Liquidity and Asset Prices: Financial Management Implications

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■ Liquidity, marketability, or trading costs are important attributes of any financial instrument. The illiquidity of an asset is reflected in the level of difficulty in trading it, as measured by the overall cost of a transaction. An important component of this cost is the spread between the bid and ask prices at which dealers are willing to satisfy sellers' and buyers' demands for immediate execution of their transactions. A seller who wants to obtain the full market value of an asset will have to wait for the arrival of a buyer willing to buy at that price. He can avoid the associated delay by promptly selling the asset to a dealer at the quoted bid price, which reflects a liquidation discount. Similarly, to avoid delays, a buyer can choose to consummate an immediate purchase at the dealer's ask price, which is higher than the asset's current resale value.[1] Thus, trading at the quoted bid and ask prices saves traders the associated delays and difficulties — but at a cost.

The liquidity of an asset may thus be measured by its bid-ask spread (the difference between the dealer's bid and ask quotes), which represents the price of liquidity (or immediacy) services.[2] The role of the spread as a major cost of transacting (or as a measure of illiquidity) has been analyzed in detail by Demsetz [18]. In fact, there is quite a number of different measures of

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[1]While it is convenient to regard the bid and ask prices as being determined by a dealer, these prices may be determined by a trader who acts as a market maker. On the NYSE, for example, the specialist's quotes may reflect the marginal orders on his limit order book.

[2]For a model of the determination of the bid-ask spread in a dealership market, see Amihud and Mendelson [1, 2].

illiquidity (or trading costs) which are known to be strongly positively correlated with the spread. Bernstein [9] critically evaluates alternative measures of liquidity and studies the tradeoff between the liquidity of a market and its efficiency.[3] Garbade [23] and Wood and Wood [54] provide comprehensive reviews of illiquidity measures and the relationships between them.

The importance of trading costs can be assessed by considering their magnitude in actual trading. Loeb [33] found that a typical transaction in a sample of Willshire 5000 stock issues entails an overall transaction cost of some 4% of its value. These costs include the market maker's bid-ask spread for the quoted quantity, the price concession required to transact in more shares than indicated by the market maker's quote, and the brokerage commission (as well as SEC fees and transfer taxes, which are relatively small). All these components are, of course, highly correlated.

Investors are willing to pay more for assets with higher liquidity, and require a compensation for the trading costs they bear. Thus, asset prices should reflect their liquidity characteristics. In a recent study, Amihud and Mendelson [4] found that average risk-adjusted returns on NYSE stocks increased very significantly with their bid-ask spreads. This implies that, other things being equal, a firm could increase its market value by increasing the liquidity of the claims it issues. Increasing liquidity is, however, costly; thus, the firm has to balance the benefits of increased liquidity with the costs.

In what follows, we first examine the benefits and then the costs of increasing liquidity and how the two should be traded off. Specifically, we examine the role of a number of financial management policies and institutional arrangements as liquidity-enhancing investments, thus enabling an analysis of the tradeoffs involved. We then analyze how firms can actually engage in liquidity-increasing policies. We also illustrate how some commonly observed financial management policies and institutional arrangements can be better understood by considering their liquidity effects.

I. Benefits and Costs of Increased Liquidity

Our point of departure is Amihud and Mendelson's [4] assertion that the greater the liquidity of an asset, the greater its value. Investors require a higher expected return from an asset with lower liquidity to compensate for its higher trading costs. Thus, firms have an incentive to carry out policies which increase the liquidity of the financial claims they issue, since this may lower the required return on these claims and increase their value.

One might argue that this increase in value can have at best a second-order effect, because trading costs represent a small fraction of the price of a security. It is important to realize, however, that the overall effect of trading costs of, say, 4% on an asset's value is substantially higher than 4%, since these costs will be incurred repeatedly whenever the asset is traded. Consider, for example, a security whose holding period is two years, which is the average holding period of NYSE stocks. A trading cost of, say, \$0.04 on a \$1 stock represents a cost stream of \$0.04 every two years. The present value of this cost stream, assuming an 8% discount rate, is equal to

$$.04 + .04/1.08^2 + .04/1.08^4 + .04/1.08^6 + \ldots = .28.$$

Thus, the 4% cost per transaction represents a total cost of 28% of the would-be market value of the asset if it were traded costlessly. In this example, a 2% reduction in trading costs increases the market value of the security by about 20%.

