CHAPTER **6**

The Value of Liquidity

Estimating the Size of the Liquidity Discount

Firm A is a closely held firm whose securities are not listed on a highly liquid exchange such as the New York Stock Exchange (NYSE). Firm B is equivalent in every way to Firm A except that its shares trade on the NYSE. Assuming that the financial prospects of both firms are known to both private and public market participants, Firm A shares will trade at a discount to those of Firm B because shares of the former are far less liquid than those of the latter. This discount is known as the *liquidity* or *marketability discount*.[1]

The valuation of closely held firms is often carried out in two steps. First, the securities are valued as though they trade on a highly liquid exchange. Second, this value is reduced by the size of the estimated liquidity discount. The size of this discount has been debated, with almost no consensus on how to estimate it or what a plausible range might be. Indeed, the measured size of this discount has ranged from a value exceeding 40 percent to as small as 7.2 percent. This chapter reviews some of the more important research by financial economists and uses the results of this review to establish a plausible range for the size of the liquidity discount. Our analysis suggests five fundamental conclusions:

1. When valuing minority shares of a privately held C corporation, the liquidity discount should be in the neighborhood of 17 percent.
2. Minority shares of S corporations are less liquid than shares of an equivalent C corporation.
3. Hence, discounts applied to minority S shares should be greater than discounts applied to minority C shares.
4. When valuing control shares of a freestanding C corporation, discounts should be in the neighborhood of 20 percent and incrementally higher for S shares.
5. Discounts in excess of 30 percent for either minority or control shares are simply not supported by peer-reviewed research.

DOES LIQUIDITY AFFECT ASSET PRICES?
SETTING THE STAGE

Studying the pricing effects of liquidity is a major issue in both theoretical and empirical finance. While lack of liquidity affects the value of private securities, it also influences the prices of securities that trade in organized markets. Financial research has even suggested that portfolios of less liquid stocks provide investors with significantly higher returns, on average, than highly liquid stock portfolios, even after adjusting for risk.[2] This research suggests that the liquidity factor may be as important as risk in determining stock returns. Yakov Amihud and Haim Mendelson also note that higher returns on less liquid securities translate to a price discount relative to more liquid securities:

> *Why does liquidity affect stock returns? The most straightforward answer is that investors price securities according to their returns net of trading costs; and they thus require higher returns for holding less liquid stocks to compensate them for the higher costs of trading. Put differently, given two assets with the same cash flows but with different liquidity, investors will pay less for the asset with lower liquidity.*[3]

The size of the price concession due to lack of liquidity and the factors that determine it are of special interest to those who value private securities. Unlike the public firm discount literature, the interest in the size of the discount applicable to private securities is primarily, although not exclusively, related to on-the-ground practical issues. These include what the IRS will allow when valuing private shares for estate planning purposes, charitable gifting, and estimating capital gains taxes due when private firms are transacted. Since there is a great deal of controversy surrounding some of the more common liquidity benchmarks, valuation analysts are always concerned that the value applied will, at worst, be contested by the IRS or, at the very least, seriously questioned. To begin our analysis, we appeal to a liquidity literature that has not generally been brought to bear on the debate of the size of liquidity discount as it relates to privately held securities.

MEASURING ILLIQUIDITY IN THE PUBLIC
SECURITY MARKETS

Availability of liquidity is a key determinant of asset prices in public security markets. Organized exchanges, like the New York Stock Exchange, create liquid trading environments because they offer investors a number of benefits:

- Establishing a set of rules for listing a security on an exchange.
- Ensuring that the number of shares available to be exchanged is a significant percentage of the total available.
- Ensuring that the firms listed meet minimum standards of financial performance and that their information disclosure is consistent with SEC requirements.
- Ensuring that the costs of transacting are low relative to the price of an average share.
- Ensuring that the costs associated with listing are low relative to the liquidity benefits that accrue to the shareholders of the listing firm.

