Asset Pricing and the Volume Effect

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Abstract

Previous literature in financial economics documents the existence of a liquidity premium in expected returns, measured by the bid-ask spread. This study provides a more comprehensive test of the egect of liquidity on common stock returns by including trading volume as an additional liquidity measure. we find that trading volume is a relevant measure of liquidity, and affects expected returns even aher controlling for the effects of systematic risk, firm size, and the relative bid-ask spread. We also find that trading volume complements the bid-ask spread as a liquidity measure, and provides additional information about the liquidity premium. The liquidity effect emerges in non-January months as a volume effect, in addition to the spread effect in January documented by Eleswarapu and Reinganum (1993).

1. Introdudion

Previous studies in financial economics suggest the existence of a liquidity premium in equilibrium asset prices [e.g., Demset (1968), Bensten and Hagerman (1974), and Stoll (1978)]. Amihud and Mendelson (1986) provide a theoretical famework for studying the relationship between liquidiw and asset pricing. Their

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empirical results support the hypothesis that an asset's expected return is an increasing, concave function of its bid-ask spread. This conclusion is intuitively appealing in recognizing the desire of rational investors for compensation in the face of excess transactions costs. This paper proposes the use of trading volume as a complementary liquidity measure to the bid/ask spread. A general definition of liquidity is the ability to sell an asset in a timely fashion without a significant loss of value. The bid/ask spread directly measures the value loss (i.e. transactions cost) of disposal. The narrower the spread, the greater a security,s liquidity. High levels of trading volume also enhance liquidity by allowing investors to quickly execute large buy or sell orders for a security without adversely affecting its market price.[1] Therefore, if a liquidity premium in expected returns exists, investors will require a higher return on low trading-volume securities.

Jqnes and Edmister (1983) empirically test for the presence of a "volume effect" in expected returns with a sample of 500 randomly-selected issues for each of the years 1975, 1977, 1978 and 1979. Although they find no evidence of a systematic relationship between trading volume and expected returns, this result may not be generalizable to other time periods and larger samples.

The purpose of this paper is to provide a more comprehensive test of the effect of liquidity on expected returns by including trading volume in a specification that controls for systematic risk, the size effect [e.g., Banz (1981) and Reinganum (1981)] and the spread effect documented by Amihud and Mendelson (1986). Previous research has also uncovered a January seasonality in the systematic risk premium [e.g., Tinic and West (1984, 1986)] and the size effect [e.g., Keim (1983), Reinganum (1983), and Roll (1983)]. More recently, Eleswarapu and Reinganum (1993) document a January effect in the relation between bid-ask spreads and expected stock returns. This paper also explores whether such seasonalities exist in the relationship between trading volume and expected stock returns. The methodology employed in this study is similar to that of Fama and

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1) The higher a security's trading volume, the easier it is to find a counterparty to trade with at the market. Investors-institutional investors, in paritcular-appear to use trading volume as a measure of the relative liquidity of a security. Bernstein (1987) provides a comprehensive review of the liquidity literature.

French (1992), who reexamined the cross-sectional variation in expected stock returns, and Eleswarapu and Reinganum (1993), who employ the Fama and French methodology in their investigation of seasonality and liquidity premia.

This paper is organized as follows. Section 2 describes the data, the portfolio formation method, and test design. Section 3 presents the empirical results, which are divided into three parts: 1) the characteristics of the size/beta portfolios, 2) the results of Fama and Macbeth (1973) regressions, and 3) the results of control-portfolio tests. Section 4 summarizes and concludes the paper.

2. Data and Methodology

2.l. Data

This paper examines the cross-sectional relationship between monthly returns, systematic risk (measured by beta), market value of equity, bid-ask spreads, and trading volume for NYSE stocks over the period 1973-1990. The Center for Research in security prices (CRSP) monthly return files provided data on stock returns and market returns for the period 1968-Dec. 1990, and annual trading volumes and year-end market value equity for the period 1972-1989. The Francis Emory Fitch NYSE Stock Quotations provided bid and ask prices for NYSE stocks at the end of the years 1971 through 1990. The relative spread is computed as the dollar spread (ask price minus bid price) divided by the average of the bid and ask prices. As in Amihud and Mendelson (1986) and Eleswarapu and Reinganum (1993), the relative spread variable used in this paper is the average of the beginning- and end-of-year relative spreads.

