

Managing the Costs of Issuing Common Equity: The Role of Registration Choice

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In this paper we find that firms manage the costs of issuing common equity through their choice of SEC registration strategy. Firms that use unallocated shelf, a deregulated registration procedure, pay lower underwriter fees and access the market faster than similar firms that use the slower traditional procedure that requires detailed advance disclosure. Low information-asymmetry firms that use shelf incur minimal asymmetric-information-related price declines when registering and issuing equity. High information asymmetry firms that choose shelf, however, experience large price declines and instead tend to choose the traditional registration procedure.

Introduction

Issuing common equity is an expensive way to raise capital. Costs include fees paid to underwriters, downwards price pressure from an increased supply of shares, time delays that uniquely arise from registering equity, and asymmetric-information-related stock-price declines at issuance announcements. These costs can differ, however, depending on the type of equity that firms choose to raise and firm characteristics. For example, Fama and French (2005) argue that some equity issu-

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ances, including employee stock options and equity used as currency in mergers, do not suffer from an asymmetric information problem and are therefore less costly than public-equity issuances. Gomes and Phillips (2005) demonstrate that firms with high levels of information asymmetry are more likely to privately place equity than are firms with low information asymmetry. These findings suggest that firms choose low-cost methods to raise capital.

In the United States, most firms have a choice of how to register and issue equity through seasoned equity offerings (SEOs). In this paper, controlling for firm and offering characteristics, we test whether firms can lower the costs of raising equity by optimally choosing among Securities and Exchange Commission (SEC) requirements for registering and issuing SEOs. The traditional method requires firms to file registration statements that include detailed disclosure about the firm and the securities being offered for sale in advance of security offerings. This information-intensive procedure, which is designed to mitigate problems of asymmetric information between firms and investors, is time consuming and subject to delays.¹ The second method is a deregulated streamlined process called unallocated shelf registration (which we refer to throughout the remainder of the paper as “shelf”). Shelf permits firms to file a single all-encompassing registration statement once every two years rather than filing individual registration statements for every security offering. A shelf simultaneously registers many types of potential security offerings, including debt and common equity, which a firm may issue at its discretion over the succeeding two years. Firms register securities without specifying the amount of each security to be offered, the expected timing of offerings or, importantly, the expected use of the proceeds. Once registration statements are approved by the SEC, firms face no additional disclosure requirements or regulatory delays when issuing securities. Compared to the traditional registration procedure, shelf contains few features to mitigate information asymmetry between firms and investors. Shelf offers users increased flexibility in the timing of securities sales and design. Accessing the market quickly allows firms to fulfill capital immediacy needs and take advantage of windows of opportunity in the market (Bayless and Chaplinsky, 1996). Proponents also argue that shelf promotes underwriter competition, lowering direct issuance costs, relative to traditional registration. The design of shelf registration trades off maximizing shareholder welfare in terms of asymmetric information and minimizing firm-specific issuance costs.

Using a sample of SEOs between 1992 and 2002, we examine the types of firms that choose each registration strategy and compare the costs that firms incur. Although all of the firms we examine are eligible to use both shelf and traditional registration, we find firms that choose shelf are larger, more highly levered, and more widely followed by analysts than are firms that use traditional registration.

¹Leone, Rock, and Willenborg (2006) find that detailed disclosures regarding expected use of proceeds in IPO prospectuses result in lower underpricing and lower costs of capital.

After controlling for selection effects, we find firms that use shelf access the market significantly faster than firms that use traditional registration. The underwriting spread for shelf common equity issuances is significantly lower than for traditional SEOs. Thus, shelf lowers the cost of raising equity relative to traditional registration.

Despite these advantages, only 20 percent of the equity that is eligible for shelf registration is issued using it. Certain firms may experience potentially significant disadvantages using shelf relative to the traditional procedure. Because firms register up to two years of securities sales—sales that may or may not take place and that may or may not be common equity—instead of only the exact amount of their next equity offering, investors do not know how much capital ultimately will be raised, the use of the funds, or the type of securities that will be offered. As such, the market may fear that common equity will be issued to fund unprofitable projects and, therefore, discount equity share prices when shelves are filed, well ahead of announcements of actual security offerings. Price drops that occur at this time are commonly referred to as *market overhang* (Bhagat, Marr, and Thompson, 1985).²

We examine the severity of and determinants of market overhang when firms file shelves, controlling for selection effects. Because market overhang is a response by the market to uncertainty about corporate actions, we test whether market overhang is related to firm-specific levels of information asymmetry. We conjecture that firms with high information asymmetry should incur more severe market overhang when registering common equity on shelves than firms with low information asymmetry. On average, we find no statistically significant evidence of market overhang. When high information-asymmetry firms register shelves, however, they experience large, statistically significant declines in share price; we find that relatively few of these firms issue common equity using shelf. In contrast, firms with low information asymmetry experience no market overhang when registering shelves. Our results suggest that managers select registration procedures that lower costs and base their registration choices on information characteristics.

We also find that high information-asymmetry firms that take equity off shelves have significantly more negative price reactions than do high information-asymmetry firms that use the traditional registration procedure. The cumulative abnormal return for registering and issuing equity using shelf for high information-asymmetry firms averages -4.7 percent, compared to -1.9 percent for comparable firms that use the traditional procedure. The market deeply discounts the share prices of firms that are difficult to value, knowing that these firms have incentives to choose shelves over traditional registration when projects are unprofitable. The market's reaction is also more negative for high information-asymmetry firms that use shelves than for low information-asymmetry firms that use shelves. Thus, although shelf lowers some issuance costs (including fees to underwriters and delays accessing the market) for

²Market overhang should not be too severe if investors anticipate that debt rather than equity will be issued (Heron and Lie, 2004).

all firms, price declines vary by information asymmetry, making shelf more valuable to some firms than to others. The market imposes costs on high information-asymmetry firms. These firms tend to use the traditional registration procedure with detailed disclosure to raise equity even though the SEC allows these firms to use shelf.

Finally, we explore why some high information-asymmetry firms use shelf even though they experience high market overhang. We find these firms pay lower gross spreads and go to market faster than the same type of firm that chooses the traditional registration procedure. Thus, the advantages of shelf may outweigh its disadvantage—market overhang—for some high information-asymmetry firms.

Traditional Registration of Common Equity Offerings

The Securities Act of 1933 requires firms that offer securities to the public to register them with the SEC. Consistent with the SEC's mandate to protect investors through detailed information disclosure, the traditional procedure stipulates that firms file registration statements that include preliminary prospectuses (red herrings) that specify information about the firm, the securities being offered for sale, and the expected use of proceeds. The SEC's staff has the option of reviewing preliminary prospectuses for accuracy and completeness; in some instances it requests changes. For example, according to the *Report of the Advisory Committee on Capital Raising Activity: July 24, 1996*, the SEC reviewed 14 percent of SEO filings during the period from January 1994 through December 1995. Staff reviews can take weeks or even months to complete and may require several iterations with firms. According to the same report, the staff approved or declared effective firms registration statements 32 days after firms filed initial preliminary prospectuses. Once the staff declares registration statements effective, firms are free to price and sell securities, and they typically access the market as soon as possible thereafter. Following the sale of securities, the SEC requires firms to file pricing supplements within two days of sale to notify market participants of the exact terms of offerings.

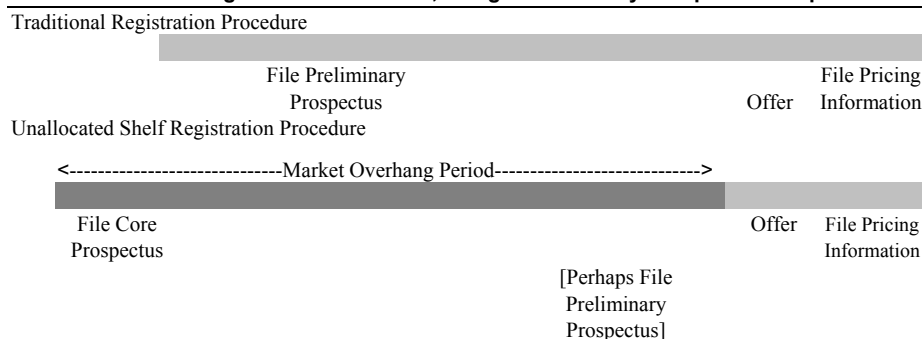
A Brief History of Shelf Registration

In 1969, Congress commissioned the Wheat Report to address problems with the capital raising process. The report criticized the traditional registration procedure as being unnecessarily burdensome and costly. The SEC responded in 1982 by adopting Rule 415, a reform that allows firms to raise capital using allocated shelf registration. Allocated shelf registration permits firms to register a core prospectus that includes the maximum dollar amount of a single type of security that they "reasonably expect to be offered and sold within two years." For example firms can register either debt or equity on an allocated shelf. After SEC review (which is typically negligible or nonexistent), the SEC declares firms' shelf registration statements effective, and firms then can sell or take down securities with no further regulatory intervention or

delay. Firms must notify the SEC of final offering details within two days following the completion of offerings. It is important to note that there is no implicit or explicit guarantee that firms actually raise the capital specified on shelves. Thus, shelf registrants publicly declare they might raise capital, but they do not specify the actual amounts, timing of offerings, or the expected use of proceeds.

