Assessing Asset Liquidity Risk is a major source of concern for Financial Institutions; despite that many methods flourish in the modern literature, this paper focus on evaluating the robustness of a single method built on cross-sectional returns. Could comparing security returns to benchmark returns allow segregating a change in the liquidity condition of a security? This is the core problem question that will be investigated within this working paper.

1. Introduction

Being responsible of identifying, assessing and monitoring Liquidity Risk, Financial Institutions must adopt sound management of Liquidity Risk conforming to regulatory requirements and privilege appropriate tolerance Risk levels in line with their business activities.

Liquidity Risk is a large and confusing subject, according to Persaud (2003), the principal challenge is not the average level of financial liquidity itself, but rather the variability and uncertainty of the latter. According to Agrippino and Rey (2012) there is no single variable capturing global liquidity condition, but a whole range of variables including prices and volumes that need to be considered. If very advanced models could be implemented to assess the Asset Liquidity Risk, this paper aims to investigate the robustness of a method based on the cross-sectional analysis of stock returns over appropriate benchmarks.

Because the barrier between Liquidity, Credit, and Market Risk is sometimes thin, we do not expect to demonstrate that the cross-sectional approach succeeds to segregate a liquidity signal with 100% certainty; but we rather expect obtaining an early warning of market divergences where Liquidity Risk aspects would require to be confirmed.

For convenience purposes, this paper focus on stocks, it is nevertheless expected to implement this approach - with minor amendments - to other asset classes (*eg.* fixed income, funds, etc.).

This paper is organised as follows: the first Section is dedicated to defining what Asset Liquidity Risk is, the second Section is committed to investigate how robust is the cross-sectional approach to assess a liquidity distress, the third Section is devoted to building a liquidity control framework based on the cross-sectional approach, the fourth Section is dedicated to an in-depth analysis of the anomalies segregated thanks to the Risk framework, the last Section is devoted to a brief conclusion.

2. Defining Asset Liquidity Risk

One wondering about defining and assessing Asset Liquidity Risk should consider if he is more concerned about the time required to liquidate an exposure or rather the cost impact of liquidating this exposure?

According to the BIS, Liquidity Risk is defined as *the Risk of being unable to liquidate a position in a timely manner and at a reasonable price*. This requires from traders to minimize the sum of the execution costs - the price concessions required completing transactions with immediacy - and the opportunity cost, the cost of waiting before liquidating a position.

Liquid markets usually exhibit the following features: tightness (low transaction costs), immediacy (speed at which the order can be executed), depth (significant market volumes), breadth (important volumes with minimal impacts on prices), resiliency (any imbalances in prices generating arbitrage opportunities are rapidly corrected).

Several methods thrive in modern finance literature to assess Asset Liquidity Risk, for instance the Amihud Illiquidity Factor, the Liquidity Adjusted Market-VaR measures or an advanced CAPM model where the net Beta is decomposed into different forms of liquidity Betas. This paper will only focus on one method, the cross-section of returns.

3. Cross-Sectional Analysis of Stock Returns

A cross-sectional analysis between stock returns and benchmark returns offers as a main advantage of being an easy to implement method. Before claiming that a liquidity shock can be spotted thanks to this approach, some questions need to be answered:

- Could the amplitude of stock returns be a signal of Liquidity Risk?
- Could spreads between stock and benchmark returns confirm a Liquidity Risk signal?
- Could the Pearson correlation coefficient or the standard error bands confirm a change in the liquidity conditions?

With the support of empirical studies, those questions will be answered into the below Subsections.

3.1. Could the Amplitude of Stock Returns be a Signal of Liquidity Risk?

Many empirical studies investigating if stock returns are cross-sectionally related to firm-specific liquidity variables or to market-wide liquidity variables have been performed these last few years. Those publications usually demonstrate that liquidity factors tend to impact stock returns via the Systemic Risk.

Pastor and Stambaugh (2003) investigate how market liquidity could be considered as a state variable for asset pricing. An investor holding a security with high sensitivity to liquidity faces a higher likelihood to liquidate its position when the liquidity is low, making then the liquidation costlier. Their analysis is based on cross-sectional differences in expected returns to the sensitivities of returns to fluctuations in aggregate liquidity. Based on daily data historical regressions, they obtain that the order flow induces greater return reversals when liquidity is lower. Other empirical studies including Amihud and Mendelson (1986) or Brennan and Subrahmanyam (1996) show that stock returns tend to be higher when the Liquidity Risk is high. By focusing on firm specific variables such as trade volumes or turnover, Chordia, Subrahmanyam and Ashuman (2001) also demonstrate that more volatile stocks have higher expected returns.