For each of the years 1973-1990 (the test period), a security was included in the sample if it satisfied the following selection criteria: 1) the security had usable CRSP returns for a minimum of one month in year t and for a minimum of 36 months in the five-year period prior to year t; 2) the security's year-end bid-ask spread was listed in the Fitch database for the years t-1 and t-2; and 3) the firm's shares outstanding did not change by more than 25% in year t. The first criterion was necessary for beta estimation and portfolio formation, the second assured a complete sample, and the third reduced possible biases from the changes in the relative spreads due to stock splits or stock dividends.[2)] This selection process resulted in sample sizes that ranged from 793 to 1023. firms (with a mean of 890) for the test period 1973-1990

2.2. Portfolio formation method

The portfolio formation method used in this paper is similar to that of Fama and French (1992). For each of the years in the test period, the stocks in the sample were placed into portfolios based on their firm saize and estimated betas (hereaher, pre-ranking betas). The-pre-ranking betas were estimated using market-model regressions of monthly returns on the CRSP equally-weighted index over the five-year period prior to the test year t. A minimum of three years (36 months) of data was required to estimate the stock's ordinary least-squares beta. Each year, the stocks in the sample were sorted and assigned to seven groups based on their firm size, estimated as the market value of the firm's equity at the end of the year t-1. Within each size class, the stocks were divided further into seven equal subgroups according to their estimated pre-ranking beta, resulting in 49 size/beta portfolios. For each of these portfolios, equally-weighted monthly returns were calculated for the 12 months in year t. This procedure was repeated in each year of the 18-year test period.

We then estimated betas (hereafter, post-ranking betas) using the Dimson (1979) method and returns on each portfolio and the CRSP equally-weighted index over the 18-year (216 month) full-sample period. The full-period post-ranking beta of a size/beta portfolio is allocated to each stock in the portfolio. This beta-estimation procedure reduces the errors-in-variables problem associated with

2) For a sample of 147 NYSE firms, Conroy, Harris, and Benet (1990) report that on average, relative spreads increase from 0.95% (two months after to the split announcement) to 1.46% (two months after the ex-split date). Although the empircal evidence on split-induced change in dollar trading volume is mixed [e.g., Copeland (1979) and Lamoureaux and Poon (1987)], raw trading volume obviously increases after a split.

the non-contemporaneous market model betas, at the cost of a loss of information (i.e. the use of portfolio rather than security betas). It does, however, allow the betas of the stocks to change over time (i.e. a firm can move pom one portfolio to another on an annual basis).

2.3. Test Design

We analyzed the effect of volume on expected returns using two complementary procedures. First, we used Fama-Macbeth cross-sectional regressions of portfolio returns against the previous year's average trading volume, controlling for beta, firm size, and the bid-ask spread. In this specification, we used time-series averages of monthly cross-sectional coefricients from the fo]lowing model:

$$R_p = b_0 + b_1 BETA_p + b_2 SIZE_p + b_3 SPREAD_p + b_4 VOLUME_p + e_p \quad (1)$$

with cross-sectional regressions estimated month-by-month during test year t (t= 1973-1990), and where

R_p	=	the average monthly return of the stocks included in portfolio p,
$BETA_p$	=	the post-ranking beta of portfolio p,
$SIZE_p$	=	the natural log of the average equity market value of the stocks included in portfolio p as of the end of year t-1,
$SPREAD_p$	=	the average relative bid-ask spread of the stocks included in portfolio p, with the spreads computed as averages of beginning- and end-of-year relative spreads in year t-1,
$VOLUME_p$	=	the natural log of the average annual trading volume of the stocks included in portfolio p during year t-1, and
e_p	=	a random error term.