Following the introduction of allocated shelf registration, firms quickly began registering debt securities on shelves. By 1991, firms registered approximately 60 percent of all debt and preferred equity issued on allocated shelves.³ In contrast, less than 1 percent of common equity issued was registered on shelves.⁴ The SEC responded in 1992 to firms' reluctance to register common equity on allocated shelves by permitting them to register multiple types of securities on a single unallocated shelf registration statement. Under this process, firms do not need to specify the amount of each type of security that they plan to offer. Qualifying firms need only file a core prospectus specifying their potential financing needs over the subsequent two years and a list of the securities they might issue. As with allocated shelves, firms publicly declare they might raise capital, but do not specify the amount to be raised. Unlike allocated shelves, the types of securities that firms can choose to issue are also uncertain. We depict timelines for the traditional and unallocated shelf registration procedures below in Figure 1.

Figure 1—The Sequence of Events for Filing Registration Statements and Issuing Securities Using Traditional and Unallocated Shelf Registration Procedures. In the Unallocated Shelf Registration Procedure, Filing a Preliminary Prospectus is Optional



In its Adopting Release 33-6964, the SEC expressed its hope that issuers would use this new, more flexible registration procedure for common equity. The purported advantages of issuing common equity using unallocated shelf are threefold. First, by

³See U.S. Securities and Exchange Commission Proposing Release No. 33-6943, 7/22/92; 1991 SEC *Annual Report*; and Denis (1991) for further discussion.

⁴Autore, Kumar, and Shome (2005) find the use of equity shelf began increasing in the late 1990s. They do not distinguish allocated and unallocated shelves in their sample. Analysis shows, however, that most of the shelves are allocated shelves. Here we focus on unallocated shelf registration.

registering common equity on unallocated shelves, managers avoid SEC review of offerings at the time of sale and, hence, regulatory uncertainty and the possibility of delay. Thus, firms using unallocated shelves should be able to fulfill their funding needs more quickly and with greater certainty of timing than would firms using the traditional registration procedure. Second, because firms avoid possible regulatory delays, they should be able to better exploit short-term pricing opportunities in the market. Whether stock price movements arise from economy-wide or firm-specific sources, managers have incentives to issue common equity when stock prices are high.⁵ Graham and Harvey (2001), in a survey of CFOs, document that 67 percent of managers admit that “the amount by which our stock is undervalued or overvalued by the market” is an important factor in their decision to issue common equity. Third, managers who register and take common equity off shelves should encounter a more competitive underwriting market and have lower direct issuance costs. Because firms that register core prospectuses typically have no immediate capital-raising needs, underwriters have less bargaining power over fees than they do when firms want to go to market quickly. When common equity is taken down because many of the regulatory hurdles have already been met, due diligence is generally shorter and fees are lower. Consistent with this argument, Bhagat, Marr, and Thompson (1985) and Blackwell, Marr, and Spivey (1990) document lower issuance costs for common equity offerings from allocated shelves in the early and mid-1980s. Denis (1993) finds a selection bias in the type of firm that chose to use allocated equity shelves in the 1980s. The study documents the differences previously found in underwriter fees are based on issuer characteristics rather than registration choice.⁶

Offsetting these advantages is a potential disadvantage—market overhang. As discussed above, managers avoided registering common equity on allocated equity shelves because they feared doing so would result in high levels of prolonged market overhang.⁷ Models of asymmetric-information such as Ambarish, John, and Williams (1987), Myers and Majluf (1984), and Cooney and Kalay (1993) demonstrate that the cost of raising equity capital is positively related to asymmetric information. Extending this line of reasoning, we conjecture that the cost of shelf registration should be increasing in firm-specific information asymmetry; stock-price drops sur-

⁵Kidwell, Marr, and Thompson (1987) find no evidence of timing ability in debt offerings, although Thatcher and Thatcher (1988) and Kadapakkam and Kon (1989) document some benefit.

⁶Kidwell, Marr, and Thompson (1984, 1987) find lower costs for issuing debt from allocated shelves. Hansen (1986) argues firms with low costs under the traditional procedure may have preferentially used allocated shelf registration and continued to have lower costs. Consistent with this, Allen, Lamy, and Thompson (1990) fail to find cost savings after accounting for differences in the types of firms using allocated shelves for debt offerings.

⁷Most empirical studies of allocated shelf common equity offerings in the early 1980s find little or no evidence of market overhang. See Bhagat, Marr, and Thompson (1985), Jensen, Hudson, and Sullivan (1995), Moore, Peterson, and Peterson (1986), and Heron and Lie (2004). Denis (1991), however, finds evidence that market overhang is more severe for shelf offerings than for non-shelf offerings.

rounding shelf registrations are likely to vary across firms and should be positively related to information asymmetry. Because shelf allows firms to raise capital without specifying the amount, timing, or use of proceeds in advance of offerings, firms with high information asymmetry likely will incur more severe market overhang when registering common equity on shelves than will low information-asymmetry firms. For high information-asymmetry firms, it is difficult for the market to evaluate the need for and the potential use of proceeds. For firms with low information asymmetry, uncertainty should be minimal and firms should experience little, if any, market overhang.

In related work, Denis (1991) examines allocated-equity shelves in the early 1980s to test whether market overhang is more severe for shelf firms that need underwriter certification of firm value than for those that do not need certification. The results show that announcement-period returns are more negative for shelf issuers than other issuers and that firms with low certification needs are more likely to use shelf.⁸ Extending Denis (1991, 1993), we perform a comprehensive study of the unallocated shelf registration choice and simultaneously examine all of the purported shelf costs and benefits controlling for selection effects. We find that although some costs of equity issuance, including underwriter fees and delays in accessing the market, depend on registration choice and are lower for shelf issuers, other costs, such as market overhang, depend on firms' characteristics. Thus, shelf is a low-cost choice for some, but not all, firms.

To date, there is limited research examining managers' choice of registration strategy. Previous studies show, however, that managers actively manage the security offering process in numerous other ways. For example, Booth and Smith (1986) show that managers choose high-quality underwriters as certification agents to mitigate the adverse impact of issuing common equity. Managers issue debt when interest rates are low and common equity when stock prices are high. Bayless and Chaplinsky (1996) document firms are sensitive to information asymmetry in the market when raising capital, because it affects the contracting costs due to adverse selection. Following this line of research, we investigate whether managers choose registration strategies that lower the costs of raising common equity.

The Data

We examine the characteristics of firms that filed common equity on unallocated shelves between the date of unallocated shelf adoption, October 29, 1992, and December 31, 2001. Only firms eligible to register securities on Form S-3 can register securities on unallocated shelves. Eligibility for Form S-3 is restricted to firms that meet the following requirements:

⁸Sherman (1999) develops a model of underwriter certification for shelf registration.

1. The aggregate market value of voting shares held by nonaffiliates must be at least \$75 million.
2. The firm must not have defaulted on debt, preferred stock, or rental payments.
3. The firm must meet all SEC disclosure requirements for the last 12 months.
4. The firm's debt must be investment grade.

Because the financial information for REITS and financial services firms differs from that of other firms, we eliminate these firms from the sample. We also remove ADRs from the sample, because their filing requirements differ from those of domestic firms.⁹

We identify common equity takedowns from these shelves for the two-year period following their registration. (We note that given the 10/29/92 adoption date, issuers had only 71 days in 1992 during which to file shelves. None took common equity off shelves during this period.) We compare the characteristics of these firms with those of all firms that were eligible to use unallocated shelf, but whose managers chose instead to use the traditional registration procedure to issue common equity.

Table 1—Unallocated Shelf Registration

The table shows the characteristics by year of 670 unallocated shelf registrations that occurred between 1992 and 2001. # Shelves filed is the total number of unallocated shelves filed that included equity, median shelf amount is the amount of capital registered on the median unallocated shelf, total shelf amount is the amount of capital registered on unallocated shelves each year, and other securities included on shelf is the percentage of unallocated shelves that included the indicated security as well as common equity. Other equity includes dual class shares, common stock warrants, rights, and depository shares. Other debt includes debt guarantees, equipment trust certificates, debt warrants, etc.

