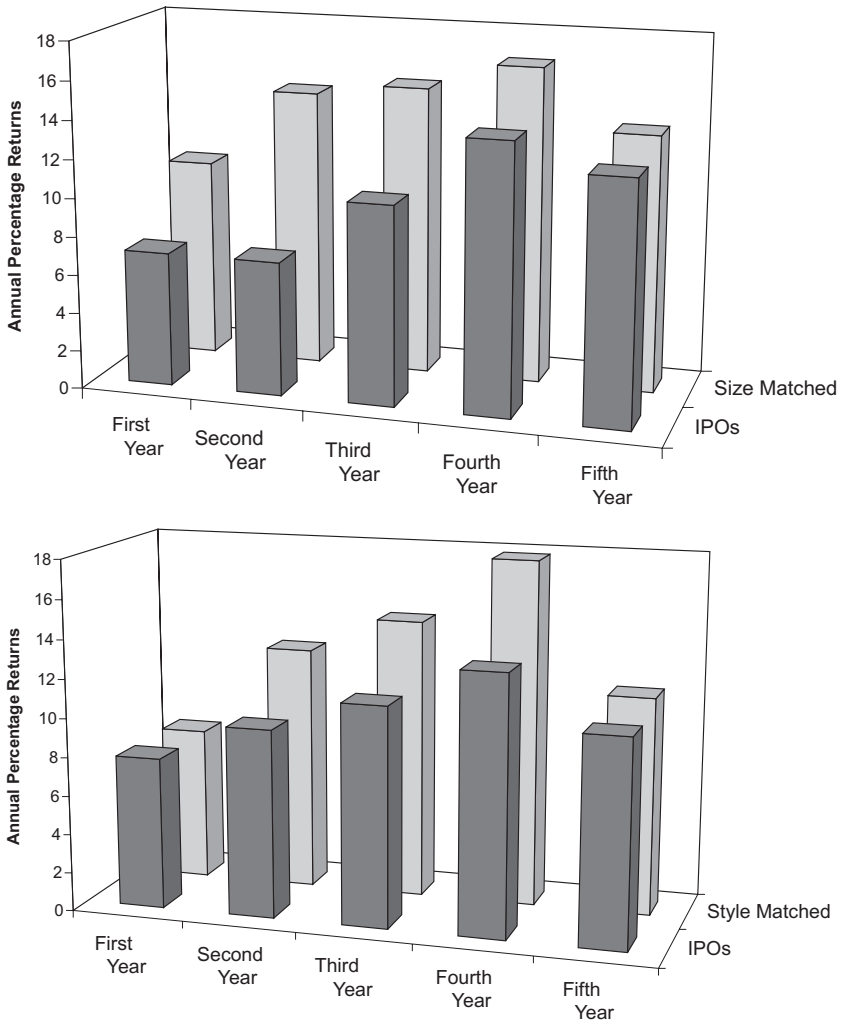

Fig. 2. Post-issue returns for firms conducting IPOs from 1970–2000, with returns through December 31, 2001. In the top panel, size-matched nonissuers use the nonissuing firm with the closest market capitalization as of the month-end prior to the IPO. In the bottom panel, style-matched nonissuers use the nonissuing firm in the market cap decile with the closest book-to-market ratio. The average annual percentage return for IPOs and matching nonissuing firms is shown for each of the five years after issuing. The data are described in Table 9. Nonissuers are CRSP-listed stocks that have not issued equity (IPO or SEO) is plotted during the prior five years, and have been listed on CRSP for at least five years. CRSP covers the common stock of domestic operating companies listed on the Amex, NYSE, and (after December 14, 1972) Nasdaq. Book-to-market for IPOs is measured using the post-issue book value and market cap at the close of trading on the first day. The first-year returns do not include the first day of trading. If an IPO is delisted before five years from the issue date, its annual return during the year of delisting is calculated by splicing in the CRSP value-weighted market return for the remainder of that year.

underwriters with regulatory problems, and these IPOs are least likely to be backed by venture capitalists [Brav and Gompers (1997)]. Furthermore, there is little or no institutional investor interest in these stocks.

When going public, IPOs almost always commit to a "lock-up period", whereby insiders are prohibited from selling shares without the written permission of the lead underwriter until a certain amount of time has passed. In recent years, the vast majority of IPOs have lockup provisions of 180 days. Bradley, Jordan, Roten and Yi (2001), Field and Hanka (2001) and Brav and Gompers (2003) document that, in the week that the lockup expires, share prices fall approximately 2%. This is not an announcement effect, in that the date that the lockup will end is known at the time of the IPO. Trading costs (especially bid-ask spreads) probably prevent the implementation of a profitable active trading rule to take advantage of this predictable price drop, but the drop would appear to be a violation of market efficiency, even in its weakest form.

Further evidence that supply and demand shifts, unrelated to fundamentals, affect the price of IPOs comes from price patterns at the end of the quiet period, 40 days after an IPO starts trading. Bradley, Jordan and Ritter (2003) report average market-adjusted returns of 3% in the week surrounding the end of the quiet period. For firms where investment banks initiate analyst recommendations at this time, the average jump is 4%. For firms where there is no initiation of research coverage, the average market-adjusted return is close to zero.

