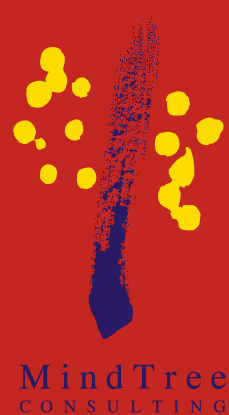


MindSCAPE

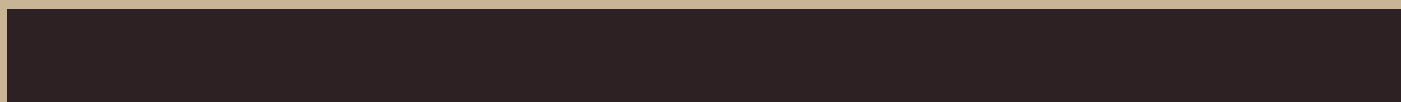
# JOURNAL FOR CAPITAL MARKETS



15 November 2007, Volume I



Clients have become well versed and informed on financial matters, markets have seen blurring difference between institutional investment and pure play arbitrage brokerage, funds are moving across the globe in search of alpha. Beta prediction becoming not only complex but creative too. Theatrical experiment in markets continues with sub prime saga unbundling further...





## Managing the Wealth - Asian Experience

There is significant renewed focus on Asia from the private bankers and managers including Institutional money managers. Arrival of Asia into the board room discussion of large Wall Street and Zurich banks has been there for a while. Rise of China, followed by Indian subcontinent however is changing the dynamics and tilting the scale away from US centric strategies. Strong economic growth across the region in recent years has boosted wealth creation and number of affluent individuals and SMEs in the region. Some of the leading studies conducted recently by Securities Industry Association (SIA) predict that Asia- Pacific excluding Japan will grow by 9.7 percent per annum between 2006-2010 against growth rate of less than 6 percent rest of the world. UBS one of the leading player in the private banking segment, has doubled its business to 151 bn Swiss Francs between 2004-2006 which is equivalent to a compounded annual growth rate of 37 percent.

From client serving perspective, Asia differs to its counter parts in rest of the world. Unlike in Europe, Asian clients tend to have multiple relationships with different types of institutions. In addition Asian clients have become more technology savvy, have become well versed with different concept of risk and return and informed on financial matters. In Asia to offset high alpha risk investors tend to invest in total portfolio that contains investment with differing risks characteristics similar to the strategy that adopted by sophisticated money managers. Institutional investors themselves are recognizing that there are “very large qualitative issues that have nothing to do with technology (and data). No system can ever fill all the needs of investors,” as per Leslie Rahl, president of Capital Market Risk Advisors. Beyond the risks that can be analyzed quantitatively valuation, portfolio characteristics, credit risk and stress testing, to name a few institutions also need to perform regular qualitative due diligence.

It has been increasingly challenging for wealth advisors and institutional managers to understand the evolution in expectations. Difficulties are increasingly felt to effectively address changing needs of clients. However in all this, what has not changed is importance of relation and need of agile IT infrastructure supporting both clients and advisors.

To survive in such a competitive business, private banks need to have strong R&D and innovation capabilities to meet the varying demand of ever growing high net worth investors.

In this issue we cover wide ranging topic from risk modeling, fund raising and convergence which is happening at practice level. We hope you enjoy your reading.

Best Regards

**Dr. Ashok Hegde**  
(PhD Economics)

# Business at glance

## Credit Risk Modeling: Study of Interrelationships between Credit Risk and Financial Ratios of a Firm

The article highlights different types of Credit Risk models which help to compute a fair price for Credit Risk and the probability of default of a firm. The article also shows relationship between credit risk and the financial ratios of a firm.

Raghunath Tripasuri

raghunatht@mindtree.com

Raghunath Tripasuri is B.Tech (Hons.) from IIT Kharagpur and MBA from IIM Bangalore. He is currently working as Principal Consultant with MindTree Consulting Ltd.

### INTRODUCTION

**Credit Risk:** Credit Risk is defined as the risk of loss arising out of a debtor's inability to pay up either interest or principal (or both) components of a loan or any other form of credit. Investors, who would be willing to take on exposure to Credit Risk, expect to be compensated for the same. Different types of Credit Risk Models are available, to help compute a fair price for Credit Risk and also the probability of default of a firm.

**Structural Approach to Credit Risk Modeling:** Structural models for credit risk rely on the basic principle that if a public limited company uses debt financing, its capacity to repay the debt depends entirely on the market value of its assets at any point in time. Hence as the market value of assets falls, the firm is more likely to default. However, estimating the market value of the assets and volatility in the value of assets is a problem as balance sheet captures historical cost and market value of assets is not observable. What is observable though, is the market value of equity and market value of debt.

We can observe from Figure 1 that, for a public limited company with debt financing, if the market

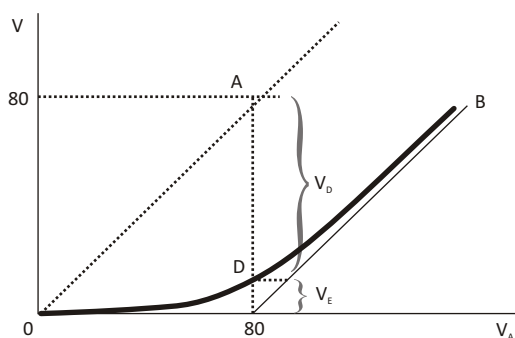


Figure 1: Relationship between market value of Assets, Equity & Debt. [Reference 4]

value of assets of the firm  $V_A$  is lower than the value of its debt  $V_D$ , the value of its equity drops to zero due to limited liability and the firm defaults. However, if the value of the assets of the firm is greater than the value of debt, Value of equity is positive. It is observed from **Figure 1** that the payoff to the equity holders of a firm with debt financing is similar to that of a call option. Hence it can be considered that, in a firm with debt financing, equity holders have a call option on the assets of the firm.

