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Liquidity risk and stock returns around the world

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ABSTRACT

The recent global financial crisis demonstrates that market liquidity is a prominent systematic risk globally. We find that *local* liquidity risk, in addition to the *local* market, value and size factors, demands a systematic premium across stocks in 11 developed markets. This local pricing premium is smaller in countries where the country-level corporate boards are more effective and where there are less insider trading activities. We also discover that *global* liquidity risk is a significant pricing factor across all developed country market portfolios after controlling for *global* market, value, and size factors. The contribution of this risk to the return on a country market portfolio is economically and statistically significant within and across regions.

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1. Introduction

The recent financial crisis has had a severe and prolonged impact on equity markets and economies around the world. It first started hitting the equity markets in July 2007 after investment banks and commercial banks reported substantial write-downs related to mortgage-backed securities caused by the US subprime crisis. Initially, the market participants and governments around the world played down the severity of the crisis until the US government refused to rescue Lehman Brothers, which was forced to file for bankruptcy protection on September 15, 2008, creating the domino effect of the global liquidity crisis. The shocks of market liquidity wiped out Lehman Brothers, and also resulted in Washington Mutual, Merrill Lynch, and Wachovia being taken over by their competitors.¹ The shortage of market liquidity quickly spread all over the world and interbank lending rates surged across the globe.²

In Europe, governments had to bail out big lenders such as HBOS, Hypo Real Estate, and B&B. The credit crunch enlarged the impact of market liquidity risk on asset values and led to investors' fears of severe global economic recessions.³

More significantly, the dry-out of liquidity and fears of recessions caused a 20% drop in the equity markets around the world in the second week of October 2008.⁴ This was the worst week in the recent history of stock markets worldwide. Due to investors' continued fears of market illiquidity and recessions, global equity markets continued to drop until March 2009. The equity market at one point lost over \$7 trillion in the US and \$30 trillion worldwide during this global crisis period. In percentage terms, the US equity market dropped by over 46% while other major stock markets dropped by between 40% and 60% during the period from September 2008 to March 2009. While a dry-out of liquidity can reduce asset values, an ample supply of market liquidity can help asset prices recover from their distress.⁵ However, Huang and Wang (2010) show theoretically that the market force can fail to lead the supply of liquidity and suggest that there is a need for intervention from policy makers. This is demonstrated by the fact that global equity markets surged

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¹ The failure of Washington Mutual is the biggest banking failure in US history. Bear Stearns was taken over much earlier (March 2008) by JPMorgan Chase with the US Federal Reserve asset guarantees. Other financial institutions including Freddie Mac, Fannie Mae, and Citigroup were either bailed out by or received substantial fund injections from the US government.

² The Euro overnight inter-bank lending rate, Euribor, peaked at 5.09% even after the European Central Bank cut the interest rate to 3.75% and the Federal Reserve cut the interest rate to 1.5%. The Yen interbank lending rate also surged to 0.9%, an 0.4% spread over the Japanese central bank's 0.5% overnight lending rate. Furthermore, on September 30, 2008, the US dollar overnight inter-bank borrowing cost, Libor, surged to 7.88%, a 5.88% spread over the Federal Reserve's 2% overnight funding rate on September 30, 2008.

³ A Japanese insurer, Yamato Life Insurance, also declared bankruptcy after the largest American insurer, American Insurance Group (AIG), received a \$100 billion bailout from the US government.

⁴ The US stock market lost over \$2.3 trillion in this week while the global stock market suffered a loss of over \$6 trillion. In percentage terms, the Dow Jones index and the S&P 500 index each dropped by more than 20% and the Morgan Stanley Capital Indicator (MSCI) world index also dropped by more than 20%.

⁵ Fang et al. (2009) show that a firm's liquidity level can improve its valuation as measured by the market-to-book ratio.

more than 6% on October 12, 2008, after central banks around the world promised unlimited access to liquidity through providing unlimited dollar auctions to banks and guaranteed all deposits in banks. The global equity markets recovered by over 70% as of March 31, 2010 from the trough of the crisis on March 9, 2009, after the central banks of developed countries decided to coordinately supply market liquidity and reduce market-wide liquidity risk.

