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Liquidity: Pricing, Management and Financial Stability
Liquidity in Financial System Panel

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Ludwig B. Chincarini, Ph.D., CFA
University of San Francisco
United States Commodity Fund Investments

- Thank you for coming. Special thanks to Professor Clas Wihlborg for organizing such a special and meaningful conference.

OUTLINE OF DISCUSSION POINTS

1. Definition of Liquidity
2. Price Risk and Liquidity Risk
3. Crowding
4. Modelling Crowding

5. Appendix 1: Fischer Black's definition of liquidity
6. Appendix 2: Elements of Crowding: What Model Should Explain
7. Appendix 3: Empirical Results on Crowding
8. Appendix 4: References on Crowding

1. Understanding Liquidity

- **Definition 1**: Market Exchange: The ability to buy or sell an asset quickly in large volume without affecting the asset's price.
- **Definition 2**: Convert to Cash: The ability to convert to cash quickly.

- **Definition 3 (1&2)**. Liquidity is the ability to convert an instrument of a given volume at perceived value/prices to liquid cash at or close to those prices.

- **Definition 4 (Financial System Liquidity):** The financial system is said to be liquid when financial institutions can easily raise cash, either by selling 'liquid assets' or by borrowing in the wholesale money market.

- Source of Definitions 1 & 2: *Barron's Dictionary of Finance and Investment Terms*.
- Definition 4 from Reserve Bank of New Zealand.

1. Understanding Liquidity

- What is liquidity risk and what is price risk?

Typically prices move due to new information that affects alpha of the traders. Alpha=1, it's very commonly agreed, Alpha ~ 0 is less so.

New information includes company specific, worldly news, consumer tastes, etc.

1. Understanding Liquidity

- What is liquidity risk and what is price risk?

If we measure historical volatility or any other kind of volatility:

Monthly Basis: Mainly reflects news changes or price risk.

Daily Basis: Still mainly news changes, but a small fraction of liquidity risk.

Tick Basis: Even more liquidity.

1. Understanding Liquidity

- What is liquidity risk and what is price risk?

Generally, liquidity risk will be small with respect to news changes and thus, even a standard volatility measure will be heavily dominated by price risk.

Liquidity risk is concentrated in specific pockets of time. It is not "news" risk or price risk, but can be triggered or "revealed" through a "news" event.

1. Understanding Liquidity

- What is liquidity risk and what is price risk?

Uncertainty is higher with liquidity risk – why? In the past, we ignored it. In the present, we think about it, but aren't sure we can measure it accurately, since it oftentimes depends on the structure of the system, the holders, and behavior of the holders during pockets of time.

1. Understanding Liquidity

- What is liquidity risk and what is price risk?

Crowding – when there is a saturation of similar holders or similar behaving holders on one side of the buy or sell side in a pocket of time. Implicitly, liquidity is low whether the individual traders know it or not.

1. Understanding Liquidity

- **Modelling Crowding**
- *At every interval, y(t), shares liquidity-based trading (depth). N holders of risky-assets with amounts x(j), where j=group of holders, rho-correlation between types of holders.*
- *Simulate decisions of different holders to sell (randomness could reflect news items)*
- *Rho represents how news similarly affects different types of investors (rho=1 – is same as N=1)*

1. Understanding Liquidity

- **Modelling Crowding**
- *At every interval, y(t) + sum(x(j)) if x(j)<0 is liquidity, while sum(x(j)) where x(j)>0 is demand pressure. The difference causes price movement due to liquidity.*
- *Do time pockets matter – introduce time element.*
- *Introduce price model to imbalances*
- *Specify news process*
- *Liquidity = f(news vol, alpha (imbalance y/x sides of transaction, uncertainty, …)*

1. Understanding Liquidity

- Modelling Crowding
- *Integrate into existing models? Or too different?*
- *Brunnermeier & Pederson (2008) – deviation from fund. value is liquidity capacity.*
- *Roch (2011) – model for pressure on limit order and bubbles*
- *Jarrow and Roch (2011) – liquidity and bubbles*
- *Kyle (1985)*