Equation (1) controls for systematic risk and firm size and recognizes the importance of the-bid-ask spread as a liquidity measure, while allowing for the possibility of additional aspects of liquidity being captured by trading volume. To test for seasonality in the volume effect, we estimated alternative specifications of equation (1) for the total sample of monthly returns, and for both the January and non-January subsample. If volume is a valuable liquidity proxy and if there is a volume effect in excess returns, we expect negative volume coeficients in tests of equation (1) (i.e., trading volume is positively related to liquidity and thus should be negatively related to expected return)

In the secord procedure, we used a control portfolio approach in which excess returns were computed as the security's monthly return less the equal-weighted monthly return of the control portfolio into which the security is ranked. The control portfolios are rebalanced annually, and are formed in a similar manner to the process discussed above. First, all stocks in the sample were sorted into 7 size portfolios, based on the market value of their equity at the end of the year t-1. Next, each of the size portfolios was subdivided into seven spread poqfolios on the basis of average relative bid-ask spread during year t-l. This resulted in a total of 49 control portfolios formed on the basis of firm size and relative spread.

In order to test for a volume effect in excess returns, seven volume portfolios were then formed on the basis of average annual trading volume during year t-I, with 1 the lowest volume portfolio, and 7 the highest. These portfolios were also rebalanced annually over the test period. Dummy-variable regressions ofthe excess security returns on the volume portfolio dummys were then performed according to the following specification,

$$X_{it} = a_1 + a_2D_{2t} + a_3D_{3t} + a_4D_{4t} + a_5D_{5t} + a_6D_{6t} + a_7D_{7t} + e_{it} \qquad (2)$$

where

X_{it}	=	the excess return on security i in month t, measured as the difference between the return on security i at time t and that of the control portfolio into which the security is ranked based on its firm size and relative spread,
D_{nt}	=	a dummy variable that takes on the value of 1 in year t if security i belongs to nth volume portfolio, or 0 otherwise, and
e_{it}	=	a random error term.

In equation (2), the average excess return for the lowest volume potyfolio is measured by a_1, while a_2 thorough a_7 represent the differences between the average excess returns of the respective volume portfolio (2 through 7) and the average excess returns for the lowest volume portfolio (a_1). If there is a liquidity effect in excess returns and if volume is a valuable liquidity proxy, then we expect the marginal dummy variable coefficients (a_2 thorough a_7) to be decreasing and the F-statistic. which measures the joint significance of the dummy variables, to be significant,

3. Empirical Results

3.1. Portfolio charaderistics

Table 1 reports the characteristics of the 49 portfolios formed on the basis of market value of equity and pre-ranking beta. The results are generally consistent with those of Fama and French (1992). In panel A, the average monthly returns exhibit little systematic variation across beta portfolios (columns 1 - 7). In fact, none of the size groups exhibit consistently increasing returns in beta. The same result does not hold, however, when size is analyzed across beta groups. Even after controlling for beta, the expected portfolio returns are generally inversely

Table 1

Average monthly returns, post-ranking beta, firm size, relative bid-ask spread, and annual trading volume for the 49 portfolios of NYSE firms based on firm size and pre-ranking beta, Jan. 1973 - Dec. 1990.