In a Risk oversight context, this Section confirms that – even if not a sufficient condition – the size of returns also embodies a Liquidity Risk component. This component can be systemic or idiosyncratic. Considering this evidence, extreme abnormal returns could then be generated by stressed liquidity conditions and require to be investigated further.

3.2. Could Spreads Between Stock and Benchmark Returns Confirm a Liquidity Risk Signal?

Analysing bond spreads or bid-ask spreads to assess Liquidity Risk has extensively been discussed in the modern literature; but investigating if higher spreads between benchmark returns and stock returns could help extracting a Liquidity Risk signal has far less been discussed.

At this stage, we know that stock returns can partially be explained by a liquidity component, but it is still confuse to separate the systemic effect from the idiosyncratic one; we expect in this Subsection to segregate those two effects. If the distance between the stock return and the benchmark return increases, could we interpret this higher spread as a lower liquidity of the stock, independently from the market-wide liquidity?

Ibbotson and al (1995) investigate if investing in less liquid stocks in period of market volatility and large down-side stress could generate higher returns for investors; they note that liquidity strategy - strategy that focus on investing in less liquid stocks - effectively beats the benchmark by generating limited downside capture and that in equilibrium the cost for investors of trading less liquid stocks has to be compensated by higher returns. Their findings are consistent with the analysis of Wu (2012) finding that the distance between the most extreme observations and the benchmark could explain extreme illiquidity events.

This Subsection confirms that analysing the distance between stock returns and benchmark returns could be used to assess a change in the liquidity condition of a stock. Extreme downside or upside returns of a given stock compared to benchmark returns can be representative of a liquidity premium. Please note that the benchmark selection process is crucial, and that a reliable, transparent, unambiguous and independent benchmark has to be picked in order to draw meaningful conclusions.

3.3. Could the Pearson Correlation Coefficient or the Standard Error Bands Confirm a Change in the Liquidity Conditions?

As discussed here-above, stock returns and spreads between stock returns and benchmark returns can be used to highlight a change in the liquidity condition; but could a change in the Pearson Correlation coefficient between stock and benchmark returns be used to confirm this signal? Based on several empirical studies performed on the interdependences of the Liquidity Risk and the Correlation Risk, performed on the correlation between expected returns of a stock and liquidity factors impacting returns of a benchmark we expect to demonstrate that a variation in the Pearson Correlation Coefficient can be used for that purpose.