Year	# Shelves Filed	Median Shelf Amount (\$MM)	Total Shelf Amount (\$MM)	Other Securities Included on Shelf				
				Debt	Preferred Equity	Convertible Debt	Other Equity	Other Debt
1992	2	\$350.0	\$700.0	100.0 %	100.0%	0.0%	100.0%	50.0%
1993	37	\$500.0	\$18,528.0	94.5%	73.0%	5.4%	24.3%	24.3%
1994	56	\$400.0	\$27,655.0	100.0%	83.9%	1.7%	25.0%	21.4%
1995	48	\$394.0	\$25,497.0	100.0%	87.5%	2.1%	25.0%	25.0%
1996	56	\$409.5	\$28,682.0	98.2%	67.8%	8.9%	32.1%	26.7%
1997	76	\$600.0	\$66,203.0	96.1%	77.6%	3.9%	71.1%	48.6%
1998	99	\$500.0	\$88,949.2	96.9%	80.8%	2.0%	67.6%	43.4%
1999	102	\$775.0	\$105,464.7	96.1%	78.4%	1.0%	72.5%	42.1%
2000	83	\$1,000.0	\$122,639.6	97.5%	86.7%	1.2%	80.7%	48.2%
2001	111	\$999.0	\$156,953.0	96.3%	83.7%	4.5%	77.5%	50.4%
Full Sample	670	\$600.0	\$641,271.4	97.2%	80.5%	3.1%	60.1%	40.0%

Using information on unallocated shelf registrations and takedowns from SEC filings and Securities Data Corporation New Issues Database, we find that during the

⁹We also eliminate 68 firms that had missing data on TAQ or CRSP.

period we study, 402 issuers registered \$641 billion of securities on 670 unallocated shelves that included common equity. Table 1 contains details of the sample. Firms registered \$600 million of securities per unallocated shelf. In addition to common equity, 97 percent of the shelves included straight debt, 80 percent included preferred equity, 3 percent included convertible debt, 60 percent included other equity, and 40 percent included other types of debt. The table indicates that over time, firms increasingly have registered unallocated shelves that include common equity and the size of unallocated shelves has risen.

Table 2—Unallocated Shelf Takedowns and Traditional SEO Filings

The table shows the characteristics by year of 1,027 unallocated shelf takedowns and 2,148 non-shelf SEOs that occurred between 1992 and 2002. # common equity TDs is the number of common equity issuance from unallocated shelves. \$ common equity TD is the mean amount of common equity taken off unallocated shelves. # debt TDs is the number of debt issuances from unallocated shelves. \$ debt TD is the mean amount of debt taken off unallocated shelves. # preferred equity TD is the number of preferred equity issuances from unallocated shelves. \$ preferred equity TD is the mean amount of preferred equity taken off unallocated shelves. # other TDs is the number of issuances of convertible debt, other equity, and other debt from unallocated shelves. \$ other TD is the mean amount of other securities taken off unallocated shelves. # SEO filed is the number of SEOs using traditional registration procedures. \$ SEO is the mean amount of equity issued using traditional registration procedures

Year*	Securities Taken Off Unallocated Shelf								Traditional SEO Registration	
	# Common Equity TDs	\$ Common Equity TD (\$MM)	# Debt TDs	\$ Debt TD (\$MM)	# Preferred Equity TDs	\$ Preferred Equity TD (\$MM)	# Other TDs	\$ Other TD (\$MM)	# SEO Filed	\$ SEO (\$MM)
1993	10	\$144.8	7	\$292.3	7	\$145.8	13	\$167.4	226	\$79.4
1994	13	\$136.4	14	\$299.7	4	\$157.5	8	\$278.1	146	\$74.7
1995	13	\$85.3	16	\$472.9	2	\$161.6	18	\$361.8	255	\$105.6
1996	13	\$187.4	22	\$321.1	3	\$352.5	18	\$253.4	301	\$103.8
1997	20	\$197.8	36	\$611.7	3	\$178.3	38	\$553.7	292	\$101.7
1998	35	\$241.1	51	\$464.7	6	\$190.8	69	\$420.6	179	\$120.7
1999	46	\$250.1	37	\$549.9	2	\$162.5	76	\$423.1	202	\$192.2
2000	42	\$418.1	28	\$586.7	1	\$200.0	64	\$490.0	222	\$229.8
2001	51	\$288.9	63	\$813.8	1	\$1,400.0	105	\$560.5	131	\$162.2
2002	19	\$143.4	17	\$600.2	0	\$0.0	36	\$389.7	194	\$196.9
Full Sample	262	\$250.7	291	\$567.4	29	\$231.8	445	\$458.5	2,148	\$133.8

Table 2 presents information on takedowns from shelves that included common equity and SEOs that used the traditional registration procedure. From the 670 unallocated shelves, 217 firms took common equity off 262 times. An additional 37 shelves had no securities taken down. A total of 185 firms that registered common equity on unallocated shelves never issued common equity off their shelves.

Of the unallocated shelves that had securities taken down, firms raised \$66 billion in common equity, \$165 billion in straight debt in 291 offerings, and \$7 billion in preferred equity in 29 offerings. They raised \$204 billion in 445 offerings of other

classes of securities. Issuers that were eligible to issue common equity from unallocated shelves registered \$287 billion in common equity in 2,148 traditional registration offerings. The average size of these offerings is \$134 million, compared to an average common equity takedown from shelves of \$251 million.

Table 3—Firm Characteristics and Registration Strategies

This table shows the mean and median characteristics of our sample of shelf and traditional SEO issuers between 1992 and 2001. Market capitalization is the market value of common equity, and total assets is the book value of total assets. Long-term debt-to-assets is the book value of long-term debt divided by total assets, and volatility is the standard deviation of daily stock returns over the prior calendar year. Market-to-book ratio is the [market value of common equity + total assets – book value of common equity] divided by total assets. Free cash flow-to-assets is measured as [operating income after tax + non-operating income after tax – change in net working capital – net capx – interest expense – common stock dividends – preferred stock dividends] divided by total assets; and return on equity is net income divided by shareholders' equity. Percentage bid-ask spread is the percentage bid-ask spread scaled by the midpoint of the two quotes that define the spread, using the average of the percentage bid-ask spreads across all quotes from day -30 to the shelf registration filing day. Number of analysts is the number of analysts issuing forecasts as reported by IBES. Analyst forecast dispersion is the absolute value of the range of analyst forecasts divided by the mean estimate. Share turnover is defined as trading volume as a percent of shares outstanding measured over the 60 trading days preceding the filing of a registration statement. p-values are shown in parentheses

	Shelf Registration		Traditional SEO		Test of Differences	
	Mean	Median	Mean	Median	t-test p-value	Kruskal-Wallis p-value
Market Capitalization (\$MM)	12,407.8	3,209.2	2,491.8	637.5	(.0001)	(.0001)
Total Assets (\$MM)	7,154.9	2,941.5	1,328.9	158.6	(.0001)	(.0001)
Long-Term Debt-to-Assets (%)	30.9	28.3	18.7	11.2	(.0001)	(.0001)
Volatility (%)	2.6	2.2	3.6	3.5	(.0001)	(.0001)
Market-to-Book Ratio	3.29	1.69	10.50	3.93	(.0001)	(.0001)
Free Cash Flow-to-Assets (%)	-17.6	-10.4	-39.4	-30.1	(.0001)	(.0001)
Return on Equity (%)	4.33	10.83	-5.82	9.62	(.3312)	(.0118)
Percentage Bid-Ask Spread (%)	0.75	0.56	1.92	1.50	(.0001)	(.0001)
Number of Analysts	10.32	13.00	3.04	3.00	(.0001)	(.0001)
Analyst Forecast Dispersion (%)	26.56	19.20	26.63	17.40	(.9621)	(.8457)
Share Turnover (%)	6.30	4.19	10.44	6.24	(.0001)	(.0001)
% Listed on NYSE	80.29%		31.37%			
Observations	670		2,148			

Who Uses Shelf?

To investigate the types of firms that adopt the different registration strategies, we use financial information from Compustat and the Center for Research in Security Prices (CRSP), trade and quote data from the New York Stock Exchange's TAQ Database, and analyst forecast data from the I/B/E/S database. Table 3 shows that shelf registrants have greater market capitalizations and more total assets than firms that choose the traditional registration procedure. Shelf users are nearly twice as financially leveraged as are firms that use traditional registration. We find stock-return volatility (Volatility), measured as the standard deviation of daily stock

returns calculated over the previous calendar year, is higher for firms that choose the traditional registration procedure to issue common equity than shelf registrants.

We also compare the investment opportunities and need for capital (financial slack) between shelf and non-shelf equity issuers. Jensen (1986) argues that the market should respond positively to common equity issuances if firms have valuable investment opportunities and limited free cash flow. We proxy investment opportunities with the market-to-book ratio and financial slack by the free cash flow ratio. We define market-to-book as [market value of common equity + total assets – book value of common equity] divided by total assets. We define free cash flow as [operating income after tax + non-operating income after tax – change in net working capital – net capx – interest expense – common stock dividends – preferred stock dividends] divided by total assets. Firms using the traditional registration procedure have stronger investment opportunities and less financial slack than do firms using shelf. On average, shelf registrants are no more profitable than the traditional firms based on return on equity.