Portfolios are formed each year preceding the test year t. The NYSE stocks in the sample are allocated to seven portfolios, based on their market value of equity at the end of year t-1, and then subdivided into seven beta portfolios, based on the pre-ranking betas of individual stocks which are estimated with 3 to 5 years of monthly returns (as available) ending in year t-1. As a result, 49 portfolios are formed and rebalanced each year preceding the test period from 1973 to 1990. The total number of firms included in the portfolios ranges from 793 to 1,023 with mean of 890. Panel A reports the average return, which is the time-series average of the monthly equal-weighted portfolio returns in year t, where t=1973 to 1990. Panel B reports the post-ranking beta which is estimated using the full (January 1973 to December 1990) sample of monthly equal-weighted returns for each portfolio. The post-ranking beta is the sum of the slopes from a regression of monthly portfolio returns on the current and prior month's returns on an equal-weighted portfolio of NYSE stocks. Panel C reports the average firm size within each portfolio, calculated as the time-series average of the market value of the equity for stocks in the portfolio at the end of year t-1. Panel D reports the time-series average of the relative bid-ask spread for each portfolio, where the spread for the stocks in the portfolio is computed by averaging relative spreads at the end of year t-1 and t-2. Panel E reports the portfolio average trading volume of the stocks in the portfolio during year t-1.

Size group	Beta group: Lowest	2	3	4	5	6	Highest	All
			Panel A: Average monthly return (in percent)					
Lowest	1.423	1.991	2.092	2.117	1.881	2.127	1.929	1.937
2	1.883	1.640	1.895	1.566	1.927	1.872	1.522	1.758
3	1.645	1.640	1.862	1.640	1.716	2.002	1.239	1.678
4	1.603	1.656	1.741	1.350	1.412	1.439	1.345	1.506
5	1.569	1.638	1.498	1.686	1.597	1.199	1.618	1.544
6	1.257	1.513	1.405	1.486	1.407	1.354	1.163	1.369
Highest	1.422	1.265	1.340	1.176	1.164	1.039	0.995	1.200
All	1.543	1.620	1.690	1.575	1.586	1.576	1.402	1.570
			Panel B: Post-ranking beta					
Lowest	0.799	0.947	1.066	1.252	1.276	1.331	1.522	1.170
2	0.689	0.851	0.935	0.933	1.173	1.257	1.438	1.040
3	0.563	0.812	0.851	0.975	1.067	1.138	1.315	0.960
4	0.438	0.618	0.808	0.784	0.963	1.021	1.151	0.826
5	0.416	0.659	0.750	0.827	0.842	0.997	1.078	0.796
6	0.367	0.577	0.664	0.716	0.846	0.831	0.994	0.713
Highest	0.362	0.485	0.542	0.583	0.664	0.745	0.855	0.605
All	0.519	0.707	0.802	0.867	0.976	1.046	1.193	0.873

Table 1 (continued)

Size group	Beta group Lowest	2	3	4	5	6	Highest	All
	Panel C: Average firm size (in million dollars)							
Lowest	31	30	31	28	30	29	27	29
2	73	71	72	74	72	73	71	72
3	148	152	147	146	149	146	142	147
4	288	294	300	299	286	286	289	292
5	579	570	567	573	564	567	570	570
6	1169	1214	1230	1177	1188	1224	1139	1192
Highest	5761	7557	7289	5349	4748	3625	3339	5381
All	1150	1413	1377	1092	1005	850	797	1098
	Panel D: Average relative bid-ask spread (in percent)							
Lowest	2.740	2.777	2.954	3.353	3.449	3.800	4.219	3.328
2	1.801	1.843	1.791	1.864	2.135	2.190	2.565	2.027
3	1.376	1.503	1.419	1.589	1.661	1.729	1.919	1.600
4	1.193	1.288	1.250	1.297	1.291	1.395	1.422	1.305
5	1.034	1.100	1.083	1.079	1.026	1.071	1.139	1.076
6	0.945	0.904	0.935	0.834	0.866	0.859	0.866	0.887
Highest	0.854	0.675	0.633	0.596	0.651	0.631	0.667	0.672
All	1.421	1.441	1.438	1.516	1.583	1.668	1.828	1.556
	Panel E: Average annual trading volume (in million)							
Lowest	1.15	1.33	1.45	1.94	2.10	2.86	3.50	2.05
2	1.40	1.90	2.47	2.86	3.78	5.03	6.32	3.40
3	2.24	2.92	3.28	3.67	5.69	7.17	10.52	5.07
4	4.35	6.06	6.46	7.36	6.94	10.48	15.69	8.19
5	13.00	11.17	9.48	10.46	11.19	15.13	22.28	13.24
6	20.26	17.96	17.51	17.85	19.65	24.13	29.85	21.03
Highest	41.32	45.94	43.95	43.55	45.63	43.31	49.42	44.73
All	11.96	12.47	12.09	12.53	13.57	15.45	19.66	13.96

related to portfolio size. There appears to be a relationship between size and average return, but controlling for size, there is no discernable relationship between beta and average return.