In a perfect exchange world, market participants would have full information about the securities being exchanged, prices would reflect this information, and bid-asked spreads would be a tiny percentage of the bid price. Thus, the spread would reflect only the production costs of executing a transaction. In this stylized world, there are no information asymmetries. Prices of securities are therefore efficiently priced; that is, security prices reflect all known information about risks and opportunities. In the real world, things are not this tidy.

The public security markets are made up of *auction markets,* such as the New York Stock Exchange (NYSE), where prices are directly determined by buyers and sellers, and *dealer markets,* such as the over-the-counter (OTC) market, where a network of dealers stand ready to buy and sell securities at posted prices. Transactions not handled on large liquid auction markets like the NYSE are handled in the OTC market. This market primarily handles unlisted securities, or securities not listed on a stock exchange, although some listed securities do trade in the OTC market. Securities of more than 35,000 firms are traded in this market, most of which are thinly traded, highly illiquid stocks that do not have a significant following. Prices of these stocks may be reported once per day or even less frequently on what is termed *pink sheets,* hence the name *pink sheet stocks.* Prior to the establishment of the Nasdaq Stock Market, OTC firms could obtain the benefits of maximum liquidity only if they could list their shares on the NYSE. At one time, the major benefit of moving from the OTC to the NYSE was that the greater liquidity of the NYSE would result in a higher share price, all else equal. The ratio of the resulting price increase to the NYSE price is equal to the price of liquidity, or the *liquidity discount.* For example, if an OTC-listed firm were to list on the NYSE, and the share price increased by $1 per share on the announcement date, say from $20 to $21, then the price of liquidity would be 4.8 percent ($1 ÷ $21).

Although increased liquidity may be the primary reason a share price increases when a firm moves from the OTC to the NYSE, it is also possible

that the increase is a result of *information signaling.* In such case, when a firm is accepted to list on the NYSE, it is akin to having a seal of approval. As a result, investors conclude that expected future financial results are now more certain. This means that the listing signal has high informational value, which leads to greater certainty about future firm performance in the postlisting environment, a lower cost of equity capital, and therefore a higher share price. Thus, the price increase and the implied discount that results when firms move from quasi-private-firm status like the OTC to listing on a major exchange may be, in part or completely, the product of information signaling.

Several important strands of research shed light on these issues, and an examination of each will help us place boundaries on the price of liquidity. However, before presenting these results, we need to review a basic research design used by financial economists so that their reported results can be interpreted properly.

EVENT STUDY METHODOLOGY

To study the impact of a particular event on share prices, researchers have developed an event study methodology. This method isolates the impact of the event, in this case the listing announcement, on the listing stock's return. To implement the procedure properly, all confounding events around the *event window,* a period prior and subsequent to the event date, need to be controlled for. Confounding events include movements in the overall market and/or firm-specific events like acquisitions or divestitures. If an acquisition or other major firm-specific event takes place within the event window, the firm is usually removed from the sample or, if kept, the researcher uses some other approach to control for the influence of the confounding event on the study's results. The firms that remain are those whose share prices have changed because the overall market moved or because of the event being studied, which in this case is the listing announcement.

To remove the influence of movements in the overall market, researchers calculate an abnormal return, which is defined in Equation 6.1.

$$AR_{jt} = R_{jt} - (\hat{a}_j + \hat{B}_j \times R_{mt}) \tag{6.1}$$

where AR_{jt} = abnormal return, stock j at time t
$\quad\quad R_{jt}$ = rate of return, stock j at time t
$\quad\quad \hat{B}_j$ = estimated beta, firm j
$\quad\quad R_{mt}$ = rate of return, market index
$\quad\quad \hat{a}_j$ = constant term from regression model used to estimate beta

Event studies require the measurement of returns on a daily or weekly basis around the event date. If P_b and P_a are prices before and after the event, respectively, then P_a is equal to $P_b \times (1 + AR_a)$. The ratio of P_b/P_a is $1/1 + AR_a$ so the implied discount is $1 - (1/1 + AR_a)$, or $AR_a/(1 + AR_a)$. Therefore, if the abnormal return is measured as 20 percent, then the liquidity discount is $(0.20/1.20) \times 100 = 16.7$ percent.