2. Aggregate Liquidity

- For banks, like with Basel III, doesn't solve liquidity, rather instructs them to hold high liquid assets … but what if those assets undergo stress?
- How does liquidity in system related to liquidity on individual stock level or security level?
- If Liquidity = f(news vol, alpha, uncertainty, …) maybe by increasing macro liquidity and reducing uncertainty?
- Casino Analogy: If the doorman guarantees minimum on chips bets, more likely to bet chips either way.

3. Liquidity, Solvency, and Triggers

- Lack of liquidity can trigger mark-to-market insolvency.
- Time Horizon?
- Valuation?

Other Discussion Topics

4. **Is there a role for Regulation?**

5. **Liquidity, Volatility, and Risk**

6. **High Speed Trading and Liquidity**

7. **Is Liquidity Sentiment and Fear? If so, how to proceed?**

8. Crowded Places Today

- Vineer's article about "low volatility" trades – addresses many types of holders with similar positions – rho might be low, but trade concentration is high. Different opinions.

- Smart Beta – different opinions.

- Index and Passive trading – signs of crowding → diminishing liquidity, outperformance of large-cap to small-cap. What's the trigger? Retail or Advisor panic – then cascade may start.

Open Discussion for all Participants

1. Lots of great questions about crowding and contagion.

Thank you

- Dr. Ludwig Chincarini , CFA
- University of San Francisco
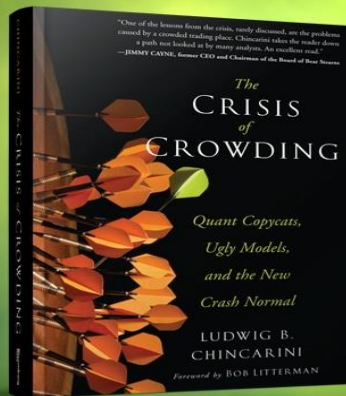- United States Commodity Funds

www.ludwigbc.com
chincarinil@hotmail.com

Appendix 1: Fischer Black's Definition of Liquidity

- Thus the market for a stock is liquid if the following conditions hold: (1) There are always bid and asked prices for the investor who wants to buy or sell small amounts of stock immediately. (2) The difference between the bid and asked prices (the spread) is always small. (3) An investor who is buying or selling a large amount of stock, in the absence of special information, can expect to do so over a long period of time at a price not very different, on average, from the current market price. (4) An investor can buy or sell a large block of stock immediately, but at a premium or discount that depends on the size of the block. The larger the block, the larger the premium or discount.

- Black (1971), *Financial Analysts Journal*

Appendix 2: Elements of Crowding: What Model Should Explain

1. The process that generates the crowding

    a. Copycat behavior of a good strategy (herding) (Chincarini (1998, 2012))

    b. System Structure (e.g. VaR models, risk models, (Chincarini (2018), Menkveld (2017))

    c. Regulation System (e.g. Basel II and Risk on home loans)

Appendix 2: Elements of Crowding: What Model Should Explain

2. Explains the type of crowding

      a. Types of Holders. Are all traders the same type or are they of different types? How will they behave to different types of shocks?

      b. How is liquidity affected by the crowding?

      c. What is the leverage-adjusted saturation or crowding?

Appendix 2: Elements of Crowding: What Model Should Explain

3. Specifies the Interdependence Between Holders and Relationship to Prices

      a. How do different holders affect each other in the system?

      b. How does investor Type A's actions affect investor Type B's actions?

      c. How does behavior affect liquidity and cascade effects?