There are many empirical proxies used in the literature to capture information asymmetry. Based on the work of Copeland and Galai (1983), Glosten and Milgrom (1985), Corwin (2003), and Wu (2004), we employ several measures suggested by the literature to assure robustness. In the microstructure literature, percentage bid-ask spread is used as a measure of asymmetric information, order processing, and inventory holding costs. We use percentage bid-ask spread measured over the calendar month before the event day as our first proxy for information asymmetry.¹⁰ To control for the order processing and inventory components of bid-ask spreads, we include in our multivariate analyses a measure of liquidity, share turnover, defined as daily trading volume as a percentage of shares outstanding measured over the 60 trading days preceding the filing of a registration statement and exchange listing. Second, we use the log of the number of analysts covering a firm during the calendar year prior to the offering as a proxy. The number of analysts covering a firm has a complex relationship with information asymmetry. The value of analyst coverage should be greatest for firms that have high information asymmetry. As more analysts cover a firm, however, the level of information asymmetry is likely to diminish and the marginal value of analyst coverage should decline. As a result, the univariate relationship between information asymmetry and the number of analysts is difficult to interpret. To correct for this, we include analyst forecast dispersion as our third measure of information asymmetry. We measure analyst forecast dispersion as the absolute value of the range of analyst forecasts divided by the mean estimate. Information asymmetry should be increasing in the dispersion among analyst forecasts, holding the number of analysts constant. Firm size also has been used in the literature as a proxy for asymmetric information, with larger firms assumed to have lower

¹⁰We ran all test using dollar bid-ask spread. All results are qualitatively the same and are available upon request.

information asymmetry. We include it measured as the log of total assets as a control variable in all estimations. Because firm size has been used to proxy many other firm characteristics, we focus our discussion in this paper on the other proxies.

Table 3 shows that shelf firms have significantly less information asymmetry than do traditional registration firms. Shelf firms have an average percentage bid-ask spread of 0.75 percent and ten analysts following them compared to a percentage bid-ask spread of 1.92 percent and three analysts for firms that raise equity using the traditional procedure. On a univariate level, we find no difference in analyst forecast dispersion between shelf and traditional registration firms.

The univariate results in Table 3 indicate that the characteristics of firms that use shelf differ significantly from those that use traditional registration. In a multivariate setting, we further explore the types of firms that use shelf. We estimate a probit model, where the dependent variable, shelf registration, is an indicator variable equal to one if a firm files an unallocated shelf that includes equity and zero if it raises common equity using the traditional registration procedure. We test whether the firms that are likely to achieve the greatest benefits and the lowest costs from using shelf are likely to use it. Thus, the independent variables of interest are our proxies for information asymmetry and stock-return volatility. Firms with low levels of information asymmetry should have a low cost to using shelf in terms of market overhang, and firms with high stock-return volatility should benefit from the market-timing option offered by shelf.

The control variables in the analysis include investment opportunities (as measured by the market-to-book ratio), free cash flow, liquidity (as measured by share turnover), and exchange listing. To control for the impact of differences in asset size on the probability of shelf usage, we include firm size, as measured by the log of assets. We also control for firm leverage, which we measure by total debt divided by total assets. This variable captures the ability of firms to raise debt rather than having to resort to common equity (Galai and Masulis, 1976). We control for one-digit SICs and calendar years using indicator variables. In addition to coefficients, we estimate marginal probabilities. The results are presented in Table 4.

We find the likelihood that firms register common equity on unallocated shelves is strongly related to information asymmetry. In Model 1 of Table 4, we find that firms with low information asymmetry, as measured by percentage bid-ask spread, are significantly more likely to register common equity on unallocated shelves than use the traditional registration procedure. In Model 2, we measure information asymmetry using the number of analysts following firms and find a statistically significant and positive relation between analyst following and the likelihood of shelf usage. Combining the two measures in Model 3, we find a negative (positive) relation between percentage bid-ask spread (number of analysts) and shelf usage. In Models 4 and 5, we include analyst forecast dispersion as an additional measure of information asymmetry and find that greater forecast dispersion is related to a lower

Table 4—Choice of Registration Strategy

In this table we estimate probit models of registration choice. The dependent variable in each model equals one if a firm registers a shelf that includes common equity and zero otherwise. Independent variables include three measures of information asymmetry: (1) the percentage bid-ask spread in the month prior to the filing of the core shelf prospectus, (2) log (number of analysts) is the log of the number of analysts issuing forecasts, and (3) analyst forecast dispersion is the absolute value of the range of analysts forecasts divided by the mean estimate. Exchange listing is an indicator variable equal to one if the firm is NYSE listed and zero otherwise. Share turnover is defined as trading volume as a percent of shares outstanding. Investment opportunities is defined as market-to-book, free cash flow is defined as free cash flow divided by total assets. Log(assets) is measured as the log of total assets. Leverage: is measured as total debt divided by total assets, and volatility is the standard deviation of daily stock returns over the prior calendar year. We also control for industry effects and calendar years. marginal probabilities are shown in bracket, and coefficient p-values are shown in parentheses

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Intercept	-4.560 (.0001)	-4.671 (.0001)	-4.447 (.0001)	-4.540 (.0001)	-4.565 (.0001)	-6.104 (.0001)	-5.749 (.0001)
Percentage Bid-Ask Spread	-14.824 [-3.460] (.0080)		-9.836 [-1.813] (.0710)		-2.077 [-0.675] (.7460)		-15.632 [-1.832] (.1111)
Log(Number of Analysts)		0.407 [0.077] (.0001)	0.392 [0.072] (.0001)	0.448 [0.147] (.0001)	0.437 [0.142] (.0001)	0.812 [0.085] (.0001)	0.793 [0.085] (.0001)
Low Coverage Indicator						0.062 [0.011] (.6650)	0.089 [0.143] (.7360)
Analyst Forecast Dispersion				-0.005 [-0.002] (.0020)	-0.005 [-0.002] (.0002)	-0.008 [-0.008] (.0030)	-0.008 [-0.001] (.0030)
Exchange Listing	0.119 [0.028] (.3190)		0.084 [0.016] (.4610)		0.274 [0.089] (.0410)		0.088 [0.017] (.6770)
Share Turnover	-0.160 [-0.037] (.6990)		-0.149 [-0.027] (.7190)		0.152 [0.049] (.7440)		0.029 [-0.037] (.9610)
Investment Opportunities	-0.008 [-0.002] (.1150)	-0.010 [-0.002] (.0300)	-0.011 [-0.002] (.0230)	-0.009 [-0.003] (.1220)	-0.009 [-0.003] (.1410)	-0.020 [-0.002] (.0360)	-0.023 [-0.002] (.0630)
Free Cash Flow	-0.559 [-0.128] (.0010)	-0.474 [-0.090] (.0020)	-0.478 [-0.088] (.0020)	-0.517 [-0.169] (.0006)	-0.537 [-0.174] (.0040)	-0.660 [-0.084] (.0250)	-0.648 [-0.083] (.0560)
Log(Assets)	0.562 [0.129] (.0001)	0.471 [-0.090] (.0001)	0.434 [0.080] (.0001)	0.492 [0.161] (.0001)	0.460 [0.149] (.0001)	0.828 [0.088] (.0001)	0.773 [0.078] (.0001)
Leverage	0.420 [0.096] (.0001)	0.675 [0.128] (.0001)	0.716 [0.132] (.0001)	0.614 [0.201] (.0050)	0.611 [0.199] (.0050)	1.193 [0.129] (.0001)	1.262 [0.133] (.0001)
Volatility	4.211 [1.060] (.2830)	-3.550 [-0.675] (.2820)	-0.525 [-0.097] (.8890)	-6.902 [-2.260] (.0830)	-2.971 [-0.966] (.5120)	-12.288 [-0.964] (.0490)	-8.547 [-0.334] (.2640)
Pseudo R-Squared	44.8%	47.3%	47.5%	43.3%	43.5%	47.7%	48.0%
Observations	2,818	2,818	2,818	1,680	1,680	2,818	2,818

likelihood of shelf usage. Note that we lose a significant number of observations in these final two estimations, because the construction of the forecast-dispersion measure eliminates firms with fewer than two analyst forecasts from the sample. To control for this data loss, we create an indicator variable (low coverage indicator) equal to one if analyst forecast dispersion is not measurable and zero otherwise and display the results in Models 6 and 7. As can be seen, the results are robust to this specification. Greater forecast dispersion is related to a lower likelihood of shelf usage, and more analyst coverage is related to increased shelf usage. Overall, the results show that the choice of shelf registration is strongly related to each of our measures of information asymmetry.

Our results show that shelf use is not related to stock-return volatility. After controlling for firm characteristics, the firms we anticipate would benefit the most from the market-timing option are no more likely to use shelf than the traditional registration procedure. We find that investment opportunity also is not related to shelf usage. Shelf use, however, is negatively related to free cash flow. When financial resources are tight, the market may interpret common equity issuances positively; thus, firms are willing to use shelf. Our results also indicate that firm size and leverage are positively related to shelf use. Firms that are relatively large and therefore likely to be known are more likely to use unallocated shelves than are smaller firms. Similarly, firms with high financial leverage are more likely to use shelf. It appears they may do so, at least in part, because they have few options for additional debt issuance, so the specter of issuing equity may not send a negative signal to the market.

Costs of Issuing Equity

We now examine whether the costs of using shelf are lower than the costs of using traditional registration and whether capital-raising costs differ by firm characteristics. We present results for each of the four costs of issuing equity: underwriting fees, share price discounts, delays in registration, and asymmetric-information related stock-price declines.

The results in Table 5 indicate that shelf issuers pay lower underwriting fees than firms using the traditional registration procedure. The average gross spread for common equity takedowns from shelves is 3.88 percent, but the gross spread for issuances using the traditional registration procedure is 4.91 percent. Although the gross spreads of shelf registrants do not include the fees paid when they register core prospectuses, interviews with investment bankers and shelf registrants indicate these expenses are generally negligible; thus, gross spreads are a reasonable estimate of total fees.