Using event study methodology, Gary C. Sanger and John J. McConnell studied the impact on abnormal returns of OTC stocks that listed on the NYSE over the period 1966–1977.[4] This period spans the introduction of the National Association of Securities Dealers Automated Quotations (Nasdaq) system in the OTC market. For our purposes, of particular interest is the magnitude of the abnormal return responses for firms moving to the NYSE from the OTC prior to the introduction of Nasdaq.[5] These results are reported in Table 6.1, which shows abnormal returns over the event window, 52 weeks prior to the listing event (week 0) and 52 weeks subsequent to it. The cumulative abnormal return registered an increase long before the event and reached its maximum about 8 weeks after the event. In efficient security markets, we would expect the bulk of the increase to occur around the announcement date. The abnormal return pattern indicates a very slow information diffusion process during the 1966–1970 period. This is no surprise, however. During this time period, markets were highly inefficient because of lack of technology and the high cost of obtaining and processing information. Hence, a liquidity adjustment took far longer to impact share prices at that time than would a similar event today. But it is precisely this type of lab experiment that one needs to evaluate, because going from pink sheet status during the 1966–1970 period is closely akin to a private firm listing on a public market today.

The cumulative abnormal return reached a maximum of 0.2663 (26.63 percent) eight weeks after the listing announcement, then tapered off to 0.2568 (not shown) one year after the event. If we conclude that, on average, share prices of firms in the sample rose by 25 percent as a result of moving from the OTC to the NYSE, then this implies a discount of 20 percent.

The question remains, how much of this share price increase is due to improved liquidity and how much is due to information signaling? To better understand the influence of each determinant, we turn to a paper by Richard Edelman and Kent Baker.[6] Their study examined market behavior of common stocks transferring from the Nasdaq Stock Market to the NYSE from 1982 to 1989. Using event study methodology, the authors show that stocks that are characterized by low liquidity (wide bid-asked spreads) and high informational signaling value (expected poor earnings prospects during the prelisting period) have a cumulative abnormal return of 7 percent, or a discount of 6.5 percent. Since firms on the Nasdaq that make the transition

TABLE 6.1 Summary of Abnormal Returns Analysis of 153 OTC Stocks That Listed on the NYSE over the Period 1966–1970 for the 105 Event Weeks Surrounding the Week of Announcement

Event Week (a)*	Average Abnormal Return	Z Statistic	Cumulative Average Abnormal Return (d), Begins in week −52	Percent Nonnegative
−9	0.0108	3.01[†]	0.1639	0.58[†]
−8	0.0087	2.52[‡]	0.1725	0.56[†]
−7	0.0079	2.15[‡]	0.1804	0.52
−6	0.0079	2.06[‡]	0.1883	0.51
−5	−0.0018	−0.62	0.1865	0.42
−4	0.006	1.7	0.1925	0.54*
−3	0.0003	0.3	0.1928	0.46
−2	0.0056	1.5	0.1984	0.53[‡]
−1	0.0104	2.73[†]	0.2088	0.51
0	0.0088	2.44[‡]	0.2176	0.52
1	0.0088	2.32[‡]	0.2263	0.52
2	0.0012	0.52	0.2275	0.45
3	0.0031	0.78	0.2306	0.49
4	0.0098	2.76[†]	0.2404	0.52
5	0.0116	2.55[‡]	0.252	0.52
6	−0.0003	−0.31	0.2517	0.48
7	0.0064	2.19[‡]	0.2581	0.48
8	0.0082	1.62	0.2663	0.51

*(a) Week relative to the week of listing on the NYSE.
[†]Significant at the 0.01 level.
[‡]Significant at the 0.05 level.

