Illiquidity and Stock Market Returns during Financial Crises in India

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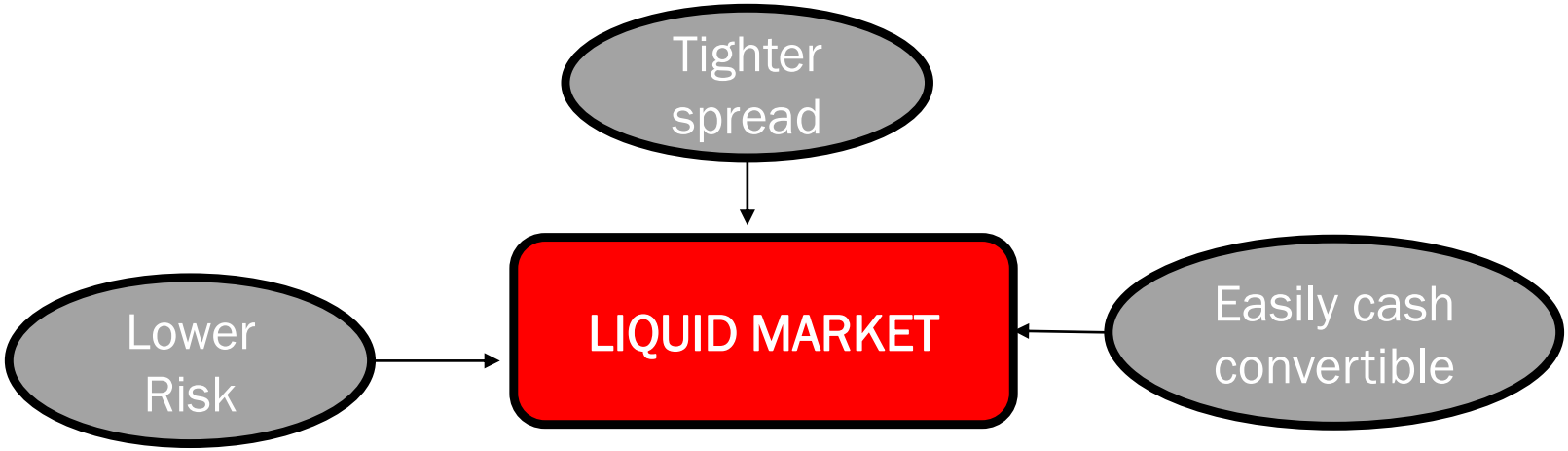
Introduction

What is Liquidity?



What is Liquidity?

- Liquidity is a multi-dimensional concept, generally referring to the ability to execute large transactions with limited price impact and tends to be associated with low transaction costs and immediacy in execution.
- A liquid market has a lower risk because there is generally someone willing to take the position of a buyer and seller.
- A more liquid stock will have a tighter spread because market participants will be able to quickly buy and sell, with a lower risk of being left with an undesired position in the stock.
- Liquidity involves the trade-off between the price at which an asset can be sold, and how quickly it can be sold.

Dimensions of Liquidity

The following dimensions of liquidity are discussed in detail in the paper.

Dimensions of Liquidity	Description	Formulae
Immediacy	Immediacy typically refers to the time it takes to complete a transaction. Market makers are a constant source of immediacy. Under an agency trading system, finding a trading match/partner depends on frequency of transactions and constant depth of trading interest in the security by investor.	• $\boldsymbol{Coefficient\ of\ Elasticity\ of\ Trading} = \%\Delta T/\%\Delta P$ • $\%\Delta T$= Percentage change in daily trading volume • $\%\Delta P$= Percentage change in dailynclosing price
Depth	A market is deep when there is a large flow of trading orders on both the buy and sell side on a frequent basis and there needs to be a constant interest and willingness to trade. With large orders in both directions, trading volumes should be high, and the price impact of larger trades should be lower, creating lower volatility and resiliency.	• $\boldsymbol{Share\ Turnover} = \frac{VO}{SO}$ • VO=Number of shares traded on any ith day • SO=Number of shares outstanding on that ith day
Breadth	Breadth typically refers to the consistency with which liquidity is distributed within asset classes and the differences in liquidity characteristics across markets. This can be captured through the number and diversity of market participants, and by segregation of assets into different liquidity strata, for example by volumes.	• $\boldsymbol{Amihud\ Illiquidity\ Ratio} = (\frac{\lvert R\rvert}{Vol})$ • |R|=Absolute Return on day T for ith stock • Vol (in Rs.)= Volume on day T for ith stock
Tightness (Breadth)	Tightness typically refers to the financial cost of completing a transaction.	• $\boldsymbol{Relative\ Quoted\ Spread} = \frac{(AP-BP)(AP+BP)}{(\frac{1}{2})}$ • AP=Daily Closing Ask Price • BP=Daily Closing Bid Price

Past works in Liquidity

We talk about the past works done in the field of liquidity in greater detail.