A number of reasons have been advanced for the low long-run returns on IPOs. Probably the most plausible story is the argument of Miller (1977) and Morris (1996) that with costly short-selling and heterogeneous beliefs among investors, the most optimistic investors will determine the market price. As more information becomes available about a firm over time, the divergence of beliefs will decrease, and the marginal holder will no longer be as overoptimisitic. Also, as the public float increases over time, the marginal holder will not be as extreme in his or her overoptimism. This story is consistent with the patterns in the 1999–2000 internet bubble, where there were extreme differences of opinion, costly short-selling, and small public floats on many IPOs.

There is also clear evidence that some IPOs are overvalued relative to other firms at the time of their IPO. There have been several internet "equity carveouts" where the parent company retained a large ownership stake, the parent announced its intention to distribute its shares in the subsidiary to shareholders, and yet the subsidiary's market value exceeded the market value of the parent company [Lamont and Thaler (2003)]. In all cases, eventually the subsidiary's stock price fell by the time the parent distributed the remaining shares. In these situations, short-sellers had difficulty borrowing shares immediately after the IPO.

Eckbo and Norli (2001) argue that IPOs have low returns because they actually have low risk. Ritter and Welch (2002) compute the systematic risk of a portfolio of IPOs including a lagged monthly market return (the summed beta approach used in Table 4 of this chapter for SEOs), and find a beta of 1.73 for IPOs, indicating a high exposure

to market risk. The high beta for IPOs is inconsistent with the hypothesis that IPOs have low returns because they have low risk.

A more subtle issue regarding the post-issue performance of IPOs is raised by Schultz (2003). He argues that, even if there is no ex ante abnormal performance expected, researchers conducting event studies are likely to find negative abnormal performance ex post. His logic can be summarized as follows. If, early in a sample period, IPOs underperform, there will be few IPOs in the future, and so the average performance will be weighted heavily towards the early IPOs that underperformed. If, instead, early in a sample period IPOs do well, there will be a lot more IPOs in the future. Thus, the average performance will place only a small weight on the early IPOs that outperformed. Because of this tendency, in studies that do not weight each time period equally, the expected performance is negative when all IPOs are weighted equally, even if ex ante there is no expected underperformance. Schultz refers to this problem as "pseudo market timing", and argues that it is relevant not just for IPOs, but for all endogenous corporate actions as reported in Table 5 of this chapter.

Time-series regressions that weight each period equally, such as the Fama–French 3-factor regressions reported in Tables 3 and 4 of this chapter, do not suffer from this pseudo market timing problem. Thus, while Schultz's argument is applicable for "fads" such as rollup IPOs [Brown, Dittmar and Servaes (2002)], it is not clear that it is quantitatively important for IPOs in general.

5. Summary

This chapter has surveyed the literature on investment banking and equity issuance. This survey is, by the necessity of space constraints, incomplete. It has focused on recent contributions to the academic literature, in that other surveys by Smith (1986), Eckbo and Masulis (1995), Ibbotson and Ritter (1995) and Jenkinson and Ljungqvist (2001) have done a comprehensive job of covering the earlier literature.

One of the most contentious empirical findings in the last decade concerns whether firms conducting IPOs and SEOs subsequently underperform relative to other similar non-issuing firms. Relative to size-matched firms, the answer is unambiguously yes. But since issuing firms tend to be small growth firms and non-issuers tend to be small value firms, the book-to-market effect is a confounding effect. When style (size and book-to-market) matching is used, IPOs underperform by only 2.2% per year, on average. With SEOs, on the other hand, economically significant underperformance of 3.4% per year is still present when a style benchmark is used. The reason for the difference in sensitivities is that the book-to-market effect is concentrated among very small firms (small growth firms, whether they are recent issuers or not, have extremely low stock returns, and small value firms have high returns). A high proportion of IPOs are very small growth firms, whereas SEOs are less concentrated in this extreme style category. Conclusions about underperformance are also affected by the sample period chosen and whether equal or value weighting is used.

An equally weighted portfolio of IPOs from January 1970–December 2000, purchased at the close on the day of offering and held for one year, gave investors an average annual return of 7.0% through December of 2001. An equally weighted portfolio of SEOs gave investors an average annual return of 9.4% through December of 2001. Yet, if one bought the S&P 500 at the beginning of 1970 and reinvested dividends, the compound annual return through December 2001 would have been 12.1%. Thus, the low returns on issuing firms partly reflect underperformance relative to a style benchmark, and partly a market-timing issue. Market-timing ability is manifested in the tendency for firms to issue after high market returns and before low market returns. Thus, investing an equal amount in each issuing firm tends to overweight periods with low market returns, and underweight periods with high market returns.

The volume of equity issues fluctuates dramatically from period to period. While explanations exist for the optimal time in a company's life cycle to go public, at this point there is no consensus on why market timing considerations appear to be so important. The number of companies going public also varies dramatically from country to country. Differences in corporate governance, laws and their enforcement, and culture explain much of the differences, but study of this important topic is still in its infancy.

In summary, in the 1980s and 1990s the number of firms around the world issuing equity increased dramatically. Not coincidentally, the academic literature related to securities issuance also exploded. Advances have been made in understanding the importance of contractual mechanism for determining the terms at which securities can be sold. There are, however, many unresolved issues remaining. In particular, even though there is abundant evidence that issuing firms face negatively-sloped demand curves for their shares, the marketing of financial securities is a relatively unexplored research area. Only recently have papers begun to focus on the corporate financing implications if firms face fluctuations in the cost of external financing due to the mispricing of securities by the market. Furthermore, the extreme underpricing of IPOs during the 1999–2000 internet bubble is unlikely to be explained by standard models based on information asymmetries.

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