to the NYSE are likely to be followed by multiple analysts and therefore have low informational signaling value during the prelisting period, it is more than likely that the price increase is a direct result of greater liquidity. This is further supported by the fact that charters of many mutual and pension funds preclude them from investing in non-NYSE-listed stocks. By moving to the NYSE, firms significantly increase the demand for their stock by the institutional investor community. Hence, one can reasonably conclude that the average 7 percent price rise is predominately due to greater liquidity during the postlisting period. If we assume that moving from pink sheet status to the Nasdaq has the same liquidity benefit that moving from the Nasdaq to the NYSE does, then moving from the OTC to the NYSE amounts to a minimum 14 percent price appreciation, with the remaining 11 percent (25% − 11%) due to information signaling. This 14 percent translates into a discount of 12.3 percent. This means that the pure liquid-

ity affect on a minority share of stock listed on the OTC results in a price discount of 12.3 percent relative to its price if it were trading on the NYSE. Since a minority share of stock of a closely held firm is more illiquid than a share of an equivalent firm listed on the OTC, the discount applied to the former should be in excess of 12 percent. But what should the size of the private firm discount increment be? Put differently, what is the liquidity premium a share would command by moving from closely held status to pink sheet status? One might argue that the discount should be no smaller than the discount associated with moving from the OTC to the Nasdaq. This means that a share of equity of a firm trading on the NYSE would sell at a minimum 21 percent premium to the equity share of an equivalent closely held firm. Alternatively, this 21 percent premium translates into a 17 percent liquidity discount (0.21/1.21). But to what extent do these results compare with other reported results on the size of the liquidity discount?

STUDIES OF THE LIQUIDITY DISCOUNT

The most often quoted studies of the liquidity discount include the pre-IPO studies of John D. Emory and the restricted studies of William L. Silber and Michael Hertzel and Richard Smith.[7] Emory consistently reports median discounts that exceed 40 percent, while simple simulations of Silber's regression model indicate discounts of 35 percent or more. Herzel and Smith report a coefficient of 13.5 in their regression that can be interpreted as a restricted stock discount due to illiquidity of 13.5 percent. The first question that arises is, why is there so much disparity in the reported results? Let us briefly address this issue.

IPO Studies

Emory's work compares equity values when firms were private to their subsequent IPO prices. He asserts that the percent difference between a firm's private equity value and its IPO price is the discount for lack of marketability. Emory finds that the greater the time period between the IPO and the valuation date when the firm was private, the greater the marketability discount.

There are several serious problems with Emory's research design. First, the private transactions are with insiders and are generally not done at arm's length. These prices are often reduced to reflect compensation to insiders. Moreover, the transactions do not represent a cash transaction, so the price base to which the IPO price is compared is likely to be too low and the discount too large. Second, Emory does not adjust the equity reference price (pre-IPO price) to which he compares the IPO price for changes in the

overall stock market or for the time value of money between the reference and IPO dates. Hence, if the overall market were generally rising over the measurement interval, the discount would be biased upward. Even if the market did not move between the reference and IPO dates, the IPO price would be higher due to the time value of money. That is, if a private transaction established a $10 share price today, all else equal, this same share would be worth more in the future simply because of the time value of money. At a minimum, the base prices used by Emory should be adjusted upward by the time value factor. This would raise the private transaction price and reduce the size of the reported discount. In short, the results of the various Emory studies are not accurate estimates of discounts for lack of liquidity.

What Do Private Placement Studies Tell Us?

Firms that have issued equity in the public security markets, for a variety of reasons, also sell equity in the private placement market. By comparing the private placement issue price to the equity price in the public market, one can measure the private placement discount. Sales to the private market include (1) securities that are registered and thus have few, if any, transaction restrictions and (2) restricted securities issued under SEC Rule 144. Rule 144 permits an investor to sell limited quantities of stock in any three-month period. Restrictions on reselling of restricted stock were originally set to expire two years after the original acquisition. In February 1997, the restricted period was reduced to one year. Hence restricted private equity, all else equal, is less liquid than private placement equity that does not have these restrictions.