Panel B shows that forming portfolios on size and pre-ranking betas, rather than on size alone, magnifies the range of the full-period, post-ranking betas. Across all 49 size/beta portfolios, the post-ranking betas range from 0.362 to 1.522, whereas the range is from 0.605 to 1.170 based on size alone. Also, again consistent with Fama and French (1992), we find that in each size portfolio, the post-ranking betas closely reproduce the ordering of the pre-ranking betas.

In panel C, the average firm size for our sample of NYSE stocks ranges from $29 million for the smallest size portfolio to $5,381 million for the largest. We also find that in each size portfolio, the average firm size exhibits little variation across the beta sorted portfolios. Again, this supports the observation that size variation dominates variation in beta.

Panel D shows that, across the 49 portfolios, the average relative bid-ask spread ranges from 0.596% to 4.219%. As expected, there is a strong negative relationship between firm size and relative spread (0.672% for the highest size portfolio and 3.328% for the smallest). On the other hand, there is little variation across the beta-sorted portfolios.

In panel E, the average annual trading volume ranges from 1.15 million to 49.42 million shares. As expected, there is a strong positive relationship between firm size and trading volume (2.05 million shares traded, on average, for the smallest size group, and 44.73 million for the largest). In addition, although to a lesser extent, average manual trading volume is positively associated with pre-ranking betas.

3.2. Results of Cross-sectional Regression Tests

Table 2 shows time-series averages ofthe slopes from cross sectional, month-by-month Fama-Macbeth regressions of portfolio returns on beta, size, relative spread and average trading volume (equation (1)). Panel A presents the

Table 2

Average coefficient estimates (t-statistics) for Fama-Macbeth type regressions of the monthly portfolio returns on post-ranking beta, firm size, relative spread, and trading volume, Jan. 1973 - Dec. 1990.

Monthly returns on the 49 portfolios, which are formed each year preceding the test year t on the basis of pre-ranking beta and firm size, are regressed each month during the test year t against post-ranking beta, firm size, relative spread, and trading volume. The coefficients of the cross-sectional regressions are then averaged over the time period from January 1973 to December 1990. The t-statistic is the time-series average of the coefficients divided by its time-series standard error. In the cross-sectional regression, the portfolio beta is unconditional beta which is estimated using the full (January 1973 to December 1990) sample of monthly equal-weighted returns for each portfolio. Firm size [ln(size)] is the average of the market value of the equity for stocks in the portfolio at the end of year t-1. Spread is the average of relative bid-ask spread for each portfolio, where the spread for the stocks in the portfolio is computed by averaging relative spreads at the end of year t-1 and t-2. Trading volume [ln(volume)] is the average of the annual trading volume of the portfolio during year t-1.

Beta	Size	Spread	Volume
Panel A: All months			
0.0044			
(0.915)			
	-0.0014		
	(-2.019)		
		0.2732	
		(1.883)	
			-0.0007
			(-3.218)
-0.0025	-0.0011	0.1682	
(-0.504)	(-2.338)	(1.618)	
		0.1888	-0.0004
		(1.283)	(-2.753)
-0.0021	-0.0006	0.1958	-0.0002
(-0.416)	(-0.777)	(1.860)	(-1.492)

Table 2 (continued)