A second cost of issuing equity is the price discount required to place offerings. Higher discounts are indicative of placement difficulty. We measure SEO discount as the offer price relative to the closing price on the day before the offering. When

firms issue common equity off shelves, we find the average offering is priced 2.09 percent below the previous day's closing price, whereas the average traditionally registered SEO is priced 2.55 percent below. Shelf issuers appear to be able to place their share more readily and thus do not need to discount the price as much as traditional SEO issuers.

Table 5—Costs of Issuing Equity Using Unallocated Shelf and Traditional Procedure

In this table we compare the costs of issuing common equity using unallocated shelf and the traditional registration procedure. We compare the gross spreads paid by issuers, the SEO discount (measured relative to the closing price on the day before the offering), the number of days between the initial filing of preliminary prospectuses with the SEC and issuing common equity, the price percentile received from issuing equity, and the market reactions to equity issuance filings and announcements. For firms that issued common equity using unallocated shelf registration, price percentile is measured as the price percentile at which equity was issued using daily closing prices in the two year period surrounding the equity issuance. The market reactions to equity issuance filings and announcements are measured as the mean and median cumulative abnormal returns CARs (day -1 to day 2) for firms filing common equity on unallocated shelves (shelf registration CAR) and for firms issuing common equity off unallocated shelf registration statements (equity takedown CAR). Total SEO CAR is defined as the sum of the CAR at the filing of unallocated shelves and first indications of common equity takedowns off shelves for shelf issuers, and the abnormal return at the earlier of an announcement or filing of a preliminary prospectus for traditional issuers. p-values are shown in parentheses

	Shelf		Traditional SEO		Test of Differences	
	Mean	Median	Mean	Median	t-test p-value	Kruskal-Wallis p-value
Gross Spread	3.88%	4.00%	4.91%	5.00%	(.0001)	(.0001)
SEO Discount	2.09%	1.07%	2.55%	1.66%	(.0193)	(.0041)
Days in Registration	10.1	8.0	44.1	29.0	(.0001)	(.0001)
Price Percentile	58.4	66.0	59.2	63.0	(.6437)	(.7663)
Overnight Offerings	39.8%		0.0%			
Shelf Registration CAR	-0.246%	-0.160%				
	(.1800)	(.1608)				
Equity Takedown CAR	-1.402%	-1.217%				
	(.0003)	(.0001)				
Total SEO CAR	-2.073%	-1.638%	-2.300%	-2.519%	(.7114)	(.0736)
	(.0001)	(.0001)	(.0001)	(.0001)		

The traditional registration procedure can delay firms' equity issuances. As shown in Table 5, firms that use the traditional registration procedure spend 44 days in equity registration. In contrast, shelf registrants take only ten days to access the market. This difference is not surprising as the SEC designed shelf to accelerate offerings. In fact, nearly 40 percent of shelf equity offerings are issued overnight without the filing of any preliminary prospectuses.

One benefit to firms of avoiding unanticipated regulatory delays is that managers should be able to exploit short-term pricing opportunities. We therefore anticipate that shelf offerings are sold for higher prices than traditional SEOs. To measure managers' ability to time offerings, we form an empirical distribution of daily closing prices over a two-year window and measure where the actual offering price lies

within the distribution (price percentile). For firms that use shelf, we record daily closing prices beginning with the date when they file the core prospectus and ending when the shelf expires two years later.¹¹ We measure timing ability using price percentile rather than price run-up or pre-offer return, because price percentile implicitly controls for cross-sectional variation in stock-price volatility. By normalizing each firm's price level by its own distribution, we compare timing ability across firms and market conditions.¹² We anticipate that if managers can take common equity off shelves for two years, they will try to exploit pricing opportunities over that period. For firms that use the traditional registration procedure, we subtract 267 days from the date that firms file their first preliminary prospectus. We select 267 days, because that is the average length of time between core prospectus filings and common equity issuances off shelves. We then measure the price percentile at which firms issue common equity over the next two years. The idea is that managers anticipate exploiting pricing opportunities over some time horizon. To compare pricing of the two registration regimes, we hold duration constant.

Table 5 shows that managers profit from pricing opportunities regardless of which registration procedure they choose. Shelf users issue equity at a price in the 58th percentile, whereas firms that use the traditional registration procedure price in the 59th percentile. We find no statistical evidence that firms using shelf exploit market-timing opportunities any more aggressively than do firms that use the traditional registration procedure. Consistent with these results, Heron and Lie (2004) find little evidence of market-timing ability for shelf issuers. They conclude that shelves are used to fulfill capital immediacy needs, rather than exploit temporary pricing opportunities.¹³

A significant cost of issuing equity is an asymmetric-information related stock-price decline when an issuance is announced. Firms that use shelf face potential market overhang when core prospectuses are filed and downwards pressure on share prices when equity issuances are announced. Firms that use the traditional registra-

¹¹We adjust prices after equity takedowns by adding price drops that occur when firms announce equity issuances. This procedure controls for any biases in price levels created by the announcements.

¹²When managers file a core prospectus, they do not know where within a future price distribution a particular price will fall. What they do know is that the core prospectus is good for up to two years of issuances. Thus, they enter into a game of guessing when to issue equity during the two-year window. If they guess right, they issue equity at a high price percentile. If they guess wrong, they either miss issuing equity at a previous high price that is no longer available or the opportunity to issue equity at a later high price. It is important that we use a measure that implicitly controls for cross-section variation in return volatility, because return volatility determines the price levels at which managers can issue equity and not all firms have the ability to issue at the same price levels. The variable, price percentile, controls for cross-section variation in return volatility by measuring how well a manager does relative to how well he or she could have priced equity, given that particular firm's price path, over the period. Price run-up on the other hand, only measures timing ability relative to historic price levels.

¹³Autore, Kumar, and Shome (2005) find that allocated shelf issuers have superior timing ability based on pre-offering price run-ups. Based on the same metric, we find that unallocated shelf issuers have worse market-timing ability.

tion procedure incur price declines when share issuances are disclosed. To compare the cost of using unallocated shelf with that of using the traditional registration procedure, we compare the cumulative abnormal returns (CARs) around shelf registration and common equity takedown dates with the CARs around traditional equity registration dates.

We measure shelf registration CAR on day -1 through day +2 around the earlier of the filing of unallocated shelves and filing announcements.¹⁴ Because firms can file pricing supplements for takedowns at the time of or after offerings, the market may have little or no advance notice of offerings. Therefore the market's reaction to shelf takedowns may occur after filing events rather than at the time of or before events. The four-day window captures the market's reaction to both more marketed offerings that are slower and quick offerings that do not have preliminary prospectuses. The equity takedown CAR captures the market reaction on day -1 through day +2 around the first indication that a firm has taken equity off a shelf—either at the filing of the first preliminary prospectus, the filing of a pricing supplement following an overnight offering or the announcement of an equity issuance. The total SEO CAR is the sum of the CAR at the first indication of a filing of an unallocated shelf and the CAR at the first indication of a common equity takedown off the shelf. For firms that use the traditional registration procedure, we define the event day as the earlier of when they first file a preliminary prospectus or announce an offering. We measure CARs as returns in excess of the CRSP NYSE/Nasdaq/Amex value-weighted index.

As can be seen in Table 5, the CAR when firms file shelves is not statistically different from zero. Overall, we find no evidence of market overhang. We next examine the market's reaction when firms issue common equity. We find that the mean CAR when firms take common equity off shelves is -1.4 percent. When we combine the CARs for firms that file shelves and take down common equity, we find the mean CAR is -2.1 percent. When firms use the traditional registration procedure, they experience a mean abnormal return of -2.3 percent. The combined CAR for firms that file shelves and take down common equity is statistically indistinguishable from the CAR when firms use the traditional registration procedure. Overall, the results show that for the average firm, using shelf is no more or less costly in terms of market reaction than is the traditional registration procedure. This finding runs counter to the view conveyed by Heron and Lie (2004), who argue that shelf registrations convey less unfavorable information than traditional offerings and that the market should react less negatively.¹⁵

The univariate results in Table 5 demonstrate that shelf issuers pay lower fees, offer smaller price discounts, and access the market faster than do traditional equity issuers. Additionally, these firms incur no greater cost in terms of negative market

¹⁴Press announcements were collected from the *New York Times* and *Wall Street Journal*.

¹⁵Heron and Lie (2004) examine 256 allocated and unallocated shelves over the period 1980 through 1998.

reaction to the announcement and raising of equity. The question is why would firms ever choose to use the traditional registration procedure rather than shelf? Our results indicate that shelf and traditional equity issuers have different characteristics. Here we explore differences in the costs of issuing equity, not only by registration strategy, but also by firm characteristics. These costs include: underwriting fees, share price discounts, delays in registration, and asymmetric-information related stock-price declines.

We examine the gross spreads paid by issuers by estimating a Heckman two-stage model to control for the potential selection bias in the type of firm that chooses to use shelf. The first-stage probit estimation, which includes both shelf and traditional-registration issuances, is estimated as Model 3 in Table 4. The first column of Table 6 shows estimates of the second stage of the Heckman model. We control for information asymmetry, exchange listing, share turnover, the log of offering proceeds, dilution, industry, and calendar year. Finally, we include λ , the inverse Mills ratio calculated from the first stage probit model, which is the predicted probability that a firm uses shelf.