Appendix 2: Elements of Crowding: What Model Should Explain

3. Specifies the Interdependence Between Holders and Relationship to Prices - Examples

Table 1: Types of Crowded Spaces

Parameters	Verbal	Example
$N = 1, L = 1$	Only one type of holder with a similar trading strategy.	Retail investors buying PALM.
$N > 1, L = 1$	2 or more types of holders with similar trading strategy, but different motivations or risk appetites. Different behaviors.	Commercial banks banks and hedge funds making similar swap spread trade. Quant hedge fund long value stocks and short growth stocks, and multi-strategy fund focused on energy starting a new portfolio to do similar trade.
$N > 1, L > 1$	Different holders in terms of behavior and different trades, but despite being diferent trades lead to a crowding of the space.	A hedge fund long the swap spread (betting that spreads will widen, thus short swap rates and long Treasuries), and a commercial bank or macro hedge fund is long Treasuries. Although trades and motivations are different, they both lead to a rallying Treasury curve. The risk inherent in Treasuries is subject to the behavior of both groups. And both groups' positions are dependent on risk from the other group.

Appendix 2: Elements of Crowding: What Model Should Explain

4. How is the total saturation or crowding measured in the model? How can we take it to the data?

   a. The model should specify how one can measure the extent of crowding with full information and with partial information.

   b. Should be implementable and testable with real data.

Appendix 3: Empirical Findings with Crowding

a. Crowding can occur from system structure (margin in clearing account, risk models in portfolio management). Chincarini et al (2018), Chincarini (2017), Menkveld (2017)

b. Crowded mutual fund holdings (wrt liquidity) leads to factor returns not explained by Fama-French (i.e. short crowded securities, long uncrowded) Tay et al (2016) & Macquarie & Others

c. Popular stocks or high concentration of hedge fund ownership leads to subsequent lower returns. Many studies.

Appendix 3: Empirical Findings with Crowding

d. Different types of equity factors might have different implications for crowding (some with natural anchors and some without). Baltas (2019)

e. Considering the "crowding" of a factor with a valuation metric leads to better investment outcomes. Arnott, Beck, Kalesnik (2016)

Appendix 3: Empirical Findings with Crowding

f.   Net positions are important because sometimes the net effect of different strategies is almost zero. (Blitz (2017))

g.   Shifting positions amongst oil futures demand (crowding on one side of market) might lead to contango and tracking error of oil futures versus spot oil. (Chincarini & Moneta (2019))

Appendix 4: Miscellaneous Academic References on Crowding

A. "The Failure of LTCM," Chincarini (1998)

B. "Sophisticated Investors and Market Strategy," Stein (2009)

C. *The Crisis of Crowding*, Chincarini (2012)

D. "The Externalities of Crowded Trades," Blocher (2013)

E. "Standing out from the Crowd. Measuring Crowding in Quantitative Strategies," Cahan and Luo (2013)

F. "Stock portfolio structure of individual investors infers future trading behavior," Bohlin and Rosvall (2014)

Appendix 4: Miscellaneous Academic References on Crowding

G. "Dimensions of Popularity," Ibbotson and Idsorek (2014)).

H. "Crowded Trades: An Overlooked Systemic Risk for Central Clearing Counterparties," Menkveld (2014)

I. "The Effects of Short Sales and Leverage Constraints on Market Efficiency," Yan (2014).

J. "Omitted Risks or Crowded Strategies: Why Mutual Fund Comovement Predicts Future Performance," Chue (2015).

K. "Fire, Fire. Is Low Volatility a Crowded Trade," Marmar (2015)

L. "Days to Cover and Short Interest," Hong et al. (2015)

Appendix 4: Miscellaneous Academic References on Crowding

M. "Portfolio Construction and Crowding" Bruno, Chincarini, and Ohara (2018).

N. "Transaction Costs and Crowding" Chincarini (2017)

O. "Mutual Fund Crowding and Stock Returns," Tay et al. (2016)

P. "Hedge fund crowds and mispricing," Sias et al. (2016)

R. "Individual stock Crowded Trades, Individual Stock Investor Sentiment, and Excess Returns," Yang and Zhou (2016)