A Liquidity-Augmented Capital Asset Pricing Model

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A stock's liquidity is an important factor for large institutional investors and portfolio managers. In the vein of the now well-known Fama–French three-factor model, the author further explores the relationship between priced risk factors and stock returns. Specifically, the author develops a new measure of liquidity and shows that a two-factor (market and liquidity) model well explains stock returns and also accounts for the book-to-market effect.

Trading quantity, trading speed, trading cost, and price impact are the four dimensions to liquidity, but so far, little research has been done on the trading speed dimension. Past studies used measures of liquidity that were incomplete in capturing all four dimensions of liquidity. Furthermore, few studies have incorporated a liquidity risk factor into an asset pricing model or explained anomalies from the standpoint of liquidity risk. This study fills the gap in three aspects—measuring liquidity, incorporating liquidity into asset pricing, and relating liquidity to anomalies.

The author introduces a new measure of stocks' liquidity: the standardized turnover-adjusted number of zero daily trading volumes over a certain period, say, 12 months. The zero-trading-volume days specifically capture "lock-in risk," reflecting the danger that the stock cannot be sold in extreme cases. The turnover adjustment incorporated into the model identifies stocks with larger turnovers as more liquid—given the same number of zero daily trading volumes. Another aspect of this measure is that it also reflects the trading cost dimension of liquidity.

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For empirical analysis, the study uses the daily trading data for all NYSE/Amex/NASDAQ common stocks during the period from January 1960 through December 2003. The data for quite a few variables—daily trading volume, number of shares outstanding, bid and ask prices, monthly return, market value (MV), B/M (book-to-market ratio), cash flow-to-price (C/P), earnings-to-price (E/P), and dividend yield (D/P)—are extracted from CRSP/Compustat databases. The measure of liquidity is LM12, which is the turnover-adjusted number of zero trading volumes over the previous 252 days—the approximate number of trading days in a year. Therefore, the larger the value for LM12, the less liquid the stock.

The research design involves forming portfolios by different criteria—LM12 or B/M. Portfolios formed at the beginning of each month and held for different time periods (1, 6, 12, and 24 months) are compared. A robustness check is done by examining characteristics-adjusted holding-period performance using three characteristics—MV, B/M, and TO12 (average daily turnover over the previous 12 months).

Major findings are as follows. By the new liquidity measure, least liquid stocks (high LM12 values) have these characteristics: small size, value oriented, low turnover, large bid–ask spreads, and large absolute-return-to-volume ratios. Findings reveal a "significant and robust" liquidity premium over and above the systematic risk premium and the Fama–French three-factor risks. There is also evidence of enhancement of the liquidity premium after adjustment for the capital asset pricing model (CAPM) or the Fama–French three-factor model. The existence of a significant liquidity risk premium is further suggestive of its importance for asset pricing. The two-factor (market and liquidity) model explains market anomalies and contrarian premiums associated with MV, B/M, C/P, E/P, and D/P.

In portfolios formed by MV, the B – S (least liquid – most liquid) difference is statistically significant for all portfolios except for the high-MV group. Obviously, there is no liquidity premium for large-size stocks that are liquid.

Both the CAPM and the Fama–French three-factor models are inadequate in capturing liquidity risk. The CAPM is found to perform poorly with respect to less liquid portfolios, and even the

adjusted betas cannot account for the performance of less liquid portfolios and the liquidity premium. In the Fama–French three-factor model, the size factor is found to have a limited ability to account for the liquidity premium.

Separate analysis of two subperiods (January 1963 to December 1983 and January 1983 to December 2003) reveals that evidence relating to the liquidity premium is not period specific. Furthermore, both the CAPM and Fama–French three-factor models performed poorly in both subperiods.

Seasonality analysis over the full sample period reveals that the liquidity premiums for January are much larger, at 2.484 percent, compared with 0.518 percent for non-January months—both being statistically significant. This January liquidity premium effect persists in both subperiods but declines to 1.933 percent during the second subperiod (January 1983 to December 2003).

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