Market liquidity has become an important issue since the collapse of Long-Term Capital Management (LTCM), a large hedge fund, in 1998. When the Russian debt crisis precipitated a widespread deterioration in liquidity across countries and markets, LTCM's over-leveraged portfolio dropped sharply in value and the company had to liquidate its illiquid assets to meet margin calls.⁶ The anticipation of a costly liquidation in a low-liquidity environment further eroded LTCM's position and caused a short-term market crash around the world before the Federal Reserve stepped into stabilize the financial markets. Ever since there has been a wide range of studies on liquidity in the US market that captured investors' attention. For example, Pástor and Stambaugh (2003) use a complex regression to estimate the market liquidity level and find that the pricing premium of market liquidity risk is higher than the market premium in the US. Bekaert et al. (2007) employ the portion of the zero daily returns over a month as their illiquidity measure and find that it significantly predicts stock returns in 18 emerging markets. They also document that unexpected illiquidity shocks are positively correlated with stock returns and negatively correlated with dividend yields. Amihud (2002) proposes a market-wide illiquidity measure that has a negative correlation with market returns. Acharya and Pedersen (2005) develop a liquidity-based capital asset pricing model (LCAPM) to illustrate how the covariance between the stocks' trading cost, namely illiquidity, and market return, the covariance between stock return and market illiquidity, and the covariance between a stock's illiquidity and market illiquidity jointly determine stock returns. Lee (2011) uses zero return ratios as the stock illiquidity and takes the simple average of stock illiquidity as the local market-wide illiquidity. He finds that the sum of the above covariance as the liquidity net betas at the local market level is priced at the stock level in the US market but not in the developed and overall world markets. However, he finds the sensitivity of stock returns to the market-wide illiquidity based on his measure is not locally priced in emerging markets, developed markets and the overall market. In addition, Lee (2011) replaces the local market illiquidity with global market illiquidity, namely the simple average trading cost of stocks in the world, and finds that the net liquidity beta, namely the sum of the abovementioned covariance, is priced across stocks. He finds that the covariance between the trading cost of a stock and the global market return is the driving force of this result while the covariance between a stock's return and the global market illiquidity is not priced in developed and emerging markets. He also decomposes global factors into US factors and non-local and non-US factors and finds that the covariance between a stock's illiquidity and the US market return significantly affects that stock's expected return and that the liquidity risk is not priced with respect to the non-local and non-US factors. He argues that these findings suggest that the US market plays a key role in the pricing of global liquidity risk, namely the unexpected component of the average stock trading cost in the overall world market.

The above episodes demonstrate that market liquidity can be a prominent systematic risk across stocks and other securities around the world. However, there is still a lack of empirical studies on whether the local market liquidity risk, i.e., the local market liquidity shock, is a systematic pricing factor across stocks in addition

to Fama and French's (1998) market and value factors within each of the developed markets. It is also unclear whether the covariance between a stock's return and the local market liquidity risk as the liquidity risk beta is priced across stocks in a country. Further nobody knows how the *local* market liquidity risk affects the returns of individual stocks within a developed country and how the *global* liquidity risk is priced across the portfolio returns of developed markets if investors invest in market portfolios that are locally diversified. It is also unknown to investors how the market liquidity risk premium is related to country-wide corporate governance. The purpose of this paper is to fill this gap by using two widely used market-wide liquidity measures.

Investors can benefit from investing abroad. First, if they invest in countries with higher economic growth, they can potentially enjoy higher returns. Second, these investors can also enjoy the benefits of international diversification as documented by De Satis and Gerard (1997). However, by investing globally, investors must bear two levels of systematic risk: one on the individual stocks within a country and the other on the market portfolios at the global level. Fama and French (1998) find that the market and value factors are common risk factors for stocks in several developed markets. After the recent financial crisis, global investors are eager to find out whether or not the shock in market liquidity is globally a systematic risk factor and if yes, how it affects equity returns around the world. It is crucial for global investors to understand how market-wide liquidity risk is priced for stocks at the local level (i.e., local liquidity risk) and for locally diversified market portfolios at the global level (i.e., global liquidity risk).⁷

Due to diverse cultures, international investors behave differently in various markets. As documented by Leuz et al. (2003) and La Porta et al. (1998), legal systems and corporate governance mechanisms have important influences on stock markets. Bekaert et al. (2007) document that investors' perception of a country's legal system and political risk can have an influence on the liquidity pricing and asset returns in emerging markets. Chung et al. (2010) find that good corporate governance of firms improves their liquidity as measured by the bid-ask spread and the price impact. We therefore investigate whether the pricing premium of the liquidity risk factor is related to country-level corporate governance and market regulations.

The recent literature has given at least two market-wide liquidity measures. The market liquidity risk measure proposed by Pástor and Stambaugh (2003) is the unexpected increase or decrease in market-wide liquidity. This liquidity measure captures the price reversal of underlying assets. Easley and O'Hara (2010) show in their model that illiquidity of assets arises from uncertainty. Chordia et al. (2009) show that their theoretically estimated illiquidity is cross-sectionally priced in the US market. We therefore investigate whether Amihud's (2002) market-wide illiquidity measure is a pricing factor across stock markets. Amihud's (2002) measure captures the price pressure of underlying assets.⁸ He shows that a decrease in *market* liquidity has a negative impact on stock prices, with a greater effect on illiquid stocks than on liquid stocks. This phenomenon is known as the "flight-to-liquidity" effect. He also documents that an unexpected increase in market illiquidity has a negative impact on stock returns in the US market.

We start off with the two market-wide liquidity measures suggested by Pástor and Stambaugh (2003) and Amihud (2002). To

⁶ LTCM had a position of over US\$ 1 trillion and managed a fund worth just under US\$ 5 billion.

⁷ Investors can avoid costly idiosyncratic risk at the stock level by investing in locally diversified market portfolios through exchange-traded funds (ETFs). It is noted that the liquidity of the markets where the assets are traded is more important than that of the traded ETFs, because the prices of ETFs should reflect the liquidity risk of the underlying assets rather than the liquidity risk of ETFs.

⁸ The dollar trading volume can cause the price of a stock to go up or down when it is illiquid.

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