The results indicate gross spread is related to both of our proxies for information asymmetry. Firms with high levels of information asymmetry, as measured by either a high percentage bid-ask spread or by having low analyst coverage, incur large underwriting fees. Gross spread is negatively related to the log of proceeds raised, evidence of at least some fixed costs in the underwriting business. Importantly, gross spread is also determined by registration choice. The coefficient on λ is negative and significant at the one-percent level. Thus, even after controlling for firm characteristics and information about offerings, firms that choose to use shelf incur significantly lower underwriter fees than do firms that use the traditional registration procedure. When the SEC adopted shelf, it hoped to confer this benefit to shelf issuers.

Our univariate analysis shows that the price discount for shelf issuers is significantly lower than for traditional issuers. In Column 2 of Table 6, we control for firm and offering characteristics and use OLS to test whether the price discount required to place offerings is lower for shelf registrants than for traditional equity issuers. The dependent variable is SEO discount and the independent variables are information asymmetry, exchange listing, share turnover, volatility, industry, and calendar year. We include the log of proceeds raised, dilution, the log of the number of days in registration, and an indicator variable, *overnight*, which is equal to one for offerings for which no preliminary prospectus was filed with the SEC. To compare the price discounts of the registration choices, we use an indicator variable, *choice*, which

equals one if a firm issues common equity from an unallocated shelf, and zero if it uses the traditional registration procedure.¹⁶

We find that SEO discount is significantly related to information asymmetry, volatility, and speed to market, as captured by both days in registration and over-

Table 6—Costs of Issuing Equity Using Unallocated Shelf and Traditional Registration Procedure Multivariate Analyses

In this table we compare the costs of issuing equity using unallocated shelf and the traditional registration procedures. We estimate a Heckman two-stage model of gross spreads. The first stage is probit Model 3 presented in Table 4. It examines which firms choose unallocated shelf registration. The second stage, shown in the first column of this table, examines gross spreads controlling for firm and offering characteristics. In the second and fourth columns we use OLS estimations to compare shelf and traditional SEO discounts and price percentiles. The third column uses tobit estimation to compare the number of days in registration for the registration procedures. Gross spread is the percentage fee paid to underwriters. SEO discount is measured relative to the closing price on the day before the offering. Log (days in registration) is the natural log of the number of days between the initial filing of preliminary prospectuses with the SEC and issuing common equity. Price percentile is measured as the price percentile at which equity was issued using daily closing prices over a two-year period. Information asymmetry is measured as the percentage bid-ask spread in the month prior to the filing of the core shelf prospectus and the log of the number of analysts. Exchange listing is an indicator variable equal to one if the firm is NYSE listed and zero otherwise. Share turnover is defined as trading volume as a percent of shares outstanding. Volatility is measured as the standard deviation of daily stock returns for the previous year. S&P 500 price percentile is the percentile at which the S&P 500 traded over the same period as the offering's price percentile. Proceeds raised is the dollar amount of common equity raised in \$ millions. Dilution is the number of shares issued as a percent of shares outstanding. Overnight is equal to one if offerings take less than one day and zero otherwise. Lambda is the inverse Mills ratio calculated from the first stage probit model, and choice equals one if a firm issues common equity from an unallocated shelf and zero if it uses the traditional registration procedure. Coefficient p-values are shown in parentheses

	Gross Spread Heckman Model (1)	SEO Discount OLS Model (2)	Days in Registration Tobit Model (3)	Price Percentile OLS Model (4)
Intercept	5.453 (.0001)	-0.025 (.0015)	34.841 (.0060)	-0.286 (.9802)
Percentage Bid-Ask Spread	13.737 (.0001)	-0.224 (.0005)	65.214 (.6207)	121.577 (.0156)
Log(Number of Analysts)	-0.244 (.0001)	0.004 (.0005)	-1.522 (.4505)	-2.050 (.0161)
Exchange Listing	-0.543 (.0001)	-0.002 (.4187)	17.987 (.0001)	-1.523 (.4127)
Share Turnover	-0.009 (.9442)	-0.023 (.0005)	-7.675 (.5820)	14.887 (.0025)
Log(Proceeds Raised)	-0.002 (.0001)	0.005 (.0001)	-1.481 (.4376)	6.523 (.0001)
Dilution	0.000 (.0001)	0.000 (.1102)		0.000 (.3591)
Volatility		-0.174 (.0132)	190.531 (.1687)	124.546 (.0239)
Log(Days in Registration)		-0.005 (.0001)		-3.155 (.0014)
Overnight		-0.014 (.0476)		2.566 (.6662)
S&P 500 Price Percentile				0.015 (.0001)
Lambda	-0.093 (.0058)			
Choice		-0.005 (.1547)	-48.960 (.0001)	-8.608 (.0016)
Adjusted R-Squared	54.6%	10.9%		12.6%

¹⁶We use OLS rather than a Heckman model, because the independent variable is a choice variable rather than dictated by market forces and the result of a selection bias, as is the case with gross spreads or abnormal returns.

night. Uncertainty about firm value and volatile prices cause managers to offer price concessions. Placement difficulty is also positively related to SEO discount; that is, large or quick-to-market offerings increase price discounts. That said, counter to the univariate results, we find no difference in SEO discounts between shelf and traditional equity issuances once we control for firm and offering characteristics. Thus unlike gross spread, SEO discount cannot be lowered through the use of shelf.

In Column 3 of Table 6, we examine the time spent in SEC registration. We use a Tobit specification to model the dependent variable, days in registration, because it is censored at zero. The independent variables include information asymmetry, exchange listing, share turnover, volatility, industry, and calendar year. We control for proceeds raised and include an indicator variable of registration choice. The findings in Column 3 indicate that firm and offering characteristics do not affect the time spent in registration. Instead, we find registration choice determines registration duration. Shelf issuers register offerings faster than firms that use the traditional registration procedure. This result, although not surprising, substantiates the ability of firms to access this benefit of shelf.

Finally, we examine whether shelf filers are able to exploit short-term pricing opportunities better than traditional equity issuers. We use OLS to model the pricing benefits of shelf registration. The dependent variable is price percentile and the independent variables are information asymmetry, exchange listing, share turnover, volatility, industry, and calendar year. We include the S&P 500 price percentile, calculated for each offering as the percentile at which the S&P 500 traded over the same period as the offering's price percentile. We also include dilution, days in registration, whether offerings are offered overnight, and an indicator variable of registration choice. We anticipate the S&P 500 price percentile will be positively related to price percentile; that is, the level of the market should influence managers' issuance timing, and that issuers will focus on dilution, as it should affect the final price achieved. It is difficult to predict the relation between price percentile and overnight, as managers who issue equity overnight may be taking advantage of a temporarily high stock price or just seeking funding immediacy. The indicator variable of registration choice allows us to compare firms' relative abilities to time issuances for high prices based on their registration choices.

The results in Column 4 of Table 6 show that shelf issuers are significantly worse at exploiting pricing opportunities in the market relative to traditional equity issuers. When offerings are done by firms with higher levels of information asymmetry and with higher stock return volatility, however, they extract significantly higher prices. When firms spend more time in the registration process, the price percentile of offerings is low. Thus, although shelf users do not appear to take advantage of the timing option afforded to them, speed to market is a significant determinant of pricing ability. We find price percentile is also positively related to the S&P 500 price percentile. When the market is high, managers receive a higher

price than when it is low. Taken together, we find that timing and pricing benefits are related to firm and offering characteristics as well as to registration choice. The benefits that the SEC sought to confer with shelf registration—lower underwriting fees and faster time to market—are realized by shelf issuers.

A major cost of raising equity is the downward pressure on share price when managers file shelves and announce equity issuances. We now examine market reaction using a two-stage Heckman model to correct for the potential selection bias in the type of firm that uses shelf registration. We start by examining market overhang—the market's reaction to unallocated shelf registrations. The first stage estimation is probit Model 3 of firm registration choice that is presented in Table 4. Table 7 contains the second stage results. In Column 1 we explore the impact of information asymmetry on market overhang, controlling for selection bias and firm-specific characteristics. The dependent variable is shelf registration CAR and the independent variables are as follows: information asymmetry proxied by both percentage bid-ask spread and the log of the number of analysts following the firm; exchange listing; share turnover; investment opportunities; free cash flow; and volatility. Following Krasker (1986), we also control for shelf size. Issuances of new shares can create permanent price pressure if demand curves are downward sloping or temporary price pressure if issuances cause liquidity shocks. We measure shelf size (shelf amount) as the total dollar amount of securities registered on shelves. We control for the percentage of securities registered on shelves that can dilute common equity (equityness). We anticipate that the market will react negatively to unallocated shelves that contain a high proportion of potentially dilutive securities. We include λ , which is the predicted probability that a firm files a shelf that was estimated in the first stage.