Author(s)	Summary
P. Naik, B.G. Poornima and V.K. Reddy (2020)	The paper is focused on measuring the liquidity in the Indian stock market and measures interdependencies between four liquidity dimensions. The study aids investors to understand the market depth and tightness which are essential in determining market liquidity.
S. Bhattacharya, M. Bhattacharya and S. Basu (2019)	The paper examines the relationship between five liquidity measures and stock market movements, using the Autoregressive Distributed-lag (ARDL) Bounds Testing Approach. The paper concludes that liquidity tracks stock market movements in India.
V. Acharya and L. Pederson (2005)	The paper investigates the relationship between stock prices, liquidity risk and commonality. The paper concludes that illiquid stocks with a low turnover and small market capitalization have high volatility of stock returns.
K.H. Lee (2005)	The paper investigates the role of liquidity in developed and emerging markets using the LCAMP framework. The paper concludes that that commonality existed in liquidity internationally. Moreover, the results show that liquidity is more critical in emerging markets as compared to developed markets.
Y. Amihud, Hameed, Kang, Zhang (2005)	The paper studies the commonality in 45 countries and their result showed that there exist positive and significant illiquidity premiums.
M. Sadaqat, H. Butt (2017)	The paper analyses the role of liquidity in Pakistan stock market using LCAMP. Results evidence that higher returns serve as compensation to investors for being exposed to illiquidity. The paper reasserts the importance of liquidity being incorporated in asset pricing models.
Y. Chauhan, S. Kumar, R. Pathak (2017)	The paper examines the effect of stock liquidity on stock price crash risk for Indian stock market. The paper concludes:- 1. Higher liquidity of a stock reduces its crash-risk. 2. Authors examine the threat of intervention model, due to which stock liquidity effects cash-risk deeply for firms with high block ownership. 3. Since stock liquidity encourages price informativeness, managers are restrained from exploiting stock prices by hoarding negative news to augment short-term earnings.

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Research Goals

What are our aims here?

The aim of this paper is to discuss the how liquidity affects stock market returns in the following ways:

1. We investigate whether the liquidity of a stock affects its stock returns
2. We investigate whether the above mentioned effect varies before, during and after a crisis
3. We investigate whether all types/measures of liquidity have different effects on stock returns
4. We investigate whether the size of the firm influences how its stock returns are affected by liquidity before, during and after a financial crisis

Our analysis covers 500 companies listed on the National Stock Exchange (NSE), India and the financial crisis caused by:

1. 2008 housing and credit crisis
2. Covid-19 pandemic

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Stock Price Data

What are our aims here?

- We refer to daily of the top 500 companies (in terms of market cap) listed on the National Stock Exchange (NSE), India from January 1, 2006 to December 31, 2012 and October 1, 2019 to March 18, 2021
- We then also divide our data into 5 portfolios on the basis of market cap