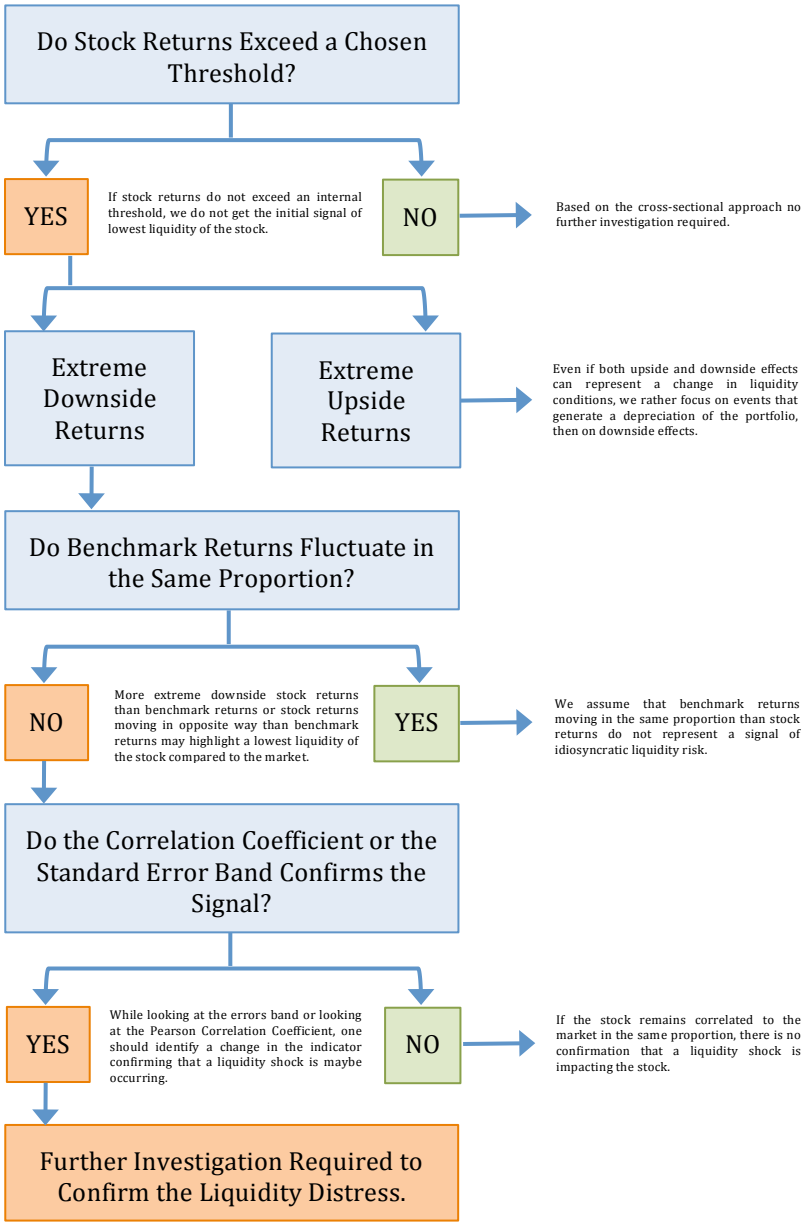
Acharya and al (2008) show that liquidity effects can cause fluctuations in correlations. For the Hedge Fund industry, Fung and Hsieh (2004) also find that Mutual Funds and Hedge Funds investing in a very similar manner share a common return component. It is then not unreasonable to conclude that any change in the liquidity condition of a stock at the idiosyncratic level should be followed by a change in the correlation structure with the benchmark.

A variation in the Pearson correlation coefficient between stock and benchmark returns is not sufficient to explain a change in the liquidity position; but combined with other indicators, it can be used to confirm a signal. A significant drop of the correlation coefficient could be interpreted as worsened liquidity conditions at the stock or at the benchmark level.

4. Building a Liquidity Risk Framework on the Cross-Sectional Approach

Comparing stock returns to benchmark returns - even if not the most rigorous approach for assessing Liquidity Risk - presents several advantages: first this process is easy to implement, second this technique can be used with common market tools (*eg.* Bloomberg), third this approach can be applied on an intra-day basis.

Bear in mind the anomalies spotted thanks to the cross-sectional approach can be explained by a lowest market liquidity or security liquidity, but also by other market or credit factors; this is the responsibility of the analyst to further investigate the source of the abnormality.



5. Going Forward: In-Depth Analysis of an Hypothetic Liquidity Distress

Once the cross-sectional approach has detected an anomaly, it has to be confirmed or invalidate that this abnormality is due to a liquidity event. This can only be achieved by an in-depth investigation of the asset characteristics and of the market structure.

Adopting an approach to confirm the liquidity distress depends on the asset type (*eg.* stock, fixed income, fund, derivatives, *etc.*) and on the trading aspects (*eg.* OTC, ETD). We propose in this Section some properties that could be considered to further investigate the liquidity profile of the security.

Depending on data available, using the Amihud illiquidity factor (average daily returns in absolute values by dollar volumes), or looking at the bid-ask are easy way to proceed. According to the BIS, some other qualitative appraisals can also be performed, this implies considering the probability of default of the asset, the flight to quality, the volatility, the remaining time to maturity, the price transparency or the standardisation of asset features from an asset characteristics point of view, or the trading venues, the market size, the issue size, the related financing markets, and the market participation of the market makers from a market structure characteristics point of view.

6. Conclusion

It can be challenging to identify a change in the liquidity structure of a security, and even more challenging to segregate a liquidity shock from a market or a credit event. Using cross-sectional returns to stress out a change in the liquidity condition at the security level or at the market level offers as main advantages of being easy to implement on an intra-day basis, and of not requiring very advanced analytics tools.

We expected to demonstrate within this paper that any widening distance between stock returns and benchmark returns could be explained by a liquidity event occurring at the systemic or idiosyncratic level of the security. Any spotted discrepancy does not necessarily mean that the liquidity condition has changed, and this is then the responsibility of the analyst to perform in-depth analyses to confirm or invalidate the liquidity distress.

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