This approach of linking option pricing theory with the assessment of risky debt was pioneered by Black and Scholes (1973) and Merton (1970, 1974).

### Measuring Default Probability of a Firm:[Reference 4]

The three important elements that determine the default probability of a firm are as follows:

a. **Value of Assets:**

This refers to the market value of the firm's assets. It is a measure of the present value of the future free cash flows produced by the firm's assets, discounted at an appropriate discount rate.

b. **Asset Risk:**

This is the uncertainty or risk of the asset value. This is a measure of the firm's business and industry risk. Value of firm's assets is an estimate and hence, uncertain. It should always be understood in the context of the firm's business or asset risk.

c. **Leverage:**

This is the extent of a firm's contractual liabilities. Book value of firm's debt could be used with the market value of assets of the firm to compute leverage as the firm has to only the book value.

The asset risk of a firm is measured by its asset volatility. A firm's leverage has the effect of magnifying its underlying asset volatility.

The KMV model [Reference 4] combines the asset value, business risk and leverage into a single measure of default risk, which compares the market net worth of the firm to the size of a one standard deviation move in the asset value. This ratio is referred to as Distance to Default [DD].

$$DD = \frac{[MV\ of\ Assets] - [Default\ Point]}{[MV\ of\ Assets] \cdot [Asset\ Volatility]}$$

The distance to Default Measure combines three key credit issues: The value of the firm's assets, its business and industry risk, and its leverage. The distance to default measure also incorporates the effects of industry, geography and firm size through asset value and asset volatility.[Reference 3]

### Measuring the Market Value of Assets and Volatility of Assets of the Firm:

From Merton's Model [Reference 2], we have the following relationships:

$$V_E = V_A \phi(x_1) - V_D e^{-r\tau} \phi(x_2) \quad \dots (i)$$

$$\text{where } \phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^x e^{-(1/2)z^2} dz$$

$V_E$  is the value of equity of the firm,  $V_D$  is the value of debt of the firm,  $V_A$  is the value of assets of the firm,  $r$  is the risk free interest rate and  $\tau$  is time.

$$x_1 = \left\{ \log(V_A / V_D) + \left( r + \frac{1}{2} \sigma^2 \right) \tau \right\} / \sigma \sqrt{\tau}$$

$$x_2 = x_1 - \sigma \sqrt{\tau}$$

$$\sigma_e = \sigma_v \cdot \frac{V_A}{V_E} \phi(x_1) \quad \dots (ii)$$

Equations (i) and (ii) could be solved simultaneously to obtain an estimate of market value of assets  $V_A$  and volatility of assets  $\sigma_v$ .

In the equations (i) and (ii) above, the market value of Equity ( $V_E$ ) and Volatility of Equity ( $\sigma_e$ ) are observable. The following steps are repeated in several iterations to measure the market value of assets and volatility of assets:

- Initially the Market Value of Assets  $V_A$  is estimated as the sum of Market Value of Equity and the Book Value of Debt.
- The initial estimate for the asset volatility is obtained by multiplying the ratio of Beta of Assets to Beta of Equity with the Equity Volatility. The marginal tax rate was assumed to be zero.
- The estimated values of Value of Assets and Volatility of Assets are used to compute the value of Equity and Volatility of Equity as described in equations (i) and (ii)

- d) The error in observed value of equity and computed value of equity as per step c) is evaluated.
- e) The error in observed volatility of equity and the computed volatility of equity as per step c) is evaluated.
- f) If the errors, as computed in steps d) and e) are above the tolerance limits, then the estimates for value of assets and volatility of assets are revised.
- g) Steps from c) through f) are repeated till the errors as evaluated in steps d) and e) are within the defined tolerance limits.

### Procedure for the Study:

As part of this study, only the publicly listed firms in the Indian Industry with a default history were considered. Different sectors like Textiles, Automobiles, Chemicals, Consumer Durables, Steel, Pipes & Fittings were considered to get a diverse profile of firms.

CRISIL Rating Scan reports from the period 1997 to 2005 were used to identify a set of firms that defaulted on Long Term Debt at some point of time during this period. Microsoft Excel was used for data analysis. For each chosen firm, for a period of 3-4 years prior to default, the stock market data was collected and the following financial ratios were computed from the audited & published financial statements:

