Physica A 458 (2016) 52–66

Contents lists available at ScienceDirect

Physica A

journal homepage: www.elsevier.com/locate/physa

# Illiquidity premium and expected stock returns in the UK: A new approach

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## HIGHLIGHTS

- A single illiquidity measure is proposed to capture the multidimensionality of illiquidity.
- Both parametric and non-parametric methods are applied to investigate the relationship between illiquidity and stock returns in the UK.
- The inclusion of the illiquidity factor in the capital asset pricing model plays a significant role in explaining stock returns.
- The illiquidity-augmented capital asset pricing models yield a small distance error by using Hansen–Jagannathan non-parametric bound.

## ARTICLE INFO

*Article history:*
Received 8 October 2015
Received in revised form 26 January 2016
Available online 6 April 2016

*Keywords:*
Asset pricing models
Multiple illiquidity measures
Hansen–Jagannathan test

## ABSTRACT

This study examines the relative importance of liquidity risk for the time-series and cross-section of stock returns in the UK. We propose a simple way to capture the multidimensionality of illiquidity. Our analysis indicates that existing illiquidity measures have considerable asset specific components, which justifies our new approach. Further, we use an alternative test of the Amihud (2002) measure and parametric and non-parametric methods to investigate whether liquidity risk is priced in the UK. We find that the inclusion of the illiquidity factor in the capital asset pricing model plays a significant role in explaining the cross-sectional variation in stock returns, in particular with the Fama–French three-factor model. Further, using Hansen–Jagannathan non-parametric bounds, we find that the illiquidity-augmented capital asset pricing models yield a small distance error, other non-liquidity based models fail to yield economically plausible distance values. Our findings have important implications for managing the liquidity risk of equity portfolios.



## 1. Introduction

The role of liquidity in asset pricing has grown rapidly over the past few years. A variety of studies have proposed different illiquidity measures as proxies for illiquidity by investors. However, although researchers are able to test whether the stock returns are statistically related to their illiquidity measures, their results generate conflicting impacts over stock returns. In other words, despite the increasing interest in the role of liquidity in equity markets in general, and asset pricing in

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http://dx.doi.org/10.1016/j.physa.2016.03.035
0378-4371/

particular, a universal definition for liquidity remains elusive, and the basic question of how to measure liquidity remains unsolved.[1] For example, Hasbrouck [1] and Goyenko, Holden, and Trzcinka [2] find that the measures are of a different quality themselves. They find that different measures have conflicting impact on stock returns: Amihud's price to volume measure is reported to have significant impact on stock returns but Pastor and Stambaugh's gamma is tested to have very little impact. In fact, if the empirical results are based solely on one particular measure, it is difficult to ascertain whether the results are driven by measure-specific components or by some common components of the measured illiquidity. Therefore, it is important to reconcile the conflict by collapsing all existing measures into one measure. Given the fact that strong evidence against the reliability of a single illiquidity measure exists, in this paper we adopt not only individual measures, but also construct a comprehensive illiquidity proxy. This illiquidity proxy is used across seven different measures and examines whether the pricing of liquidity risks varies amongst these measures. In particular, we adopt illiquidity measures introduced by Amihud [3], Stambaugh [4], zero-return measures proposed by Lesmond, Ogden, and Trzcinka [5] and Liu [6], Roll's [7] effective bid–ask spread measure [7], the price-based spread measure of Corwin and Schultz [8] and the effective tick measure from Ref. [2]. Consistent with Korajczyk and Sadka [9] and Kim and Lee [10], we find around 33% of the variation in illiquidity proxies is explained by the first principal component, which further suggests that systematic common components exist in illiquidity measures.

Our study contributes to understanding of the seemingly contradictory effects of illiquidity on asset pricing in several ways. It is generally the case that recent researchers have focused on new factors that contribute to traditional asset pricing models. Indeed, Fama and French [11] propose a brand new five-factor model while adopting indirect factor to denote liquidity. In contrast, in our approach we use UK data and examine the price of the common systematic components of illiquidity. There are indeed differences between the UK and the US environment in terms of trading and market structure. In the UK, all trading takes place on the London Stock Exchange (LSE) whereas in the US stocks are traded primarily on the Nasdaq and NYSE. In the US, trading on Nasdaq is based on order book driven while the NYSE uses a hybrid system. In the case of the UK, trading on the LSE is a mix of order book driven (SETS) and a hybrid quote/order book driven system. Furthermore, the UK is a bank-based system, which is more vulnerable to liquidity crunches than capital market-based system (US) because the first-order risk is bank solvency and the level of risk lies with financial institutions [12]. Since most studies on illiquidity premium and expected stock returns are predominantly based on US data, in this paper we seek to investigate if differences in market structure and liquidity characteristics of a country will lead to different results [13,14]. In this paper, we define 'illiquidity factor' as the spread return of equal-weighted portfolios $P10$–$P1$. These portfolios are constructed on the basis of the first principal component of the first seven illiquidity measures. Further, rather than the conventional parametric tests of asset pricing models, we use Hansen–Jagannathan distance to examine non-parametrically the level of errors associated with the liquidity capital asset pricing model (LCAPM). This helps shed light on these errors as an indication on the efficiency of the models.

This paper aims to provide answers to a number of questions. Firstly, based on existing illiquidity measures, is there a single illiquidity proxy that can significantly outperform other proxies with robust illiquidity premiums in asset pricing models in the UK? Secondly, does liquidity commonality exist in the UK? Thirdly, which liquidity-adjusted asset pricing model explains stock returns in the UK? Finally, do the results vary between parametric and non-parametric tests?

The remaining part of the paper is set out as follows. Section 2 provides a brief review of the literature on the illiquidity framework. Section 3 provides details of the methodology and models we used to answer our questions. Section 4 presents the data and variable construction. Section 5 presents the empirical results and Section 6 concludes.

## 2. Literature review

What kinds of risk systematically drive stock prices? This question has prompted vast amounts of research and continues to exist as one of the main challenges in finance. The Sharpe–Lintner CAPM (1964) was the first attempt to answer this question by quantifying the risk which is attributable to general market fluctuations [15].

Yet, although the Sharpe–Lintner CAPM provides a theoretical framework to explain stock returns, the ability of the model to describe asset returns is weak. Indeed doubts regarding the empirical validity of the model are well established and it is both frequently rejected by data and also known to ignore some well documented anomalies, see *inter alia* [16–20]. Traditional tests of the CAPM assume that the market portfolio is observable, expected returns are constant, and that assets' betas are stationary over a fixed period. Further, it measures risk by beta, which is a consequence of its questionable assumption of the existence of an equilibrium in which investors display mean–variance behaviour and requires the distribution of stock returns to be symmetrical.

The failure of the Sharpe–Lintner CAPM to capture the behaviour of the data and to measure a stock's or a portfolio's volatility has led to a number of different approaches that have attempted to address the limitations of the model. For instance, the three-factor model [21] and the [22] model have received significant attention in empirical research. Whilst Fama and French [21] demonstrate that asset prices are influenced not only by market systematic risk, but also the size and value factors, Carhart [22] argues that momentum is an important risk factor which has not been priced in assets.

[1] Liquidity is a broad and elusive concept that generally denotes the ability to trade large quantities quickly, at low cost, and without moving the price.