Beta	Size	Spread	Volume
	Panel B: January		
0.0823 (3.409)			
	-0.0141 (-3.991)		
		3.1358 (3.519)	
			-0.0044 (-2.779)
0.0366 (1.501)	-0.0023 (-0.905)	1.8032 (3.734)	
		3.1707 (3.381)	-0.0004 (-0.697)
0.0317 (1.315)	-0.0059 (-1.453)	1.6419 (3.403)	0.0003 (0.510)
	Panel C: Non-January		
-0.0027 (-0.621)			
	-0.0002 (-0.355)		
		0.0130 (0.107)	
			-0.0004 (-2.112)
-0.0061 (-1.226)	-0.0010 (-2.149)	0.0195 (0.198)	
		-0.0823 (-0.686)	-0.0004 (-2.675)
-0.0051 (-1.041)	-0.0001 (-0.139)	0.0644 (0.634)	-0.0002 (-1.812)

results for the full sample period, while panels B and C provide the results for the sample subdivided into January and non-January periods, respectively.

The results in panel A indicate that when each of the explanatory variables BETA, SIZE, SPREAD, and VOLUME are used alone as a single explanatory variable, the signs ofthe coeficients are consistent with those models in which the coeficients are estimated jointly. In univariate regressions, SIZE and VOLUME are significantly negative at the 0.05 level and SPREAD is significantly positive at the 0.10 level. However, consistent with Fama and French (1992), BETA is insignificant in all specifications, and thus has no power to explain average returns regardless of which variables are included in the regression test. When BETA, SIZE, and SPREAD are included in the specification, SIZE remains significantly negative, SPREAD remains significantly positive. when volume is added to the specification, the significance of the other coefricients declines.

In panel B, when only January returns are considered, the slope for the relative spread is significantly positive and persists even in the presence of other variables. This result is consistent with that of Eleswarapu and Reinganum (1993), who report that the spread premium is significantly positive only during in the month of January. In univariate regressions, consistent with the results of Tinic and west (1984, 1986) and Keim (1983) who report that the beta and size risk premia are significant only in January, the beta risk premium is significantly positive and the firm size premium is significantly negative. However, these premia become insignificant in joint regressions. In addition, the results in panel B indicate that although significantly negative in the univariate regression, the trading-volume premium is insignificant in January in the presence of other variables, In contrast to panel B, the results in panel C (for non-January months) indicate that only the volume premium is generally significant. In univariate regressions, VOLUME is significantly negative at the 0.05 level. When combined with the spread variable, it is significant at the 0.01 level, and when combined with all other variables, it is significant at the 0.10 level. The significance of the size risk premium (which is significant at the 0.05 level when combined with

BETA and SPREAD) disappears in the presence of VOLUME. In addition, the spread premium completely disappears in the non-January period. These results are surprising, and indicate that the volume premium makes itself felt most when the spread premium is weakest -i.e., in non-January months.

3.3. Results of control podfolio tests

To further investigate the results of Table 2, we conducted control portfolio tests, As described above, we first estimated residual (excess) stock returns by taking the difference between the return on the security and the return on its constituent size/spread portfolio. The excess returns are then used in dummy variable regressions (equation (2)). The results are repoaed in Table 3.

As in estimates of equation (1), we estimate equation (2) using the full sample, and then subdivide the sample into January and non-January returns. For all months, although the signs of all coefficients (a_2 thorough a_7) are negative, none of them are significant. In addition, the-F-statistic, which tests the joint significance of the coefficients of the dummy variables, is insignificant.

When the sample is partitioned into January and non-January returns, however, the results change dramatically. For the January subsample, the coefficients increase monotonically and are significant at the 0.01 level for a_1, a_2, a_6, and a_7. The F-statistic is also significant at the 0.01 level. On the other hand, for the non-January months, the coefficient a_1 is significantly positive at the 0.05 level. The remaining coefficients are negative. The coefficients a_2 and a_4 are significant at the 0.05 level, and a_7 at the 0.01 level. The F-statistic is also significant at the 0.05 level. These results support those of Table 2, and suggest that volume has a usefull role in liquidity measurement along with the bid-ask spread. The results in Tables 2 and 3 are also consistent with a pervasive liquidity effect thoughout the year, in that the liquidity premium is significant in one form or another (either as a spread premium in January or volume premium in non-January months)

Table 3

Monthly excess returns on seven portfolios formed with stocks sorted by trading volume, Jan. 1973 -Dec. 1990.