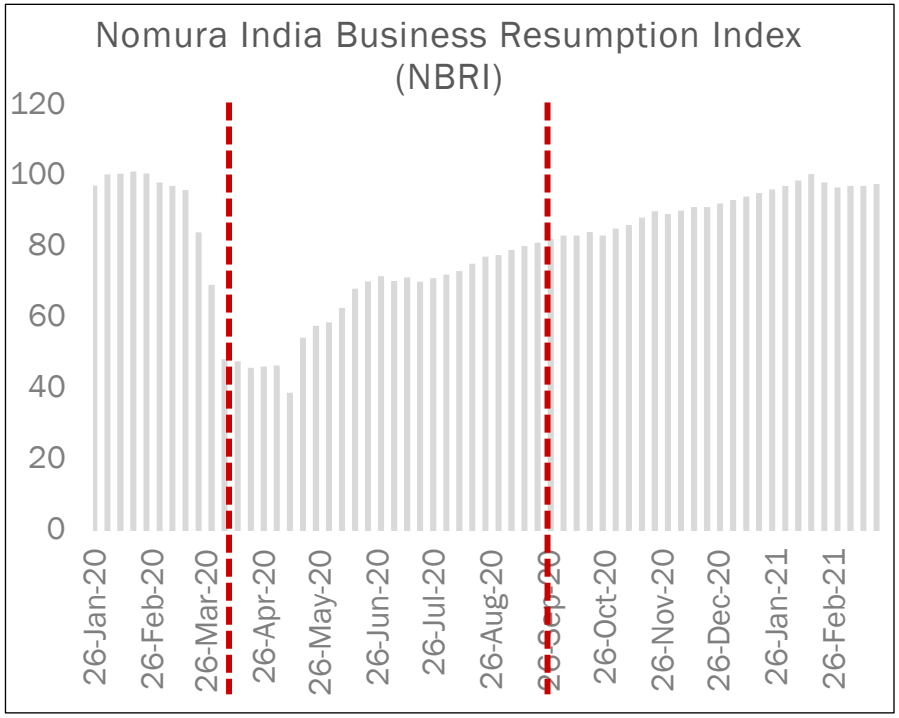
Portfolios	Average Market Capitalization (in millions)
Portfolio-1 (100 Largest Companies)	8.42
Portfolio-2	1.31
Portfolio-3	0.56
Portfolio-4	0.28
Portfolio-5 (100 Smallest Companies)	0.15

Marking time periods

We create before, during and after periods for

- **For the 2008 financial crisis, we create the periods as mentioned in Tsai 2015:**
  1. **Pre crisis:** January 1, 2006 to December 31, 2007
  2. **During crisis:** January 1, 2008 to June 31, 2009
  3. **Post crisis:** July 1, 2009 to December 31, 2012

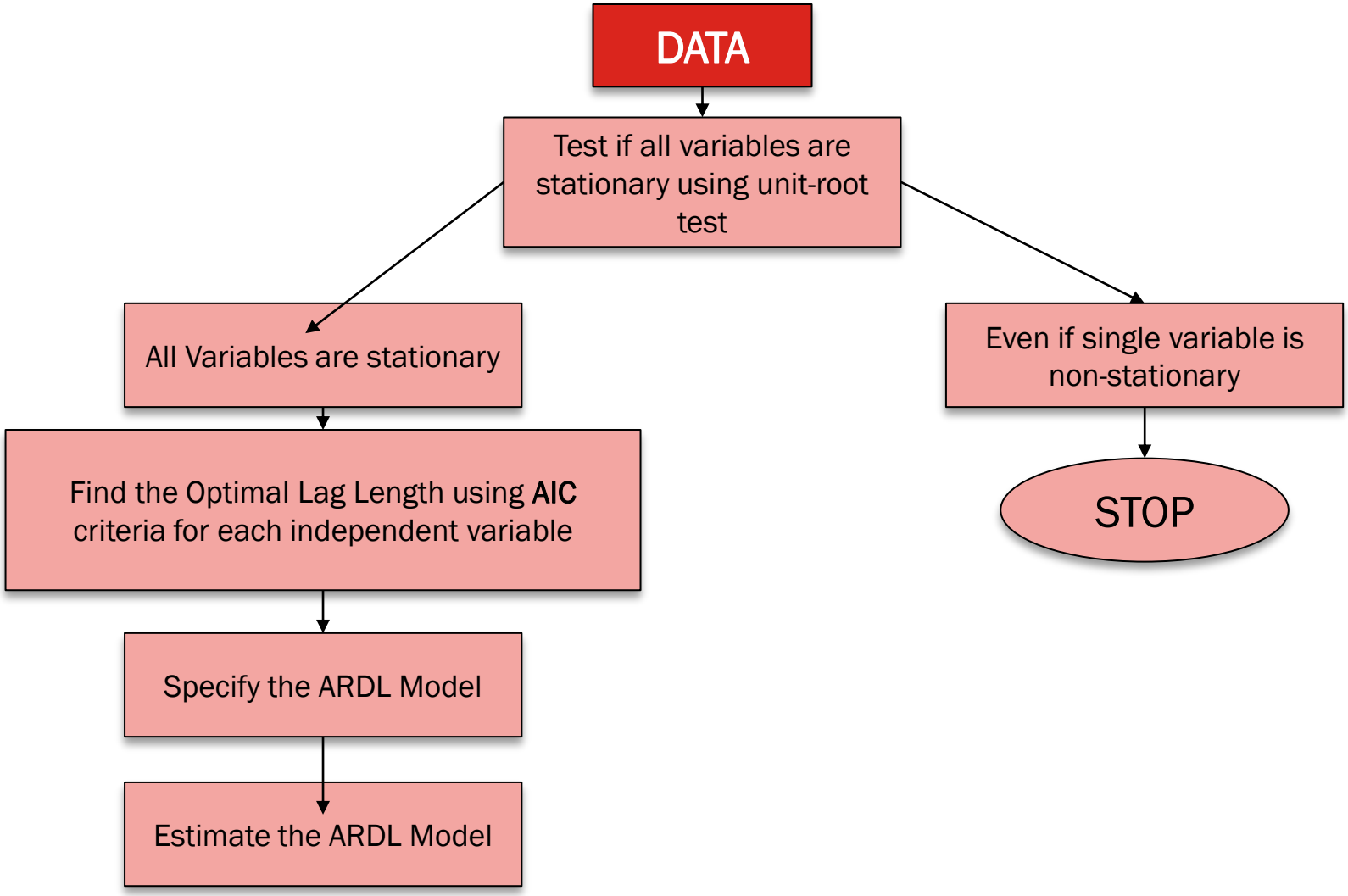
- **For the Covid-19 pandemic, we refer to the Nomura India Business Resumption Index (NBRI):**
  1. **Pre crisis:** October 1, 2019 to March 31, 2020
  2. **During crisis:** April 1, 2020 to September 30, 2020
  3. **Post crisis:** October 1, 2020 to March 18, 2021