- *Liquidity Stock Measures*
  - Current Ratio
  - Quick Ratio
  - Cash Ratio
- *Liquidity Flow Measures*
  - Cash Flow Ratio computed as  $[(\text{Cash Flow From Operations}) / (\text{Current Liabilities})]$
  - Defensive Interval computed as  $\{[(\text{Quick Assets}) / (\text{Capital Expenditure})] \times 365\}$
  - Cash Flow to Capital Expenditure computed as  $[(\text{Unlevered Cash Flow From Operations}) / (\text{Capital Expenditure})]$
- *Long Term Solvency Ratios: Solvency Stock Measures*
  - Debt To Total Assets
  - Debt To Equity
  - Long-Term Debt Ratio computed as  $[(\text{Long Term Debt}) / (\text{Long Term Debt} + \text{Equity})]$
- *Long Term Solvency Ratios: Solvency Flow Measures*
  - Interest Coverage Ratio computed as  $[\text{EBIT} / \text{Interest Payments}]$
  - Cash Flow From Operations to Debt computed as  $[\text{Cash Flow From Operations} / \text{Total Debt}]$
- *Profitability Ratios*
  - Debtor Turnover Ratio computed as  $[\text{Net Sales} / \text{Average Debtors}]$
  - Asset Turnover Ratio computed as  $[\text{Net Sales} / \text{Net Operating Assets}]$

The iterative method described in the 'Introduction' section above, was used to estimate market value of assets and volatility of assets. Based on this, the Distance to Default parameter, and its correlation with the financial ratios of the firm, was computed.

### ANALYSIS OF RESULTS

The list of chosen companies and the time of their default, as reported by CRISIL Rating Scan, is given in the table below.

Company Name	Dec,97	Apr,98	Apr,99	Apr,00	Dec,00	Mar,01	Apr,03	Apr,03	Apr,04	Mar,05
Arvind Mills Ltd.	AA+	AA	BBB+	C	D	D	D	D	D	
BPL Ltd.	AA-	AA-	AA-	AA-	AA-	AA-	A-	D	D	
Escorts Ltd	A	A+	A+	A+	A+	A+	A	BBB	C*	D
Essar Shipping Ltd.	AA-	AA-	BBB+	C		D	D	D	D	
Hindustan Organic Chemicals Ltd.	AA	AA-	A-	A-	C	C	D	D	D	
Jain Irrigation Systems Ltd.	BB+	D	D	D	D	D	D	D	D	
Kalyani Steels Ltd.	A	A	BBB+	D	D	D	D	D	D	
Lloyds Steel Inds Ltd.	BBB	D	D	D	D					
Punjab Alkalies & Chemicals Ltd.	AA	BBB+	D	D	D					
Welspun India Ltd.	A	BBB	BB+	B	B	D				

Table 1: List of Companies;  
Source: CRISIL Rating Scan

It has been observed that the Distance to Default parameter is a good predictor of the probability of default of a firm. It predicts the likelihood of a firm's default sufficiently in advance.

The overall results of the study are summarized below:

	Current Ratio	Quick Ratio	Cash Ratio	Cash Flow Ratio	Debt to Total Assets	Debt to Equity	Longterm Debt Ratio	Interest Coverage	CFO to Debt Ratio	Debtor Turnover Ratio	Asset Turnover Ratio (Average Book Assets)	P/E	P/B
Mean	0.72	0.7	0.19	0.62	-0.77	-0.68	-0.51	0.58	0.56	0.14	0.54	0.42	0.68
Standard Error	0.11	0.11	0.32	0.15	0.07	0.13	0.16	0.13	0.14	0.22	0.15	0.13	0.17
Median	0.73	0.76	0.13	0.66	-0.82	-0.8	-0.78	0.72	0.6	0.11	0.55	0.45	0.88
Mode	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Standard Deviation	0.28	0.29	0.85	0.39	0.2	0.35	0.41	0.36	0.37	0.57	0.4	0.34	0.45
Sample Variance	0.08	0.08	0.73	0.15	0.04	0.12	0.17	0.03	0.14	0.33	0.16	0.11	0.2
Kurtosis	2.85	-1.99	-1.78	3.97	2.97	5.14	-2.56	-0.18	3.13	-1.57	-1.23	-1.77	3.27
Skewness	-1.47	-0.33	-0.39	-1.82	1.7	2.16	0.42	-0.73	-1.59	-0.01	-0.56	-0.17	-1.87
Range	0.84	0.69	1.95	1.15	0.57	1.03	0.89	1.01	1.13	1.48	1.04	0.86	1.24
Minimum	0.15	0.3	-0.95	-0.19	-0.94	-0.95	-0.87	-0.03	-0.19	-0.66	-0.08	-0.06	-0.25
Maximum	0.99	0.99	1	0.96	-0.37	0.08	0.02	0.99	0.94	0.82	0.96	0.8	0.99
Sum	5.06	4.88	1.3	4.33	-5.36	-4.76	-3.59	4.07	3.95	0.97	3.75	2.93	4.74
Count	7	7	7	7	7	7	7	7	7	7	7	7	7
Confidence Level(95.0%)	0.26	0.26	0.79	0.36	0.18	0.32	0.38	0.33	0.34	0.53	0.37	0.31	0.42

Table 2: Descriptive Statistics for Correlations of Distance To Default with Financial Ratios for all firms

From the table with descriptive statistics for correlations of all financial ratios with the Distance to Default parameter across all the firms included in the study, we could infer the following:

- The Distance to Default parameter has a strong positive correlation with the Liquidity Stock Measures of a firm like Current Ratio, Quick Ratio & Cash Flow Ratio.
- The Distance to Default parameter has a strong negative correlation with some Long Term Solvency related Stock Measures of a firm like Debt to Total Assets Ratio, Debt to Equity Ratio & Long Term Debt Ratio.

This signifies that during the period of 2-3 years before default, firms typically have a tendency to take on more debt. If this phenomenon occurs, it is quite likely that the distance to default parameter for the firm would decrease during the same period. Similarly, if it is observed that the distance to default parameter for a firm is declining over a period of 2-3 years, it is quite possible (though not absolutely certain) that the firm might have increased its leverage significantly.