Excess returns are computed as the monthly returns on the stocks in the sample less the (equal-weighted) average monthly return on the stock's constituent control portfolio. The control portfolios are formed each year preceding the test year t by allocating the stocks in the sample to seven portfolios on the basis of their market value of equity at the end of year t-1 and then subdividing each portfolio into seven spread portfolios on the basis of average relative bid-ask spread during year t-1. Average monthly excess returns are then computed for seven equally weighted portfolios, which are formed on the basis of total trading volume during year t-1. To report the differences in the average excess returns across the seven volume-ranked portfolios and perform statistical tests, the following dummy-variable regression model is used:

$$X_{i,t} = a_1 + a_2D_{2t} + a_3D_{3t} + a_4D_{4t} + a_5D_{5t} + a_6D_{6t} + a_7D_{7t} + e_{i,t}$$

$X_{i,t}$ is the monthly excess returns (in percent) for stock i at month t. The dummy variables, D_{2t}, ... ,D_{7t}, have a value of 1 if stock i belongs to the volume portfolio 2, ... ,7 at month t, respectively, and 0 otherwise. The time-series average excess return for portfolio 1, the lowest volume portfolio, is measured by a_1, while the estimates of D_{2t} through D_{7t} represent the differences between the excess return for the portfolio 1 and the excess returns (in percent) for the portfolios 2 through 7. The statistical significance of each estimate for a_2, ... ,a_7, is measured by a t-statistic reported in parenthesis. The F-statistic (p-value) measures the joint significance of the dummy variables.

Period	a_1	a_2	a_3	a_4	a_5	a_6	a_7	F-statistic [p-value]
All months	0.0423 (0.735)	-0.1329 (-1.632)	-0.0242 (-0.298)	-0.0243 (-0.298)	-0.0345 (-0.425)	-0.0251 (-0.309)	-0.0552 (-0.680)	0.563 [0.761]
January	-0.8945 (-3.676)	0.4898 (1.424)	0.7003 (2.036)	0.3857 (1.121)	0.9132 (2.658)	1.7082 (4.973)	2.0505 (5.971)	9.220 [0.000]
Non-January	0.1285 (2.186)	-0.1902 (-2.290)	-0.0909 (-1.094)	-0.0621 (-0.747)	-0.1217 (-1.467)	-0.1841 (-2.222)	-0.2481 (-2.996)	2.117 [0.048]

4. Summary and Conclusion

Amihud and Mendelson (1986) suggest a famework for investigating the existence of a liquidity premium in expected returns. The major testable implication of their model is that expected returns are a concave, increasing function of liquidity, measured by the bid-ask spread. This paper investigates whether trading volume serves as a complementary liquidity measure to the bid-ask spread, using both a specification similar to that of Fama and French (1992) and a control poafolio procedure. The results of these two approaches were consistent and mutually supportive.

The results of this study suggest that trading volume is a relevant measure of liquidity. We find that trading volume affects expected stock returns even after controlling for systematic risk, firm size, and the relative bid-ask spread. The negative signs associated with the volume premia observed in this study indicate that investors require a higher rate of return on low trading-volume stocks. In addition, volume is a complementary liquidity measure to the relative bid-ask spread, and provides additional information about a security's liquidity. Previous studies (e.g. Eleswarapu and Reinganum, 1993) conclude that the liquidity egect, measured by the bid-ask spread, is primarily a January effect. This paper finds evidence of a pervasive liquidity effect throughout the year. When trading volume is included as an additional liquidity measure, the liquidity effect emerges as a volume effect in non-January months, and a spread effect in January.

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