In the liquidity discount literature, it has been assumed that the restricted stock discount emerges due to lack of liquidity. Silber notes that "companies issuing restricted stock alongside registered securities trading in the open market usually offer a price discount in the restricted securities to compensate for their relative illiquidity." However, there are other reasons why a restricted stock discount might exist. From the supply side, the purchasers of privately placed securities, including restricted stock, are very often large institutions like life insurance companies and pension funds. These buyers have a long-term investment horizon and therefore place a low value on liquidity. Given their investment preferences, it is not sensible to think they would require a deep discount to purchase stock that would be illiquid for only two years. So, if illiquidity is not the primary or even the secondary reason for the discount, then why does it exist at all?

Research by S. C. Myers and N. S. Majluf supports the view that the private placement market offers an opportunity for firms to signal that their

publicly traded securities are undervalued.[8] Prices of restricted stock are established through direct negotiation between the issuer and the investor. These negotiations focus on evaluating both public and private information concerning firm prospects. Costs of obtaining and evaluating target firm information, which is often proprietary, are often quite significant, and the price concession that emerges is likely to represent compensation to the long-term investor for bearing these costs. This hypothesis suggests that the discount is not due to illiquidity, but rather represents a return to the investor for the information search investment being made.

Interestingly, K. H. Wruck reports that firms placing equity privately are associated with positive abnormal returns averaging 4.4 percent around the announcement date.[9] The likely reason for this reaction is that public market participants perceive these firms to be less risky, because "expert" private investors with large research budgets would not invest in these securities unless their review of private and public information supported it. Hence, privately placed equity, while sold at some discount, also positively influences shares of the firm's publicly traded equity. This outcome, of course, suggests that placing restricted stock at a discount has a net benefit to the issuing firm and its shareholders. In their restricted stock study, Hertzel and Smith estimate an econometric model where one of the coefficients is interpreted to be a direct measure of the liquidity discount. The size of this coefficient, 13.5 percent, is statistically significant. In an update of this study by Mukesh Bajaj and others, the coefficient, while still significant, declined to 7.2 percent.[10] Despite the fact that many valuation professionals have latched onto these findings, Hertzel and Smith are not convinced that the coefficient is a measure of a liquidity discount. They state:

> *Discounts on restricted shares, though commonly characterized as "liquidity" discounts are unlikely to be due entirely to the two year restriction on resale under SEC Rule 144. Liquidity discounts of such magnitudes would provide strong incentives for firms to register their shares prior to issuing or to commit to quickly register shares after the private sale. Given the substantial resources of institutions that do not value liquidity highly such as life insurance companies and pension funds, it is not obvious that investors would require substantial liquidity discounts just for committing not to resell quickly.*[11]

Silber's restricted study, in contrast to those of Hertzel and Smith and Bajaj, does not estimate the liquidity discount directly. Rather, he estimates an econometric model that relates the natural logarithm, ln, of the restricted equity price discount, P^r (restricted stock price at issue date) divided by P

(exchange-traded price at issue date) to a set of explanatory variables. He then simulates the model under a set of assumptions about the values of the explanatory variables and obtains various values for the discount. The model estimated by Silber follows.