Consistent with the univariate findings, we find the market reaction to the filing of shelves is related to information asymmetry. When the bid-ask spread is wider or analyst coverage is thin, consistent with higher information asymmetry, the market revises its estimate of a shelf registrant's value downwards. Also, when a firm has greater investment opportunities, the market is more positive in its reaction to the filing of a shelf. Firms' free cash flow and financial slack do not affect the market's reaction to the filing of shelves. Once we control for the level of information asymmetry and other firm characteristics, the market response is unrelated to firms' choice of registration strategy.

The second-stage estimation in Column 2 examines the market return for both traditional seasoned equity issuances and the combined return for shelf users at the filing of shelves and equity takedowns. The independent variables include information that the market can observe when core prospectuses are filed: information asymmetry as proxied by the percentage bid-ask spread and the log of the number of analysts, exchange listing, share turnover, investment opportunities, free cash flow, volatility, leverage, and size. We also include independent variables reflecting

information about specific common equity offerings. These variables are proceeds raised, gross spread, log of days in registration, and price percentile. We include lambda, which is the predicted probability that a firm files a shelf that was estimated in the first stage.

Table 7—Cost of Issuing Equity: Market Reaction to Shelf Registration and Equity Issuance

In this table, we estimate two Heckman models of the market's reaction to shelf registration and common equity issuance using shelf and the traditional registration procedure. Shelf registration CAR is the mean cumulative abnormal return (day -1 to day 2) for firms filing common equity on unallocated shelves. Total SEO CAR is defined as the sum of the CAR at the filing of unallocated shelves and first indications of common equity takedowns off shelves for shelf issuers and the abnormal return at the earlier of an announcement or filing or a preliminary prospectus for traditional issuers. The first stage is the probit model presented in Table 4. Independent variables include information asymmetry as measured by the percentage bid-ask spread and the log of the number of analysts. Exchange listing is an indicator variable equal to one if the firm is NYSE listed and zero otherwise. Share turnover is defined as trading volume as a percent of shares outstanding. Investment opportunities is defined as market-to-book. Free cash flow is defined as free cash flow divided by total assets, and volatility is measured as the standard deviation of daily stock returns for the previous year. Shelf amount is the dollar amount of securities registered on core prospectuses, and equityness is the percentage of securities registered on shelves that can dilute common equity. Leverage is measured as total debt divided by total assets. Log (Assets) is measured as the log of total assets. Proceeds raised is the dollar amount of common equity raised. Gross spread is the percentage fee paid to underwriters. Log days in registration is the log of the number of days between the filing of preliminary prospectuses with the SEC and issuing common equity. Price percentile is measured as the price percentile at which equity was issued using daily closing prices over a two-year period, and lambda in the inverse Mills ratio calculated from the first stage probit model. Coefficient p-values are shown in parentheses

	Shelf Registration CAR		Total SEO CAR	
	(1)		(2)	
Intercept	0.0007	(.9658)	0.3538	(.6397)
Percentage Bid Ask Spread	-0.7557	(.0294)	4.2294	(.3130)
Log(Number of Analysts)	0.0054	(.0545)	0.0612	(.3848)
Exchange Listing	-0.0020	(.7458)	0.1699	(.2761)
Share Turnover	-0.0965	(.0039)	-0.0719	(.8634)
Investment Opportunities	0.0011	(.0004)	0.0004	(.7296)
Free Cash Flow	0.0001	(.9869)	-0.4199	(.0124)
Volatility	0.1918	(.3130)	-1.4954	(.7416)
Shelf Amount	0.0000	(.0319)		
Equityness	-0.0199	(.2532)		
Leverage			0.6747	(.0154)
Log(Assets)			-0.1329	(.0573)
Proceeds Raised			0.0008	(.0168)
Gross Spread			-0.2572	(.0020)
Log Days in Registration			0.2445	(.0005)
Price Percentile			0.0033	(.0932)
Lambda	0.0081	(.1414)	0.5390	(.0001)
Adjusted R-Squared	3.51%		4.61%	

We anticipate that the CAR is negatively related to proceeds raised and gross spread. Large offerings tend to exert downward pressure on share prices, and, in this

setting, gross spread reflects the difficulty of underwriting an issue, because investment banks charge more for facilitating difficult offerings. The expected relation between the market's reaction and log of days in registration is ambiguous. Slow offerings provide market participants time to assimilate information, potentially mitigating adverse market response. Managers are also less likely to be able to exploit short-term pricing opportunities in slow, rather than fast offerings. In either case, the market should respond less favorably to quick offerings from shelves than to slow offerings. On the other hand, long marketing periods can indicate that offerings are difficult to sell. If this effect dominates, the market will respond less favorably to slow offerings than to quick ones. Finally, we include the price percentile of the actual offering to capture managers' timing ability. If managers aggressively exploit pricing opportunities, the market should respond negatively.

We find that the market's reaction is not related to our proxies for information asymmetry or investment opportunities. Consistent with the prediction of the free cash flow model (Jensen, 1986), the market responds negatively when firms have financial slack. As anticipated, the results show the combined CAR is negatively related to gross spread. Market reaction is, however, positively related to the log of days in registration. When the market has more time to digest information, the reaction to an equity issuance is less negative. The market reaction is significantly related to λ . Conditional on a firm choosing to raise equity using a shelf registration, the CAR when equity is taken down is significantly less negative for shelf issuers than for traditional SEO issuers.

Why Do Some High Information-Asymmetry Firms Choose Shelf?

The results of the multivariate analyses show that firms benefit from choosing shelf in terms of underwriter fees and time to market. When asymmetric-information-related price declines related to shelf are small, firms have clear incentives to choose it. When price declines are large, however, firms instead may choose the traditional registration procedure. In this section, we investigate whether firms that choose shelf have low information asymmetry and whether firms that choose the traditional registration procedure have high information asymmetry. We then explore why firms might choose the opposing strategy. In Table 8 we divide firms into quartiles based on their information asymmetry using both percentage bid-ask spread and analyst coverage. Because spreads have declined over time, we define new quartile breaks each calendar year for percentage bid-ask spread. We also partition calendar year 1997 into two periods around the date when the minimum tick size changed from eighths to sixteenths. We find that 56 percent of shelf issuers are in the lowest quartile of information asymmetry. If firms were randomly distributed, we would expect 25 percent. In contrast, only 6.4 percent of shelf issuers are in the highest quartile of information asymmetry. We find a very different pattern for users of tra-

ditional registration: 14.4 percent are in the lowest quartile of information asymmetry, and 31 percent are in the highest quartile.

Table 8—Information Asymmetry and Issuance Costs

In this table, we compare four costs of issuing common equity using unallocated shelf and the traditional registration procedures. We compare the gross spreads paid by issuers, the SEO discount, the number of days between the initial filing of preliminary prospectuses with the SEC and issuing common equity, and the price percentile received from issuing equity. SEO discount is measured relative to the closing price on the day before the offering. Price percentile is measured as the price percentile at which equity was issued using daily closing price over a two year period surrounding the equity issuance. Firms are divided into top quartile interquartile, and bottom quartile based on two measures of information asymmetry, percentage bid-ask spreads, and number of analysts. p-values are shown in parentheses

	Gross Spread			SEO Discount			Days in Registration			Price Percentile		
	TD	SEO	p-value	TD	SEO	p-value	TD	SEO	p-value	TD	SEO	p-value
Panel A: Percentage Bid-Ask Spread Information Asymmetry Analysis												
Top Quartile (Wide Spreads)												
Mean	4.39%	5.13%	(.0001)	2.60%	2.62%	(.9642)	6.8	45.3	(.0125)	69.6	62.2	(.1346)
Median	4.38%	5.22%	(.0001)	1.15%	1.84%	(.4902)	7.0	28.0	(.0001)	82.5	66.0	(.0438)
Quartiles 2 and 3												
Mean	4.02%	4.95%	(.0001)	1.68%	2.56%	(.0044)	11.9	44.4	(.0001)	60.2	61.8	(.5488)
Median	4.23%	5.00%	(.0001)	1.07%	1.72%	(.0030)	8.0	29.0	(.0001)	67.0	65.0	(.7594)
Bottom Quartile (Narrow Spreads)												
Mean	3.48%	4.71%	(.0001)	2.28%	2.69%	(.2401)	7.6	44.8	(.0001)	58.1	60.9	(.2472)
Median	3.50%	5.00%	(.0001)	0.95%	1.54%	(.0372)	0.0	29.0	(.0001)	65.0	66.0	(.6947)
Test of Differences Top Quartile versus Bottom Quartile												
Kruskal-Wallis p-value	(.0002)	(.0001)		(.5180)	(.0803)			(.1626)	(.8297)		(.0874)	(.5022)
Panel B: Number of Analysts Information Asymmetry Analysis												
Top Quartile (Few Analysts)												
Mean	4.27%	5.13%	(.0001)	2.68%	3.06%	(.5021)	8.3	43.5	(.0001)	68.6	60.9	(.1131)
Median	4.94%	5.24%	(.0001)	1.61%	2.13%	(.8000)	7.0	31.0	(.0001)	75.7	65.0	(.7583)
Quartiles 2 and 3												
Mean	4.48%	4.95%	(.0001)	2.10%	2.44%	(.4033)	14.1	46.3	(.0001)	58.6	58.4	(.9576)
Median	4.58%	5.00%	(.0001)	1.18%	1.64%	(.4382)	10.0	28.0	(.0001)	65.0	61.0	(.2838)
Bottom Quartile (Many Analysts)												
Mean	3.34%	3.93%	(.0001)	1.60%	1.33%	(.2696)	8.3	40.5	(.0001)	55.1	54.4	(.8295)
Median	3.26%	4.00%	(.0001)	0.71%	0.48%	(.3162)	7.0	26.0	(.0001)	59.5	57.0	(.5157)
Test of Differences Top Quartile versus Bottom Quartile												
Kruskal-Wallis p-value	(.0001)	(.0001)		(.0286)	(.0001)			(.0061)	(.0001)		(.5715)	(.0755)