The above example demonstrates the significance of trading costs when their recurring nature is taken into account and provides an order of magnitude for the benefits of increased liquidity. A more accurate assessment of the value effects of liquidity enhancements is obtained from Amihud and Mendelson's [4] estimates of the return-spread relationship. Consider, for example, a security that generates a perpetual cash flow of \$1.00 per month with a bid-ask spread of 2% and a required net return of 1% per month. Since the required compensation for a 2% spread is about 0.42% per month, the market value of the security will be \$1.00/0.0142 = \$70.42. If the liquidity of the security can be increased so that its spread is reduced from 2% to 1%, the required monthly return will decline to about 1.21% and its market value will increase to \$1.00/.0121 = \$82.64, almost a 17% increase in value. This shows that even a substantial investment in increasing the liquidity of the firm's claims may be well-warranted. This value gain is lower for higher-spread stocks which, as shown by Amihud and Mendelson [4], are likely to be owned by investors with

[3] This tradeoff is related to the distinction between transitory and permanent price changes; cf. Black [10], Amihud and Mendelson [5].

longer expected holding periods.[4]

It is important to point out here the different roles of the firm and the individual investor in the mitigation of risk and illiquidity. While an investor can always reduce his risk from holding a security by forming a diversified portfolio or by hedging through the capital markets, there is hardly anything he can do on his own to avoid the illiquidity costs of a security. He has to bear these costs whenever he buys or sells the security, and holding a portfolio of illiquid securities will not eliminate the transaction costs which are always additive and do not cancel out. This calls for corporate financial policies that alleviate the cost of illiquidity to investors.

The above discussion clearly indicates that liquidity-enhancing policies can increase the value of the firm by reducing its cost of capital. These benefits, however, are not free; each of the liquidity-enhancing policies discussed in Section II creates costs which have to be balanced against their potential benefits. This tradeoff can be described by the following simple framework.

Consider a firm characterized by a perpetual cash flow E and cost of capital R. The firm evaluates a liquidity-enhancing project[5] which entails an initial outlay of C_0 dollars and an annual cash outflow of c dollars. To illustrate, in the first liquidity-enhancing project of Section II ("Going Public"), C_0 includes the initial cost of the public offering and c consists of the recurring costs associated with public ownership, such as agency costs and shareholder servicing costs (as well as other costs discussed in Section II). The value of the liquidity-enhancing project results from the lower cost of capital associated with more liquid claims. That is, if the firm decides to undertake the liquidity-enhancing action, its cost of capital will consequently drop to R_1 (where $R_1 < R$).

Now, the present value of the firm's cash flow without the liquidity-enhancing project is E/R, whereas its net present value if it undertakes the project is given by $(E - c)/R_1 - C_0$. Thus, the liquidity-enhancing project will increase the value of the firm if (and only if)

$$C_0 + c/R_1 < E/R_1 - E/R, \qquad (1)$$

where the left side of Equation (1) represents the cost of increasing liquidity, and the right side is the gain from greater liquidity.

Denoting the reduction in the cost of capital due to the liquidity-enhancing action by $\Delta R = R - R_1$ and assuming that $\Delta R \ll R$, we can approximate Equation (1) by

$$C_0 + c/R_1 < (E/R) \cdot (\Delta R/R), \qquad (2)$$

which expresses the value of increased liquidity as the product of the firm's initial value, E/R, by the relative reduction in its required return, $\Delta R/R$.

Expression (1) (or (2)) has a number of implications. Amihud and Mendelson [4] proved that a given change in liquidity has a greater effect on the cost of capital when liquidity is high than when it is low. This is because low-liquidity assets are held in equilibrium by investors with long planning horizons, and whose illiquidity costs are depreciated over longer periods. This implies that for a given reduction in transaction costs, ΔR will be higher when the initial liquidity is higher. Thus, it may be more beneficial to invest in increasing the liquidity of firms which already enjoy a high level of liquidity and are therefore traded more frequently.