Silber Cross-Section Model of Restricted Stock Discount

$$\ln(P'/P) = 4.33 + 0.036 \times \ln(\text{REV}) - 0.142 \times \ln(\text{RBT}) + 0.174 \times \text{DERN} + 0.332 \times (\text{DCUST})$$
$$\quad\;\; (0.13)\;\; (0.013)^* \qquad\qquad (0.051)^* \qquad\quad (0.108) \qquad\quad (0.154)^*$$

where $R^2 = .29$

Standard error of regression = 0.358

$F = 8.1$

* = coefficient statistically significant

Variable names:

  REV = firm revenues

  RBT = restricted block to total shares outstanding

  DERN = dummy variable = 1 if earnings are positive, 0 otherwise

  DCUST = dummy variable = 1 if there is a customer relationship
            between the investor and the firm issuing the restricted
            stock, 0 otherwise

Time interval: 1981–1988

Data: Security Data Corporation: 69 private placements of
   common stock of publicly traded companies

The coefficients of the explanatory variables are statistically significant from zero; that is, the ratio of each coefficient to its standard error (SE, shown in parentheses) exceeds the critical t-test value of 2 except for the DERN variable, which is slightly lower. The regression model's R^2 indicates that the model explains less than the 30 percent of the variation in the discount. This means that 70 percent of the variation is not explained by the model. The relatively low explanatory power shows up in the standard errors of the coefficients. Although the coefficients are statistically significant, the true coefficients lie within very large boundaries around these estimates. This means that the size of any predicted discount from the model can vary quite widely even if a firm's revenue and percent of equity placed is fixed.

To better understand this point, we simulated the Silber model. Following Silber, we assumed that the firm in question generated $40 million in revenue, had a market capitalization of $54 million, placed restricted stock that amounts to 13 percent of common stock outstanding, and DERN and DCUST were equal to 1 and 0, respectively. We then assumed that the coefficients on the revenue and percent placement of common outstanding stock variables varied by plus or minus one standard error (SE) around their

respective estimated coefficient values. The results of these simulations, shown in Table 6.2, indicate that restricted stock discounts reported by Silber can vary from a low of 14 percent to a high of 40 percent. This variation is simply a function of the wide dispersion of the estimated coefficients around their estimated mean values. It stretches credulity to think that an institutional investor planning to purchase 13 percent of the stock of a firm with a market capitalization of $54 million would require a discount as high as 40 percent simply because the stock cannot be sold for two years. Moreover, institutional purchasers typically have large and very well diversified portfolios. Purchasing 13 percent of a $54 million firm represents a very small part of their overall portfolio. Hence, in relative terms, the risk is quite small. Unless the firm issuing the restricted stock is forced to do so, it does not seem sensible that management, knowing the risks faced by institutional investors, would agree to such an arrangement. In short, the Silber results are informative and useful, but they do not measure the price of liquidity.

IS THE LIQUIDITY DISCOUNT GREATER IN A CONTROL TRANSACTION?

Silber's research supports the conclusion that the private placement discount increases with the relative size of the restricted stock placement. While it would be natural to use the model to test what the discount would be for a control transaction, say 51 percent, such a simulation would not be appropriate if the sample did not include observations that included control transactions.[12] Since Silber's sample did not include control transactions, we need to look to other research as a guide to what a liquidity discount might be for a control transaction.

John Koeplin and others, hereafter referred to as Koeplin, have addressed this question. Koeplin notes:

TABLE 6.2 Restricted Stock Discounts under Varying Assumptions about the Size of Coefficients of the Silber Model

Percent Restricted Stock	Revenue		
	Mean − 1SE	Mean Coefficient	Mean + 1SE
Mean + 1SE	22%	18%	14%
Mean	32%	28%	24%
Mean − 1SE	40%	37%	34%

TABLE 6.3 Liquidity Discounts for Control Transactions

	Private Targets		Public Targets		Discount	
	Mean	Median	Mean	Median	Mean	Median
Panel A: Domestic transactions						
Enterprise value/EBIT	11.76	8.58	16.39	12.37	28.26*	30.62*
Enterprise value/EBITDA	8.08	6.98	10.15	8.35	20.39*	18.14*
Enterprise value to book value	2.35	1.85	2.86	1.73	17.81	7
Enterprise value to sales	1.35	1.13	1.32	1.14	–2.28	0.79

*Statistically significant.