Regardless of whether we partition firms by percentage bid-ask spread or analyst coverage, shelf issuers across all quartiles pay lower gross spreads than do the same type of firm that chooses the traditional registration procedure. The average gross spread when high information-asymmetry firms issue equity using shelf is 4.4 percent, whereas it is 5.13 percent for similar firms that use the traditional registration procedure. When low information-asymmetry firms issue equity using shelf, the average gross spread 3.48 percent, in contrast to low information-asymmetry firms that use the traditional registration procedure that pay an average gross spread 4.71

percent. When we perform the same analysis based on the number of analysts, the results are qualitatively the same.

Firms that use shelf go to market faster than do firms that use the traditional registration procedure, regardless of their information-asymmetry quartile. High information-asymmetry shelf issuers go to market in 6.8 days, whereas similar firms that use the traditional registration procedure take 45.3 days. Low information-asymmetry shelf issuers go to market in 7.6 days, but similar firms that use the traditional registration procedure take 44.8 days to sell equity. Again measuring information asymmetry based on analyst coverage produces similar results. Overall our findings indicate that shelf confers advantages to firms, regardless of information asymmetry, in terms of underwriter fees and speed to market.

SEO discount and price percentile are not strongly related to registration choice. Whether we measure information asymmetry as percentage bid-ask spread or analyst coverage, we find no difference within quartiles between shelf firms and firms that use the traditional registration procedure. When we measure information asymmetry as the number of analysts, however, the results show that low information-asymmetry issuers, regardless of whether they use shelf or the traditional registration procedure, discount shares less to place them. Thus firm characteristics and not registration choice appear to determine SEO discount.

Given the advantages of shelf, the question then is why don't all firms use it? In Table 9 we examine the market reaction to raising equity, again partitioned by information asymmetry quartiles, using both percentage bid-ask spread and analyst coverage. We find that market overhang is strongly related to firm-specific information asymmetry. For high information-asymmetry firms that file unallocated shelves, market overhang is severe: The average CAR when firms file shelves is -2.2 percent. In contrast, the average CAR when low information-asymmetry firms file shelves is not statistically different from zero. The Kruskal-Wallis test indicates that the abnormal return for high information-asymmetry firms is significantly more negative than the return for low information-asymmetry firms. When we perform the same analysis based on the number of analysts, the results are qualitatively the same.

High information-asymmetry firms that choose to take common equity off shelves are further discounted by the market. The average combined CAR at shelf filing and takedown is -4.7 percent, which is statistically different from zero. When information asymmetry is low, the average combined CAR at shelf filing and takedown of -0.90 percent, which is not statistically significant. Again, we find a negative relation between combined market reaction and information asymmetry. By comparison, the CAR for traditional SEOs in the high information asymmetry group is -1.9 percent, which is both economically and statistically higher than -4.7 percent. The CAR for low information-asymmetry firms using the traditional registration procedure is -1.5 percent. It is more negative than the combined CAR for low information-asymmetry firms at shelf filing and takedown of -0.90 percent.

Table 9—Information Asymmetry and Issuance Cost -Market's Reaction to Shelf Registration and Equity Issuance

The table shows the mean and median four-day (day -1 to day 2) cumulative abnormal returns for firms filing common equity on unallocated shelves (shelf registration CAR), for firms issuing common equity off unallocated shelf registration statements (equity TD CAR), and for firms using traditional registration procedures to register SEOs (traditional Seo CAR). Combined shelf registration & equity RD CAR is defined as the sum of the four-day CAR at the filing of unallocated shelves and first indications of common equity takedowns off shelves. Firms are divided to top quartile, interquartile, and bottom quartile based on two measures of information asymmetry: percentage bid-ask spreads and number of analysts. p-values are shown in parentheses

	Shelf Registration CAR	Combined Shelf Registration & Equity TD CAR	Traditional SEO CAR	Combined versus SEO
	CAR p-value	CAR p-value	CAR p-value	p-value
Panel A: Percentage Bid-Ask Spread Information Asymmetry Analysis				
Top Quartile (Wide Spreads)				
Mean	-2.214%(.0525)	-4.677%(.0173)	-1.916%(.0001)	(.0356)
Median	-1.856%(.0715)	-4.979%(.0158)	-2.633%(.0001)	(.0523)
Quartiles 2 and 3				
Mean	0.004% (.9919)	-2.488%(.0006)	-2.604%(.0001)	(.8191)
Median	0.000% (.8975)	-1.857%(.0005)	-2.839%(.0001)	(.0576)
Bottom Quartile (Narrow Spreads)				
Mean	-0.187%(.2987)	-0.897%(.2096)	-1.478%(.0001)	(.3317)
Median	-0.160%(.2559)	-0.234%(.3709)	-1.291%(.0001)	(.0727)
Test of Differences Across Quartiles				
Kruskal-Wallis p-value	(.0019)	(.0185)	(.8381)	
Panel B: Number of Analysts Information Asymmetry Analysis				
Top Quartile (Few Analysts)				
Mean	-1.68% (.0288)	-2.03% (.2025)	-2.38% (.0001)	(.7871)
Median	-1.83%	-1.03%	-2.68%	
Interquartile Range				
Mean	0.07% (.8530)	-1.93% (.0238)	-1.80% (.0001)	(.8608)
Median	-0.12%	-1.85%	-2.54%	
Bottom Quartile (Many Analysts)				
Mean	-0.15% (.3905)	-1.57% (.0007)	-1.76% (.0001)	(.6982)
Median	-0.02%	-1.43%	-1.55%	
Test of Differences Across Quartiles				
Kruskal-Wallis p-value	(.0072)	(.7257)	(.1684)	

Thus, for firms with low information asymmetry, unallocated shelf registration imposes lower costs than does the traditional registration procedure, but for firms with high information asymmetry, shelf is significantly more costly in terms of market reaction. High information-asymmetry firms' use of shelf rather than the traditional registration procedure suggests that lower fees, increased flexibility, and speed to market can outweigh the cost of market overhang.

Contrary to our findings for shelf issuers, an examination of firms that use the traditional registration procedure reveals that the market's reaction is not related to information asymmetry. One interpretation is that traditional registration, by design,

mitigates information asymmetry by requiring detailed advance information. Shelf registration, on the other hand, was not intended to resolve information asymmetry, but rather to provide a quick, low-cost means of raising capital.

We show that low information-asymmetry shelf registrants pay lower gross spreads and go to market faster than the same type of firm that uses the traditional registration procedure. Many low information-asymmetry firms, however, select the traditional registration procedure. The only obvious benefit to doing so is avoidance of possible market overhang (although low information-asymmetry firms in our sample experience no market overhang on average). Choosing the traditional registration procedure may be a risk-minimizing rather than a cost-minimizing strategy for these firms.

Conclusion

Our evidence shows that unallocated shelf lowers certain costs of raising equity for all firms. Shelf firms pay lower gross spreads and access the market faster than similar firms that issue equity using the traditional registration procedure. Price declines related to asymmetric information, however, can be either higher or lower for shelf issuers than for firms that use traditional registration. The market response when firms with low information asymmetry take equity off shelves is minimal. In contrast, high information-asymmetry firms that choose to register and issue common equity off shelves incur severe market overhang and significantly negative abnormal returns when issuing equity off shelves.

Fama and French (2005) demonstrate that firms can issue common equity with little adverse market impact. High information-asymmetry firms, however, must choose issuance venues where inside information cannot be exploited. Here we document high information-asymmetry firms do not incur greater costs than low information-asymmetry firms if they issue SEOs using the traditional registration procedure, which requires detailed disclosure and slower access to the market.

The SEC's congressionally legislated mandate is to protect investors. It took nearly 25 years to deregulate the equity registration system in a way that issuers were willing to use. Both the proposing and adopting releases for the shelf rules query whether investors can get timely and accurate information about issuers and their offerings under the deregulated registration system. After much deliberation and several iterations, the SEC settled on its eligibility requirements. In hindsight, it need not have been so concerned. Our study suggests that the market is a harsher judge and jury than is the SEC: Firms with high information asymmetry, even if they are eligible for shelf, experience large stock price declines if they use shelf. Market forces dictate that high information-asymmetry firms choose a registration strategy that compels them to provide detailed advance disclosure and to access the market slowly. Low information-asymmetry firms, on the other hand, benefit from the deregulation and can lower their cost of raising equity by using shelf registration.

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