On the other hand, the liquidity-improvement effect of a given outlay may be a decreasing function of the initial level of liquidity. That is, the cost of achieving a given improvement in liquidity may be lower when liquidity is low. When this is the case, a given cost might possibly produce a greater reduction in the cost of capital and a greater gain in value for a lower-liquidity firm.

Next consider the effect of firm size. According to Expression (2), the benefits of increased liquidity are proportional to the (initial) value of the firm, E/R. This implies that if a given relative reduction in the cost of capital, $\Delta R/R$, can be achieved at a given cost, this reduction will be more beneficial to larger firms. The fact that larger firms tend to have more liquid stocks will only amplify the relative advantage of investments in liquidity for such firms. Thus, we should expect larger firms to invest in liquidity-enhancing projects more than small firms.

Finally, the model shows that in some situations decreasing liquidity, rather than increasing it, may be beneficial. This would occur when the left side of Equation (1) is greater than the right, implying that the costs of increased liquidity are greater than the benefits. The final tradeoff depends on the details of the

[4]Increasing the liquidity of high-spread stocks is still beneficial despite the mitigation of the spread-effect. Amihud and Mendelson [4] found that in the spread-range between 1.74% and 3.20%, the additional monthly return required for an increase of 1% in the spread was .0012%.

[5]Such as those discussed in Section II.

cost and benefit structure, which vary from one case to another.

II. Institutional and Contractual Aspects of Publicly Traded Claims

There are a variety of means which firms can use to increase the liquidity of the claims they issue. We examine the liquidity effects of a number of commonly observed institutional and contractual arrangements, and suggest that one motive for establishing them may be the desire to increase the liquidity of the firm's claims so as to reduce its opportunity cost of capital.

A. Going Public

"Going public" is the most fundamental form of increasing liquidity. In this transaction, the firm changes its structure from the close corporation organizational form, where claims on its value are largely restricted to decision agents, to that of a public corporation whose residual claims are transferable without restriction (Fama and Jensen [20, 21, 22]). Holders of the publicly traded common stock of public corporations are not required to have an active role in the corporation and can sell their shares on an exchange. In contrast, the residual claims of the close corporation are illiquid by their very nature. Even when close corporations issue restricted claims against their future income, these claims are less liquid than the unrestricted claims issued by a public corporation. The lower liquidity results from restrictions which increase the costs of finding a qualified buyer, negotiating a price, and transferring ownership of the claims. As pointed out by Bernstein [9], "Paradoxical as it may seem, the easier the exit from ownership of a corporation, the more attractive its ownership becomes."

The association between the restrictions on transferability of financial claims and organizational form is recognized by the legal system. This pertains in particular to the relation between the transferability of shares and the "close corporation" organizational form, which appears in some state statutes. "In Delaware, which is fairly representative, a 'close corporation' is one which not only has 30 or less shareholders, but which refrains from 'public offering' . . . of its shares and obligations" (Conrad, Knauss, and Siegel [15, p. 771]). The English Company Law similarly distinguishes between private and public companies: "A Private company is one which by its article (a) Restricts the right to transfer its shares; (b) limits the number of its members to fifty . . .; and (c) prohibits any invitation to the public to subscribe for any shares or debentures of the company" (Smith and Keenan [50, p. 199]).

The "going public" transaction can thus be viewed as a liquidity-increasing project undertaken by the firm. Its benefit is captured by the expression $(E/R) \cdot (\Delta R/R)$ in Equation (2) above; that is, the increased liquidity reduces the firm's cost of capital and thus increases its value. These benefits, however, are not costless. First, there are the high initial costs of the "going public" transaction which include registration with the Securities and Exchange Commission, preparation costs and delay costs, as well as the cost of the reorganization required to comply with the regulations pertaining to public corporations; these costs constitute the initial-cost parameter C_0 of Section I. The recurring cost component c includes the direct cost of public ownership such as shareholder-servicing costs, legal and accounting costs of satisfying the various reporting requirements, exchange fees, mailings, etc. These costs were estimated to be about $100,000 (Schneider, Manko, and Kant [46]) or $200,000 (Borden [12]) per year, not including management time.

Another important set of costs associated with the public corporation organizational form is the agency costs due to the conflict of interests between shareholders and professional managers (Jensen and Meckling [29]), which results from the separation of management and ownership. Further, the close corporation has greater freedom in carrying out deals and establishing desirable (and perhaps more efficient) managerial compensation schemes with less fear of public reaction. The need for public disclosure of information which may be useful for competitors constitutes another recurring cost for the public corporation.