> *We further limited the sample to all transactions in which a controlling interest was acquired in the transaction. Next, for each of these transactions, we identified an acquisition of a public company in the same country and the same year and the same industry. —— For every acquisition of a private company, we attempted to find an acquisition of a publicly traded company in the same four digit SIC code. For 13% of the transactions, the matching firms were not in the same 4 digit SIC code.*[13]

Koeplin estimates the private firm discount as 1 − (private firm target multiple/public firm target multiple). Table 6.3 reproduces these results, indicating that private firm discounts are statistically different from zero. The average (median) discounts based on EBIT and EBITDA multiples are 28 percent (31 percent) and 20 percent (18 percent), respectively. Although the average book value multiple is statistically significant and in line with the values of the other estimated discounts, the median is very low and not statistically significant. There is no obvious reason for such a disparity. The discounts based on sales multiples are not significant, either. This suggests that, at least for these transactions, revenue differences are not a good indicator of value differences. Nevertheless, Koeplin's results, taken as a whole, suggest that liquidity discounts associated with control transactions are not likely to exceed 30 percent. Finally, Koeplin concludes:

> *One problem with our approach is that the employment contracts for the key managers may be different in an acquisition of a private company relative to that for a public company. Specifically, the*

*owners of a private company, who are likely to be senior manage-
ment of the company, may receive part of their compensation in the
form of an employment contract. To the extent that these employ-
ment contracts entail above-market compensation, the observed
private company valuations will be less than the fair market valua-
tions, which should include any excess value associated with these
contracts. Therefore, our estimates should be considered as an
upper bound on the private company discount.*

SUMMARY AND CONCLUSIONS

In the private valuation community, the size of the liquidity discount has
been debated extensively. Estimates of the size of the discount range from 40
percent on the high side to 7.2 percent on the low side. These differences
mainly arise from the use of different research designs and differing research
assumptions made by the investigators. We have taken a different approach:
synthesizing the results that have been produced and incorporating addi-
tional research intended to anchor the various values that are often used in
private valuation settings. Our conclusions can be summed up as follows.
Using an event study methodology, we estimated the impact of liquidity on
value by measuring the extent to which the share prices of listing firms
responded to announcements that they were moving from a quasi-private-
market environment, like the OTC prior to the establishment of the Nas-
daq, to the NYSE. This experiment indicated that after controlling for
influences other than the listing announcement, share prices rose by 25 per-
cent, implying a liquidity discount of 20 percent. Part of this price rise, how-
ever, was unrelated to improved liquidity, but rather the result of information
signaling. When the impact of this effect was removed, we concluded that
the pure liquidity effect on a share of minority stock was approximately 17
percent.

While this result is approximately equal to the 13.5 percent first
reported by Herzel and Smith in their restricted stock study, we suggested
that their results are more consistent with the information signaling hypoth-
esis than a measure of illiquidity. The reason is that the purchasers of
restricted stock are typically institutional investors with a long investment
horizon, and as such they are not likely to require a 13.5 percent discount
for being unable to sell the stock within a two-year window.

Liquidity discounts for control shares are likely to be greater than for
minority shares. Koeplin's work, taken together, supports the general view
that pure liquidity discounts for controlling interests much in excess of 30
percent do not appear to be reasonable.

Although we have not addressed the issue in the body of this chapter,

our analysis also implies that shares of S corporations are likely to be less liquid than shares of C corporations. When making an S election, the firm is limited to 75 shareholders, none of which can be institutional investors. By virtue of these constraints, S shares are less liquid than C shares. Therefore, one would expect that when valuing an S corporation, the estimated liquidity discount would necessarily be larger than for an equivalent C corporation. While there is no research that might provide guidance regarding what the size of the incremental discount might be, based on the analysis presented here, it does not appear likely that the increment would exceed 5 percent. Thus, if the sale of a 100 percent stake in a private C firm commands a discount of 20 percent, the liquidity discount for an equivalent S corporation would likely be in the neighborhood of 25 percent.