- The Distance to Default parameter has a strong positive correlation with long term solvency flow measures of a firm like Interest Coverage Ratio and Cash Flow from Operations to Debt Ratio.

However, some exceptions to this rule have been observed in the study. Typically if a firm defaults due to high short term borrowings and not due to high interest obligations during the year, then it has been observed that while the Distance to Default parameter captures the information, the Interest Coverage ratio doesn't capture the information. In such scenarios, a negative correlation has been observed between the interest coverage ratio and the distance to default parameter.

- A positive correlation has been observed in the Distance to Default parameter and the P/E and P/B ratios of a firm.

During the study, it has been observed that in several cases, a consistent decline in P/B ratio indicated the probability of default of a firm where several other financial ratios like liquidity measures and solvency measures failed to predict the same.

The charts below capture information about how, for the companies included in the study, distance to default parameter changes with the change in the CRISIL Rating of the firm. In several cases, it is observed that changes in distance to default parameter provide adequate early warnings of default of a firm.

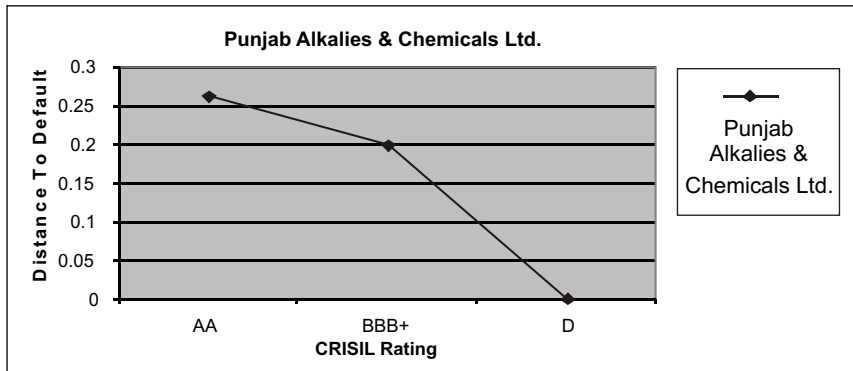


Figure 2: Change in Distance To Default with CRISIL Rating For Punjab Alkalies & Chemicals Ltd.

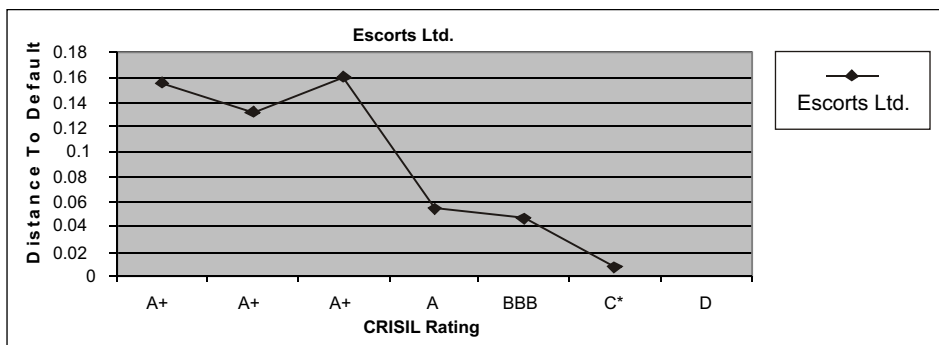


Figure 3: Change in Distance to Default with CRISIL Rating for Escorts Ltd.

Thus we could conclude that the Distance to Default parameter is more comprehensive in predicting the default of a firm.

## REFERENCES

- Options, Futures and Derivatives by John Hull.
- Merton, R. C. 1974. "On the Pricing of Corporate Debt: The Risk Structure of Interest Rates", *Journal of Finance* 29:449-470
- Credit Risk Modeling Theory & Applications by David Lando
- Peter Crosbie, Jeff Bohn Dec 2003. "Modeling Default Risk" Moody's | KMV publication
- Merton, R.C. 1973. "Theory of Rational Option Pricing", *Bell Journal of Economics & Management Science*, Vol 4, No.1, (Spring 1973), p141-183.
- Franco Modigliani & Merton H. Miller, 1958. "The Cost of Capital, Corporation Finance and the Theory of Investment", *The American Economic Review*, Vol. XLVIII, June 1958, Number Three.
- Joseph E Stiglitz, "A Re-Examination of the Modigliani Miller Theorem", *The American Economic Review*, Vol.59, No. 5 (December 1969).
- [www.mathworld.wolfram.com](http://www.mathworld.wolfram.com)
- <http://www.physics.uci.edu/~silverma/bseqn/bs/bs.html>
- Sreedhar T Bharath and Tyler Shumway, 2004, "Forecasting Default with the KMV-Merton Model", University of Michigan
- Crisil Rating Scan, Issues from Apr-June 1997 to Jan-Mar 2005.
- Prowess Database
- Credit Risk by D. Duffie & K. Singleton
- Credit Derivatives A primer on Credit Risk, Modeling, and Instruments by George Chacko, Anders Sjoman, Hideto Motohashi, Vincent Dessain.



# Fund raising , Lessons for India- New Private Equity Exchange

The article highlights the opportunities that arise from the regulations and how the same is used by the market to come up with newer financial instruments to raise money. The article also talks about the new private market proposed by Goldman Sachs and how Hedge funds and other private Equity funds would be benefited.