The choice of organizational form thus demonstrates the general tradeoff involved in undertaking liquidity-increasing financial policies. On the one hand, the net cash flows of the close corporation are expected to exceed those of its public counterpart; on the other hand, the return required on the public corporation is lower, affecting the value of these cash flows. In considering the decision to "go public," the firm has to balance the benefits of lower required returns against the costs.

The advantages of private ownership of a corporation can sometimes outweigh the costs of illiquidity. Firms which decided to "go private" enjoyed a significant increase in their value (DeAngelo, DeAngelo, and Rice [16, 17]). Yet, the fact that so many firms choose to remain public and forego the potential gains of "go-

ing private" provides some evidence on the value they place on liquidity.

A substantial part of the cost of "going public" is independent of firm size while the benefits increase with size, as evident from the model of Section I. This suggests that, other things being equal, the smaller the firm, the less likely it is to go public — a fact that certainly conforms with casual observation. According to Expression (2), for a given cost of going public, $C_0 + c/R$, and a given relative reduction in the required return, $\Delta R/R$, there is a minimal firm value which is needed to make "going public" beneficial. This point may be illustrated by the following numerical example. Let the cost of public ownership be \$150,000 per year (including the amortized initial offering cost), and let the annual required return on the liquid claims of an open corporation be 10%. If, for the sake of illustration, the required return on the illiquid claims of the close corporation is 10% a year more,[6] Expression (1) reads $E > \$300{,}000$. Thus, the "going public" transaction will be beneficial if and only if the value of the firm (before "going public") exceeds 1.5 million dollars.

Another case where the choice of organizational form is related to the attributes of the financial claims issued is the master limited partnership, which offers substantial tax benefits as compared to the public corporation. Like the latter, it issues transferable residual claims — "partnership units" — which can be traded on an exchange. However, the transferability of the partnership units is impaired by tax regulations which require the allocation of partnership gains and losses over the year between buyers and sellers (see Collins and Bey [14]). Thus, we have a tradeoff between the preferential tax treatment of the master limited partnership and the higher liquidity of the claims of the public corporation.

The suggestion that unrestricted claims entail a lower cost of capital due to their greater liquidity is supported by direct evidence from the capital markets. Privately placed bonds, which are quite illiquid, were found to yield, on average, returns which exceeded those on publicly issued corporate bonds by about 50 basis points (during 1961–77), with quality, duration, and tax treatment held constant (Zwick [57]). This difference in bond returns is likely to be smaller than the expected difference between the returns on privately placed and publicly issued residual claims. Since privately held bonds are usually held to maturity (their owners are typically mutual life and full-life insurance companies), the cost of trading in these bonds is of little consequence. In contrast, residual claims — which usually do not have finite maturity — are more likely to be traded, hence their trading cost is of greater importance and so is the impact of illiquidity on their required returns.

In conclusion, the cost-benefit analysis associated with the decision to "go public" is a special case of the more general decision on whether to invest in increasing the liquidity of the firm's claims. Given the evidence that low liquidity claims yield higher returns, such an investment may be beneficial to some firms.

B. Standardization of Claims

The sharing rules of the firm's value, which are represented by publicly issued securities, are amazingly uniform and simple. Firms usually issue bonds — priority claims on the firm's value — and one type of stocks which provide a proportional division of the residual value among their holders.[7] In contrast, we observe complex contracts and provisions in direct investment agreements, particularly in the restricted claims of close corporations. Contracting theories prescribe more complex sharing rules, and nonstandard securities (e.g., Arrow-Debreu state-contingent claims) could be issued, possibly benefiting investors who could find securities which accommodate their individual preferences. Thus, the standardization of securities entails nontrivial costs, and the question that arises is what motivates the firm to bear these costs.