Model Development

We run ARDL models to study the effect of liquidity on stock returns

$$y_t = \alpha + \sum r_i y_{t-i} + \sum X_{j,t-i}$$



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Hypothesis 1

Illiquidity affects returns differently before, during and after a financial crisis?

2008 Crisis						
	Pre-2008 Crisis		During 2008 Crisis		After 2008 Crisis	
	Significance	Sign	Significance	Sign	Significance	Sign
Immediacy	Significant	+ve	Significant	+ve	Significant	+ve
Breadth	Significant	-ve	Insignificant	NA	Insignificant	NA
Spread	Significant	-ve	Insignificant	NA	Significant	-ve
Depth	Significant	+ve	Significant	+ve	Significant	+ve

Covid Crisis						
	Pre-Covid Crisis		During Covid Crisis		Post Covid Crisis	
	Significance	Sign	Significance	Sign	Significance	Sign
Immediacy	Significant	+ve	Significant	+ve	Significant	+ve
Breadth	Insignificant	NA	Significant	+ve	Insignificant	NA
Spread	Significant	-ve	Significant	-ve	Significant	-ve
Depth	Significant	+ve	Significant	+ve	Significant	+ve

- Immediacy and depth have a significant positive effect in all three periods
- Spread has a significant negative effect before and after the crisis and is insignificant during the crisis.
- During crisis, the impact of immediacy and depth increases
- After the crisis, the impact of depth decreases

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Hypothesis 2

The size of the firm influences

2008 Crisis (Significance Table)												
	Immediacy			Breadth			Spread			Depth		
	Pre	During	Post	Pre	During	Post	Pre	During	Post	Pre	During	Post
Portfolio-1	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Portfolio-2	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Portfolio-3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Portfolio-4	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Portfolio-5	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes

Covid Crisis (Significance Table)												
	Immediacy			Breadth			Spread			Depth		
	Pre	During	Post	Pre	During	Post	Pre	During	Post	Pre	During	Post
Portfolio-1	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Portfolio-2	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Portfolio-3	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Portfolio-4	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Portfolio-5	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	Yes	Yes

- The effects of immediacy, breadth and depth do not vary much across different sizes
- We notice that spread has a significant effect during the crisis for the big companies while it is insignificant for the smaller companies.

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Conclusion

- During the analysis of 500 companies, it is evidenced that some illiquidity metrics have a positive impact and some have a negative impact on stock market returns. For example, immediacy and depth have positive impact while spread has a negative impact on market returns.

- Magnitude of this impact is varies for different scenarios(pre crisis, during crisis and post crisis).The results show that during crisis, the impact of depth increases. However, post-crisis, it's effect lessens.

- Likewise, impact of a given illiquidity metric can lose it's significance in different scenarios. For example, breadth had a significant impact during the 2008 Crisis but it lost it's significance during the Covid Crisis.

- Finally, impact of metric depends company's size as well. For example, spread had larger impact on high-value companies, but only minimal impact on smaller companies.

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THANK YOU