**Dr. Ashok. B Hegde**

ashok\_hegde@mindtree.com

*Dr. Ashok. B Hegde is Vice president of Capital Markets Group of MindTree Consulting Ltd.*

Markets all over the world have seen unprecedented growth in the development of financial instruments. Innovation has always been at the forefront of the development of financial markets. Increased volatility, increased volume, scrupulous and unscrupulous deals have always necessitated higher disclosure and regulatory governance. It is true with India, with the USA and with any other markets where demand and supply for capitals are met through the market forces rather than government dictat. Hence, it is not surprising that new laws governing the markets themselves have spawned various instruments which have helped the intermediaries as well as the investors to circumvent the regulations.

It is not that financial markets don't like regulation or that they are privy to the individual information with which they want to take advantage of. It is just that increased regulations and compliance also mean increased cost and time to originate and close a deal. Cost of operation, regulatory hurdles and possible efforts to scuttle deals all have always forced financial firms to increasingly innovate new financial instruments to bring the two parties closer to the table without incurring additional transaction costs.

Innovation in Financial Products may often defy gravity or logic. Take the example of hunda badla of yesteryears. We are sure it is practiced till today, with various changes and modifications to reduce the criticism against it - each time to reduce the market volatility and manipulations. The origin of the need for

badla can be traced in India to the absence of regulated securities borrowing and lending markets that facilitate holding positions to take advantage of index movements. In the absence of transparent ways of lending and borrowing of securities, financial intermediaries and broker dealers invented their own version of securities lending practice in India. Merits and demerits of the concept of badla have taken much of Indian policy thinking during 1990 2000. It has been blamed for every manipulation of price discovery process in the capital markets and to every major fall.

Although, Badla is now regulated, it is not clear whether the regulations are enforced rigorously. Badla trading is conducted under a risk management system approved by SEBI. This includes margin supervision where a broker has to provide margin to cover the market risk involved in transactions and there is a limit for the maximum outstanding badla positions in one single stock. It is not clear how uniformity is achieved in this aspect so as to remove the systemic risk as well as to lower the cost of securities borrowing in volatile markets.

Though it is true that market finds its own way to look outside of regulator purview, what market was trying to achieve in the core of operation was lowering the cost of transactions in deal closing. Transaction cost is viewed as the single important factor of market inefficiency all over the world. Cost and cost arbitrage has always been in the forefront of innovations for financial intermediaries.

Traditionally, funding requirement of Indian companies has been satisfied to a large extent through

debt instruments, debentures, loans from banks and financial institutions and deposits. Equity route is a phenomenon of post 1994 though many IPOs hit the Indian market at the beginning of 1990 due to liberalised IPO norms, thereby reducing substantially the cost of raising funds and debt obligations.

However, increased norms for listing, stringent criteria to satisfy SEBI and book building process have dampened the spirit of retail investors, thereby making the IPO route less attractive for those who have great ideas but are struggling in business currently. This has resulted in the resurrection of private placement as an important option for fundraising.

The private placement markets now completely dominate the more formal IPO or public issue markets. A plethora of scandals, misfortunes and grievances of investors has led to subsequent tightening of issues norms resulting in the sharp fall in public issues and the rise in the cost of transactions. High cost and market integrity have always been in question in India and will remain so in the foreseeable future.

It is interesting to note an emerging phenomenon in the U.S. which aims to ensure that the cost of a company seeking capital is limited to the least. The example of OakTree is interesting enough for us to take the phenomenon seriously. OakTree Capital Management LLC, an alternative investment firm with over \$40 billion in assets under management, has sold approximately 14% of itself for more than \$800 million to less than 50 investors. OakTree is the latest firm to cash in on the private equity/hedge fund boom. What is interesting to note is that the OakTree offering is private and its shares will trade on a new private market developed by Goldman, "GS Tradable Unregistered Equity OTC Market" with the catchy acronym GStrUE. Information about the market is limited as Goldman has to yet publicize it and OakTree is its first listing.

Goldman believes that GStrUE will become a viable alternative listing market for hedge funds, private equity and operating companies. The market is limited to investment funds with over \$100 million in assets. It is not yet clear how SEC would react or whether it would force GS to fall in line with the Self Regulatory Organisations such as Exchange rules.

It is too early to comment on the success or failure of GStrUE. I believe it is an innovative economic experiment on the validity of private markets for capital formations.

What Goldman Sachs is trying to accomplish has manifold lessons for Indian Small and Medium Enterprises (SMEs) in their quest to find partners to fund the projects. Though in the Indian context it is

too early to think of any home grown investment banks such as Kotak, ICICI, or more traditional lead managers including SBI, establishing an exchange for the non-listed, not interested enterprises to access the markets for capital. Any public route will necessarily go through the listing mechanism which is associated with SEBI regulations. Cost of making an IPO successful is significant and always against the head wind of Index movement. For many SMEs, most of the times, funding need is too specific to the project at hand or the planned expansion programs. For them, the IPO route may not be economical.

For the markets there are couple of options available such as debt or Private Equity placement, including venture funds. However, finding the right partner committed to the cause of the company is always a Herculean task. In addition, since such information is always restricted to smaller circle of contacts, it is difficult for the SMEs to find an interesting partner can be communicated to a limited circle, it is difficult to say, whether SME will ever find an interesting partner who will be willing to invest. If this new concept is discussed in detail and a platform is established, this new breed of exchanges may pave the way to effectively channel the fund from savings to the investment with reduced cost of operations.