The benefits which often offset the costs of standardization result from the higher liquidity of standard claims. Securities with specific nonstandard contract provisions would be more difficult to trade than securities with a standard contractual form for two basic reasons. First, to assess their value, nonstandard claims require more information and more resources. Second, the very features which made them suitable for the specific needs of the original investors could make them less appropriate for other investors, hence more resources would be required to liquidate them promptly. The illiquidity cost associated with the lack of standardization, and the resulting lower valuation of these securities, thus tilt the balance towards uniform,

[6]This is the estimated difference between the returns on the highest- and lowest-spread stock portfolios in Amihud and Mendelson's [4] sample.

[7]There are clearly variations in the types of bonds, and there are also preferred stocks, but the dominating form is of straight debt and common stocks. And even the other types of claims are fairly standard, and vary only in a few parameters.

standard, and simple sharing schemes.[8] As Demsetz ([18], p. 50) has already noted, "The distinguishing characteristic of . . . trading on organized exchanges is the willingness of customers to forego a personal examination of the goods bought and sold. This allows a high degree of standardization and enables communication and title exchange costs to be kept low even for large transaction rates."

Increasing the uniformity of financial claims in order to increase their liquidity is prevalent in capital markets. For example, the role of the conduit in mortgage investments is to "standardize mortgage investments in a variety of ways, and stand behind the security in the event of a loan default. This standardization greatly enhances the marketability of the final security" (Villani [52], p. 30). The securitization of loans by banks and deposit-based firms is another liquidity-increasing investment vehicle which is becoming widely implemented. Securitization involves the pooling and repackaging of individual loans into standard debt securities which are sold to the public. The originating bank usually does not provide any insurance or guarantee; it simply provides a liquidity-enhancing service: "The ability to package and sell these otherwise illiquid assets in an established secondary market increases their liquidity. . . . An active and well-developed secondary market provides a high degree of marketability for these securities" (Pavel [43], pp. 16–17). Given the competition between financial intermediaries, the benefits of increased liquidity are passed on to the original borrowers in the form of lower interest rates.

Another case in point is the substitution in recent years of publicly traded high-yield bonds for private placements and negotiated bank debt. Privately placed debt enables custom-tailoring of restrictive covenants and provisions which allow potentially better control over agency problems and other risks. Also, it obviates the need to disclose information which could be used by competitors. These advantages, however, are often outweighed by the marketability of tradable bonds with standard covenants when the ability to exploit market liquidity increases. There are indications that market liquidity has increased in recent years. The per share commission rates charged institutional investors for trades of 1,000 to 9,999 shares have fallen from \$0.28 in 1975 to \$0.14 in 1979 and to \$0.08 in 1986,[9] and trading volume has increased, as is apparent to any avid market observer. This might have instigated the proliferation of high-yield bonds as well as other liquid financial instruments.

C. Limited Liability

The choice of firms to assign limited liability to their residual claims may also be attributed to liquidity considerations. Alternative arrangements of extended liability of the corporation's equity holders could be advantageous in reducing the moral hazard and agency costs induced by limited liability. However, extended stockholder liability will render the stocks of a public corporation illiquid by impeding the alienability of the equity claims in the secondary securities market (Woodward [55]). Limited liability, on the other hand, accommodates a liquid secondary market for equity shares, thus providing a higher-liquidity form of risk sharing (Jensen and Smith [30]).[10] The associated agency costs may thus be viewed as the costs of enhancing the liquidity of equity claims, and the choice of limited liability suggests that the net result is an increase in value (i.e., inequality (1) is satisfied).

D. Corporate Borrowing

According to the well-known Modigliani-Miller proposition, capital structure should have no effect on the value of the firm. In perfect markets, individuals can mimic the firm by borrowing and lending on their own, and hence there is no value to such action taken by the firm. Senbet and Taggart [48] analyzed the case of transaction costs for borrowing and lending. These costs are lower for firms than for individuals; therefore, the firm's capital structure will not be a matter of indifference. Given the comparative advantage of firms in handling debt, each investor will opt for the firms whose borrowing or lending best accommodates his preferences (as reflected by his marginal rate of substitution between current and future consumption), and firms will adjust their capital structure until all borrowing and lending are done at the corporate level.

[8]Monahan [40] points out that private placement financing arrangements are often associated with detailed contractual agreements and restrictions between the issuer and the buyer of an issue to a greater extent than would be found in securities registered for public sale. This clearly lowers the liquidity of privately placed securities; however, this problem is mitigated by the clientele effect (Amihud and Mendelson [4]): The holders of privately-placed securities are mostly long-term institutional investors.