As a financing vehicle private placement is less expensive. It is also less time consuming from the issue handling perspective than regular corporate bond issuance or equity route. It has much lower level of transparency with respect to information about the issue and the issuer, both before and after the placement has been made. Due to this reason, private placement is usually restricted either to a limited number of investors or to a pre-determined group of intelligent investors. However, conceptualisation of limited purpose vehicle can be a positive change from the point of issuer as well as investors.

It also can bring the much wanted, and less achieved, transparency into the whole process of deal origination, capture and closure. At least, it will make fund raising more competitive and thereby reduce the spread and risk significantly.

Meanwhile, it would be interesting to see how the SEC reacts to the Goldman move and how in this collaborated world, Indian Financial Institutions pick the thread to achieve our own fund raising markets for SMEs and mid-sized organisations who are not necessarily interested in the long drawn process of red herring and road shows.



# Convergence: Is it a way forward in Algorithmic Trading?

Algorithmic trading is one of the latest technological advancements in the capital markets which have made trading of equities faster and easier. The article talks about the merits and the future of Algorithmic trading.

**Roshan Prabhakar**

roshan\_prabhakar@mindtree.com

*Roshan Prabhakar is an MBA from Christ College Bangalore and is currently working as a Business Analyst in MindTree Consulting Ltd*

## INTRODUCTION

*“The death of the trader may have been predicted for 20 years or more. But with trades now being executed by computers, supported by complex algorithms, it seems that those fears are beginning to be justified”<sup>1</sup>.*

According to an article in Wikipedia about 40% of the deals struck on the LSE were generated with the help of Algorithmic Trading. A report in The Telegraph dated 27 August 2007 Wall Street based investment bank Goldman Sachs, predicts that this number would reach 60% by the end of 12 months on the LSE.

Now the question arises, what is this algorithmic trading or the black box trading?

It is a trading system that depends on advanced mathematical models for making transaction decisions in the financial markets. The strict rules built into the model help in determining the optimal time for an order to be placed with least amount of impact on a stock's price.

Algorithmic trading involves splitting a trade into multiple orders in order to reduce visibility and market impact, but the decision to take the main trade might or might not be automated. It is the system that uses computer program for entering trading orders with computer algorithm deciding on certain aspects of trading like the timing, price and even the quantity of the orders. The protocol for the communication that is happening is done through a protocol called the FIXatdl or the FIX algorithmic trading definition language.

The flexibility provided with the assistance of latest technology makes algo trading quite different

from sequential rules-based trading. By taking into consideration the rule based trading, algo trading helps or enables individual share or a portfolio of shares to be worked by the desk with a considerable insight of the bigger picture across the horizon of activity in that share.

Algo trading helps in dynamic monitoring of the performance until the execution is complete. Thus when algo trading is combined with automated order handling system via the protocol FIX the same can be used even for derivative markets to provide better liquidity profile for the individual stock.

## Why algorithmic trading?

Because of many advantages over the manual trading, algo trading is gaining popularity among the investor communities, especially the mutual funds, hedge funds and pension funds etc.

Some of the advantages being

- A shorter response time to the news that flows into the system.
- Reduce the impact cost as the deals are done in smaller volumes as compared to the large volumes. This also reduces the transaction cost.
- Helps in taking decisions much faster and also the losses that may occur due to human error are reduced substantially.
- Provide more flexibility to the user.

The algo trading is used in all types of trading including speculation, arbitrage, and even market making. For example market making algo involves placing a limit order to sell (or offer) above the

current market price or a buy limit order (or bid) below the current price in order to benefit from the bid-ask spread. Automated Trading Desk, which was bought by Citigroup in July 2007, has been an active market maker, accounting for about 6% of total volume on both NASDAQ and the New York Stock Exchange.

Another major advantage of algo trading is that if the fund manager wants to build a large stake in a company, the black box system can find a way of doing it without anyone finding out until he has bought 3 per cent - the regulatory limit at which disclosure is required.

However, like any system developed, algo trading has its own disadvantage. That this model simply follows a set numerical pattern and analyses the news that is fed into the same. However what this system cannot analyze is the psychological behavioral pattern of the traders which plays a major role in the market.

#### **Trading strategies adopted.**

Some of the common trading strategies included in the algo trading include Iceberging, Guerilla, Benchmarking, Sniper, and Snif-fer<sup>2</sup>.

Guerrilla", an algorithm developed by Credit Suisse, for example, attempts to determine in real time which publicly displayed bids or offers (that is, those on an exchange or trading platform) can be hit or taken without a high likelihood of causing jumps or displacements in the stock's trading patterns. The technique is useful for fund managers wanting to avoid moving prices against themselves.

Similarly, "Benchmark" algorithms, can be used to achieve a specific benchmark, such as the volume weighted average price over a certain time period.

Another algo developed by Investment bank, Credit Suisse called "Sniper" has been used to detect hidden sources of liquidity. The commonly used models to develop the algo models include the Neural Language and the Genetic programming.

#### **Setting a trend in the world of trading.**

It has been observed that about 40% of the trades that happen in the LSE and a third of the trading that happen in the American stock exchange are algo enabled according to an article titled "Ahead of the Tape"<sup>3</sup>.

The trend is also picking up in the forex markets with about 25 % of the trading happening through algo trading. Even the futures and options markets are slowly moving towards the algo trading with about 20% of the trading being algo enabled.