[9]See the Wall Street Journal, May 15, 1987, p. 17.

[10]The observation that privately-held firms sometimes do not have limited liability is consistent with its liquidity-increasing role.

Corporate borrowing thus enables the firm to alleviate part of the illiquidity costs of debt faced by individual investors.[11]

E. Disclosure of Inside Information

Information released by firms whose securities are publicly traded may have a liquidity-increasing role. Publicly traded firms are required to publish periodical accounting reports and to promptly inform the public of any event which may affect their valuation. But even without these formal requirements, it may well be in the interest of public firms to voluntarily release inside information in order to enhance the liquidity of their claims. This is because insiders' trading on privileged information induces market makers to widen the bid-ask spread in order to protect themselves from better-informed traders and to be compensated for bearing greater risk (see Bagehot [6], Glosten and Milgrom [24]). Indeed, there is evidence that unexpected changes in information about a security widen its bid-ask spread. Morse and Ushman [42] found that the bid-ask spreads of sampled OTC stocks tended to increase on days of large absolute price changes, which reflects the dissemination of previously unknown information. Venkatesh and Chiang [51] found a significant increase in stocks' bid-ask spreads around an earning or dividend announcement which followed an announcement on this matter made 10–30 days earlier. They interpreted the widening of the spread as reflecting an increase in informational asymmetry.[12]

It follows that a commitment by the firm to make internally generated information promptly available to the public (e.g., in the form of accounting reports and special announcements) reduces the risk of trading against superiorly informed "insiders." This brings about a narrower bid-ask spread, greater liquidity, and consequently a lower opportunity cost of capital. The prompt release of information is costly to the firm, but this cost can be viewed as a liquidity-enhancement investment which may increase, on balance, the value of the firm's claims. We thus hypothesize that, even without mandatory disclosure regulations, firms have an incentive to voluntarily expend resources to release information to the public. A similar argument applies to regulatory constraints on insiders' trading: the firm has an incentive to voluntarily regulate[13] "insiders" in order to reduce the bid-ask spread and consequently its opportunity cost of capital.

In terms of our analysis, the cost of making information public is captured mainly through the perpetual cost component c, while the cost of setting up the information and reporting systems is C_0. The latter component is usually relatively small, since firms establish information systems for their own management decisions; hence, C_0 is only the added setup cost of making such information publicly available. The recurring cost c includes both the direct costs of information release and the adverse consequences of disclosure to outsiders (e.g., competitors). Thus, the choice of whether to release information to the public can be adequately represented by the framework of Section I, and a positive decision to release information reflects the case where Expression (1) holds.

Consistent with our analysis, most NYSE-listed firms published financial statements even before they were required to do so by the Securities Exchange Act of 1934.[14] Our hypothesis that liquidity considerations induce voluntary release of information by firms, even at a cost, is strongly supported by the existence of the bond-rating system. Firms are under no formal obligation to have their bonds rated, yet we observe that almost all firms voluntarily pay the rating agencies to rate their publicly issued bonds. We also observe that firms do not pay to have their privately placed bonds rated. Since they are not intended to be traded, the firm can hardly derive any benefit from increasing the liquidity of these bonds. This indicates that a voluntary release of information by firms is motivated (at least in

[11]This hypothesis is consistent with two observations: (i) Small firms have typically a smaller debt ratio than large firms. Since small firms may not have a significant advantage (if at all) over investors in saving on transaction costs in borrowing, they have a weaker motive to borrow on behalf of investors. (ii) There is a negative correlation between the tax bracket of individual investors and the debt ratios of the firms whose stocks they hold. Investors in low tax brackets are typically low-income ones, for whom the advantage of firms in borrowing (through lower transaction costs) is more valuable. There are, however, a number of alternative explanations for these phenomena, and the issue clearly requires further study.

[12]We propose carrying out "event studies" on the information effects of various announcements made by firms, especially those associated with asymmetric information. Such research is currently inhibited by the lack of easily-available data on bid-ask spreads. One such study, which focuses on the association between corporate payout policies, asymmetric information and liquidity, is due to Barclay and Smith [7].

[13]On "home-made" restrictions on insiders' trading by firms, see Carlton and Fischel [13], who also discuss related liquidity issues.

[14]Benston [8] cites other motives for voluntary disclosure of financial information. His arguments apply as well to firms whose securities are not publicly traded.

part) by the desire to increase the liquidity of their claims.[15]

The negative effect of the lack of information on liquidity can be mitigated by the issuing entity by buying insurance for the issue. This is often the case with small local issues of municipal bonds. The pure risk reduction provided by the insurer clearly provides no benefit, since this can be attained by investors holding diversified portfolios. However, the insurer reduces the informational asymmetry associated with these bond issues, particularly in the case of small and obscure ones, thus increasing their liquidity and value.[16]

F. Underwriting New Public Issues

The underwriter of a new public issue provides a number of liquidity-increasing functions which the issuing firm cannot perform on its own. First, it provides "stabilization" of the price of the new issue during the offering period. Then, the underwriter serves as a market maker for some period, ready to step in and provide liquidity as necessary by buying or selling the security for his own account or by soliciting customers to do so.[17] The Securities Exchange Act (1934), which prohibits manipulation of stock prices, permits underwriters to engage in market stabilization of new issues, while the issuing firm is prohibited from stabilizing its own securities in the market. This liquidity-increasing stabilization service is particularly valuable in an initial public offering and, in fact, investment bankers generally consider price stabilization to be an essential feature of their operations, and issuing companies seek an underwriter which is active in these market-making activities.

Another liquidity-increasing service is the "certification" of the new issue. The underwriting investment bank is an independent agency whose duty is to provide the public with accurate information about the new issue. The underwriter carries out a search process through the firm's records (known as "due diligence") to detect any information deemed relevant and publishes a prospectus which details the state of the firm and the expected use of the funds. The underwriter is thus a credible outsider that is allowed to inspect the firm on behalf of its claimholder for any adverse information, without actually disclosing inside information whose release could harm the claimholders (e.g., information which could be used adversely by the firm's competitors). As pointed out in Section E, the reduction in potentially adverse inside information about the firm reduces the bid-ask spread of the new issue and thus increases its liquidity. The substantial cost associated with issuing securities through an underwriter (which is mainly captured by C_0) may thus be explained, in part, as a liquidity-increasing investment.

G. Stock Denominations

Liquidity considerations may also explain why securities are issued in relatively small denominations in large numbers. For example, why does a firm have ten million shares of $20.00 each rather than issuing a thousand shares of $200,000 each, incurring the cost of servicing a greater population of stockholders? Perhaps for liquidity reasons. Wood and Wood ([54], p. 170) discuss divisibility as a liquidity attribute and suggest that "there is some evidence that divisibility may exert an indirect influence on security returns by affecting dealer spreads." This may be related to the fact that block trades incur unusually high liquidity costs. Not only are such blocks difficult to sell at the prevailing market price (Kraus and Stoll [32]), but they also incur direct costs that include the underwriter's spread, averaging 5% (which is an increasing function of the number of shares sold relative to the issue size), as well as other expenses averaging 1.7% for offerings registered with the SEC (Mikkelson and Partch [39]). By issuing shares with smaller denominations, the firm increases the divisibility of its securities, makes small transactions feasible, and enables greater dispersion of ownership. These characteristics increase the liquidity of the firm's shares and consequently reduce its cost of capital.[18]

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[15]An alternative explanation of why firms have their bonds rated is that some mutual funds are constrained to invest only in highly-rated bonds. But this does not explain why firms pay to have their bonds rated even when they are of low quality.

[16]"Insured and guaranteed bonds are usually more sellable [i.e., liquid] than comparable uninsured bonds because they are traded on the basis of the third-party guarantee rather than on the fundamentals of the local credit" (Slater [49]).

[17]See Schneider, Manko, and Kant [46], Welshans and Melicher ([53], Ch. 13), Bloch ([11], Ch. 11).

[18]Perhaps this can be extended to explain the rationale for stock splits; consider, for example, what would the price of an IBM stock be if it did not split a number of times in the last decades. Perhaps this can also provide some explanation to the positive price reaction of stocks on the actual split date (see Grimblatt, Masulis, and Titman [26]); this and related hypotheses are studied by Masson [34]). It should be pointed out that the lower stock price after a split may increase the percentage bid-ask spread, which is a declining function of price. The spread-price relationship, however, was estimated over a stock price range which was maintained by splits and dividends, and it may not be applicable to prices outside that range.