According to news article in the Financial Times,

dated Oct 02, 2006 IBM Global Business Services, the hedge funds and other investment banks should either invest and enter into the race of algo trading or lose out to the competitors. The report says that about 78 per cent of European buy-side companies use algorithms, up from 58 per cent in 2004, although only for a small proportion of their business<sup>4</sup>.

#### **The future of algorithmic trading:**

Following are the trends that that could be expected in the future:

- There would be a convergence of back and the front office. Activities like analysis of the risk exposure in forex trading and VaR calculation in case of the equities can be expected to be real time, without waiting for the next day/trading session.
- With the success that is seen in the way the equities are managed through the algo trading, the same model would be used in other asset classes like the forex, futures & options, fixed income etc.
- The modern algo trading helps the hedge funds and other I-banks to analyze hidden market trends and come up with newer strategies of investments
- With the governments tightening the regulatory norms, the use of the algo trading helps in bringing down risk and thus increases compliance with the regulatory norms.
- Algo trading also provides a huge potential for IT companies in the capital market domain as the market is still hugely untapped.

#### **SOURCES:**

1. [www.telegraph.co.uk](http://www.telegraph.co.uk) "Black box traders are on the march", August 26, 2006, Appeared in the article mentioned above
2. [www.ft.com](http://www.ft.com) "Trading with the help of 'guerrillas' and 'snipers'", By Paul Temperton, Financial Times: Published: Mar 19, 2007
3. [www.economist.com](http://www.economist.com): "Ahead of the tape" 21 June 2007, From The Economist print edition
4. [www.ft.com](http://www.ft.com) "Enter algorithmic trading systems race or lose returns" By Pauline Skypala, Financial Times Published: Oct 02, 2006
5. [www.businessweek.com](http://www.businessweek.com): "Cracking the Street's New Math" April 18, 2005, By Mara Der Hovanesian in New York



# News highlights

---

## Next in line for Sub prime hits: Bonds?

As the much hyped sub prime crisis still lingers fresh in the minds of investors and the regulators, analysts and hedge funds are predicting a bond crisis is round the corner.

The reason, Bond funds that invest in risky short term debts have been badly affected by soaring default rates by sub prime loans.

Ironically, S&P, Moody and other rating agencies had given an AAA rating to these bonds backed by sub prime home loans. About 80% of these bonds had been given an AAA rating.

Janet Tavakoli of Tavakoli Structured Finance, a Chicago based consulting firm has now raised a question on the methodology followed by these rating agencies.

Even the SEC has started reviewing the methodology followed by these rating agencies. Analysts estimate that the effect of the sub prime crisis which has affected the AA rated bonds will definitely have its impact on the AAA rated bonds in the coming days.

Source: [www.money.cnn.com](http://www.money.cnn.com)

## EU plans market reforms to avert crisis ahead of a global credit squeeze

The European nations are all set to come up with stringent proposals to improve transparency in the financial markets and to change the way the credit rating would be done by these countries. The measure is considered to a step to bring down the chances of a financial crisis arising from the global credit crunch in the coming days.

More emphasis would be laid to come up with a road map for structured products and their rating methodology. The drive comes as some members of the Group of Seven leading nations prepare to launch joint action to avoid future market turmoil at their autumn meeting this month.

French finance minister, Christine Lagarde has called for securitization to be of some standardization. She also calls for tighter regulation of unregulated entities that generate loans and then pass on the risk to others: "These entities face hardly any incentives for controlling credit risk other than market discipline. This contrasts with the more traditional situation of regulated banks." She said.

Source: [www.financialtimes.com](http://www.financialtimes.com)

## U.S. Sub prime Tension Has Increased Growth Risks: ECB

Risks to global expansion have recently increased due to tensions in the U.S. sub prime mortgage market and there are fears of growing spillovers to other segments, the European Central Bank said on Thursday.

"Risks also relate to global imbalances, protectionist

pressures and the possibility of further increases in oil and commodity prices," the bank said in its monthly bulletin for September. "While the global repercussions of the U.S. economic slowdown have so far been limited, it remains to be seen whether the recent financial market turmoil will lead to a lasting reappraisal of global financial market risks and a loss in confidence with possible implications for the real economy," the bulletin said.

Global economic activity remained robust, however, supported mainly by buoyant activity in emerging economies, the bank said.

"In particular, the larger countries in Asia continue to record strong growth rates, and the region remains the main engine of global growth," it added.

Source: [www.bnet.com](http://www.bnet.com)

## IMF head warns on impact of credit crisis

The credit squeeze will force governments worldwide to make substantial changes to their budget plans, Rodrigo Rato, outgoing managing director of the International Monetary Fund, has warned.

Mr Rato said the credit squeeze was a "serious crisis" that was not over yet and would curtail growth worldwide. His comments came during an interview with the Financial Times in which he appeared to endorse European concerns about the decline in the dollar; a subject that threatens to be a cause of discord at the Group of Seven summit and IMF annual meeting this month. But he cautioned against assuming the developing world could decouple completely from the US. "Everybody is going to feel some impact," he said.

The outgoing IMF chief said many of the big emerging markets are growing rapidly. But "to what extent they will keep that momentum will depend on how long the slowdown is in the US and Europe" Mr. Rato said emerging markets with large current account deficits would be much more vulnerable to changes in the availability and price of credit than those in a "more balanced situation". Dominique Strauss-Kahn, a former French finance minister, is poised to take over from Mr. Rato as head of the IMF at the end of October.