H. Listing on Organized Exchanges

The liquidity-increasing motive may explain the desire of many firms to list on the large and organized securities exchanges despite the costs and restrictions associated with such listings rather than to trade over the counter. Conventionally, listing *per se* should not affect the firm's systematic risk (Reintz and Vanderberg [44]) and hence should not affect the value of the firm. However, listing may produce a favorable liquidity effect due to the more active trading and greater "depth" provided by an organized exchange.[19] In particular, the bid-ask spreads on the New York Stock Exchange were found to be significantly lower than those in dealer markets, other things being equal (Hamilton [27], Moore [41]). Moreover, firms which listed on the NYSE enjoyed a significant decline in the spread of their stocks. Klemkosky and Conroy [31] found that while the pre-listing average OTC median bid-ask spread for their sampled stocks was 3.45% and the average inside (narrowest) spread was 1.73%, the post-listing average NYSE spread for the same stocks was 1.24%. This may explain the findings of large positive increases in the stock prices of firms which apply for listing at and around the month of application (Ying, Lewellen, Schlarbaum, and Lease [56]).[20] Examining a sample of OTC stocks which applied for listing on the NYSE, Grammatikos and Papaioannou [25] found that high-spread stocks enjoyed a greater price increase around the time they applied for listing than did stocks with a low spread. This suggests that the increased liquidity due to listing on the NYSE lowered the required return on stocks which had suffered from low marketability. The link between listing and liquidity is also apparent from the finding of Sanger and McConnell [45] that the value increases associated with exchange listing were higher in the pre-NASDAQ than in the post-NASDAQ period. This is because the superiority of liquidity services provided by the NYSE over the OTC has diminished after the implementation of the NASDAQ system.[21]

A related benefit of listing is the increase in information availability about the firm (Dhaliwal [19]). As pointed out in Section E, above, this contributes to the liquidity of the firm's claims and reduces its opportunity cost of capital. Clearly, listing also provides a favorable signaling effect.

The tradeoff faced by firms with respect to listing can again be analyzed in terms of the model in Section I. The costs associated with listing include the one-time cost of the changes necessary to comply with the exchange's requirements and periodic costs which reflect not only the out-of-pocket listing fees and reporting costs but also the foregone gains due to the constraints implied by the exchange's rules and regulations. These costs are captured in our model by C_0 and c. Listing is not expected to change the production activities of the firm and its underlying cash flow, E. But the increase in the liquidity of the firm's stocks, which induces a reduction in their required return R, increases the value of these cash flows.

Clearly, the tradeoff between the cost of listing and the increase in value can produce different results for different firms. For example, firms which already enjoy high liquidity on the OTC market will realize a small (if any) reduction in R due to listing, whereas they will have to bear the associated costs. For other firms, ΔR may be significant in value, but C_0 and c may be too large to make listing worthwhile. We thus observe that while many firms apply for listing on the NYSE, a large number of qualified OTC firms choose to remain in that market.

III. Conclusion

In this paper we have suggested a new perspective for studying financial management policies: the contributions of increasing the liquidity of claims issued by the firm. This is based on Amihud and Mendelson's [4] findings that average returns are higher on less liquid stocks. The benefits of liquidity-increasing financial policies which reduce the firm's opportunity cost of capital have to be balanced against their costs. In examining the associated tradeoffs, we have explained a number of observed corporate financial policies and institutional arrangements as liquidity-increasing investments. We hope that this approach will provide an impetus for further studies of the liquidity-enhancing motive for corporate financial policies.

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[19]See Mendelson [36, 37, 38], Amihud and Mendelson [3] for a discussion of the liquidity characteristics of various exchange mechanisms.

[20]Stocks listing on the NYSE exhibit a puzzling decline in value immediately following the listing. However, McConnell and Sanger [35] ruled out the conjecture that the decline is because the trading method on the NYSE is inferior to that of the OTC market.

[21]Hamilton [28] found that in the post-NASDAQ period, the difference in the bid-ask spreads between the NYSE and the OTC market has narrowed considerably.

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