Source: <http://www.ft.com>

## Record FII inflow into Indian markets:

There has been a record inflow of foreign institutional investment in the past nine months into the Indian markets. The inflows have overtaken traditional markets like South Korea, Thailand, Taiwan, and Indonesia.

The inflows amount to a whopping figure of \$14.33 Bn which is about 182% more than the last year's figure.

The major reasons cited behind this phenomenon include the two big IPO's from DLF and ICICI and the Sub Prime crisis in the US. Another major reason seen

behind such huge flow of funds includes the FED cutting the interest rates last month which has prompted the investors to turn towards Indian markets.

An interesting phenomenon that can be observed in this is that even the cautious and the so called orthodox investors of the Japanese economy too are investing in the Indian markets.

Source: [www.financialtimes.com](http://www.financialtimes.com)

### **Sub prime crisis a concern for India's growth outlook: D&B**

The US sub-prime crisis is a concern for India's growth outlook as several export-oriented companies may get affected, international and Indian business information provider Dun & Bradstreet has said.

"The perceived risks to US growth prospects, a possible outcome of the sub-prime crisis, do pose concern for India's growth outlook, as several export-oriented companies, in particular, companies that cater to the banking, financial services and insurance (BFSI) segment could get adversely impacted," Dun & Bradstreet India Chief Operating Officer (COO) Kaushal Sampat said in its economy forecast report here on Monday.

"The initial impact of the repeated hikes in interest rates which was felt by the real estate and construction sector got transmitted to the core sector," Sampat said. "The impact on other interest sensitive items like consumer durables got transmitted to related sectors in the production and distribution chain. Similarly, export-oriented manufacturing and services are facing the brunt of rupee appreciation, which is passed on to the envelope of their product chain," Sampat added. D&B expects that the Indian rupee would continue to remain strong and the average value of rupee is expected to be in the range of 40.80-41 for Sept 2007, it said.

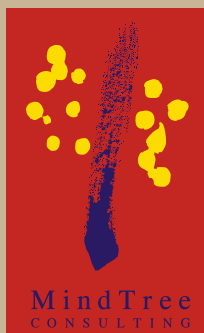


## Some unknown but amazing facts

---

- The world's first mutual fund The Massachusetts Investors Trust was started by three Boston securities executives in March 1924, who pooled their money to start the world's first Mutual fund. The amount which they pooled was \$50000. The Mutual fund industry today is worth about \$9.207 Trillion.
- The most expensive seat (market maker) was sold in 1929 for \$625,000, which, adjusted for inflation, is over six million in today's dollars.
- On October 19, 1987, the Dow Jones Industrial Average (DJIA) dropped 554.26 points, a 22.6% loss in a single day, the biggest one-day drop the exchange had yet experienced, prompting officials at the exchange to invoke for the first time the "circuit breaker" rule to halt all trading
- The NYSE was closed from September 11 until September 17, 2001 as a result of the September 11, 2001 attacks.
- The average volume of the bond trading on the US bond market is about \$923 billion which is almost 1.5 times the Indian GDP!
- The worst stock market crash ever in the world history was in the American Stock exchange that lasted for 800 days between the years 1929-32, the average loss the index experienced was about 82%! This was due to the great depression in the US.





MindTree Consulting is a global IT and R&D Services Company co-headquartered in the U.S. and India. With a passion for customer satisfaction, MindTree partners with its clients to create a transparent, value-based relationship. Our domain experts deliver business-enabling solutions by leveraging a consulting led, framework-based and IP-driven approach. MindTree's IT Services business provides a range of services to CIOs across a variety of industry segments. Our R&D Services business works with Technology companies to help build innovative products by providing Product Realization services.

MindTree was named among the Top 30 offshore service providers by the International Association of Outsourcing Professionals and Fortune Magazine. Widely known for its focus on human capital development, MindTree has been consistently rated as the most admired employers by several industry surveys, including Hewitt Associates and Mercer/TNS, and is also the winner of the MAKE Award for knowledge management. MindTree is publicly listed in India.

Please visit us at [www.mindtree.com](http://www.mindtree.com).



## In this MindScape ...

1. Editorial	
<i>By: Dr.Ashok. B Hegde.....</i>	<b>1</b>
2. Credit Risk Modeling: Study of Interrelationships between Credit Risk & financial Ratios of a Firm	
<i>By: Raghunath Tripasuri.....</i>	<b>2</b>
3. Fund raising , Lessons for India- New Private Equity Exchange	
<i>By: Dr.Ashok. B Hegde.....</i>	<b>7</b>
4. Convergence: Is it a way forward in Algorithmic Trading?	
<i>By: Roshan Prabhakar.....</i>	<b>9</b>
5. News Highlights	
.....	<b>11</b>
6. Some unknown but Amazing facts	
.....	<b>12</b>



*Opinion expressed in the articles are authors only and MindTree is not responsible for any representations/opinion expressed in here.  
This news letter is for private circulation only.*



## MindScape Team

• Dr Ashok B. Hegde (Editor) • Neeraj Pant • Roshan Prabhakar  
• Sameer Agarwal • Mariam Shireen



Please mail your feedback and suggestions to [fin\\_minds@mindtree.com](mailto:fin_minds@mindtree.com)



Designed and printed by: [gchannakeshava@gmail.com](mailto:gchannakeshava@gmail.com)