
Implication of the revised SLB scheme for equity markets

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1 Introduction

Securities Lending and Borrowing (SLB) refers to a loan of securities by a lender to a borrower for a fixed period of time. The SLB Scheme (SLBS) was introduced on April 21, 2008.

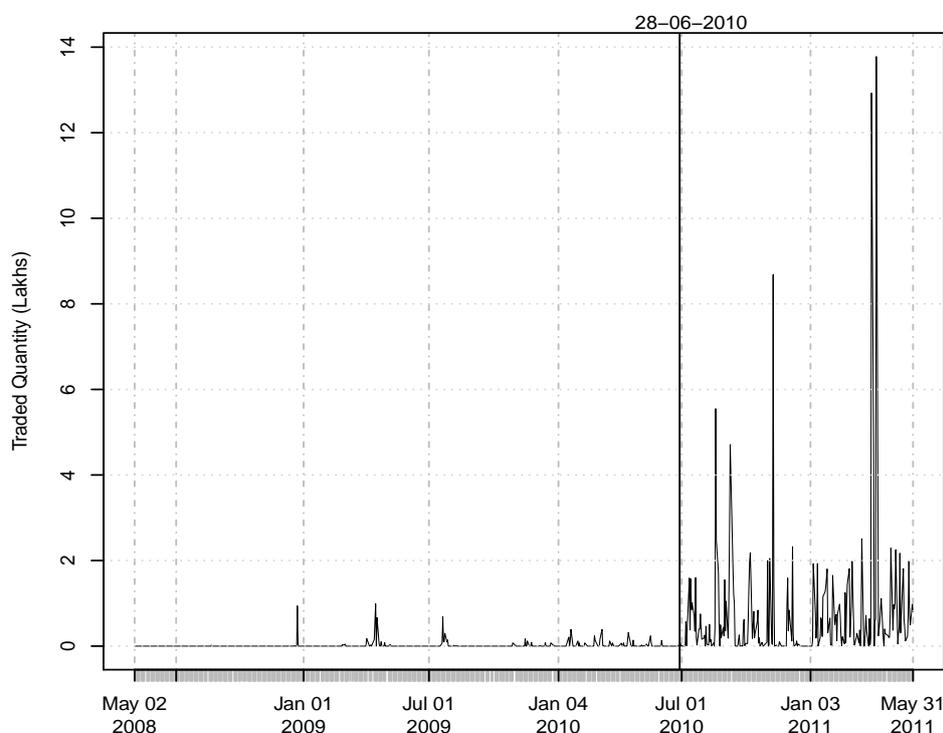
The key features of the SLBS are:

- Automated screen based trading platform with online matching of trades based on price-time priority
- All classes of investors including FIIs permitted
- Settlement Guarantee
- NSCCL as an Approved Intermediary acts as a Central Counterparty(CCP)

The SLB scheme was revised in January 2010 and the revised scheme was launched on June 28, 2010. The revised scheme included:

- Tenure of lending and borrowing available upto a period of 12 months
- A facility for placing early recall request for the securities lent is provided to the lender
- A facility for the borrower to make an early repayment of securities and further relend them

The revised scheme appeared to have had an impact on the volumes traded in the SLB market, as can be seen in Figure 1. What we aim to do is to test whether these revisions have benefitted traders in the market, and whether this, in turn, has led to improvements in the quality of the equity market.

Figure 1 Traded quantity, May 2008-May 2011

2 Benefits out of an active SLB market

There are several benefits that accrue when traders get access to a robust securities lending and borrowing market when earlier there was none.

The *simplest* is that long term investors who own the securities can become lenders in the SLB market. Lenders in this market benefit by earning a fee on securities that have been typically earning only dividends. This raises the returns on long-term investment to

$$\text{Capital gains} + \text{Dividends} + \text{SLB lending rates}$$

Thus, having an active SLB market will only improve the long-term investors returns.

A *more complex* benefit is the implication of SLB markets on improving market efficiency. The key market participant that ensures a good efficient mar-

ket system are the arbitrageurs. When the price between the futures/options and the underlying spot becomes disconnected, the arbitrageur will see an opportunity to make riskless profit by trading on both the markets. This has always been easy to do if the derivatives price becomes too high compared to the spot, because the arbitrageur would sell the expensive contract (derivative) and buy the cheap one (shares). The derivatives contracts are cash-settled, and the purchase of shares is a cash transaction also. As long as the arbitrageur has access to capital, this *cash-and-carry* arbitrage can be readily implemented, and so derivatives contract prices will never become too high compared to the share price.

However, the reverse situation – when the derivatives have become too cheap compared to the shares – has been difficult to implement. Here, when the arbitrageur buy the derivatives, this is still a cash-settled position. But they would have to sell the security, for which they would have to deliver the security on a $T + 2$ settlement period. If the arbitrageur does not have the security, or does not have access to securities, they would not be able to do this *reverse cash-and-carry* arbitrage. Thus, it would be possible for derivatives prices to go lower than they should and remain so, because the arbitrageur did not have access to borrowing the security.

However, with the start of the SLB markets, the arbitrageur in the equities market now has access to borrowing securities. This would mean that the prices of the derivatives would be more likely to remain within the correct bands of relationship – both when prices go too high or too low compared with the share price – at all times.

This would mean that the quality of the market improves with the SLB markets because the arbitrageur could become *borrowers*, and long-term investors could become *lenders* on the SLB segment.

In the following section, we examine whether the start of the SLB market has achieved the improvement in equity market quality that we expect from the above rationale.

3 Testing for impact

We expect that an active SLBS would improve market quality in two ways. Firstly, it would increase price efficiency by decreasing negative basis through reverse cash-and-carry. It would also lead to a decrease in the basis risk of stocks with active SLB trading. Secondly, we expect that the volatility of stock prices would decrease with active SLB trading.

Table 1 shows the trading activity of CNX100 stocks pre and post imple-

Table 1 Trading activity in SLB segment at NSE

Size quartiles	1 Jan - 27 Jun		28 Jun - 31 Dec	
	Lent shares	No. of trades	Lent shares	No. of trades
Big	-	-	2,877,426	214
Q2	78,134	13	1,631,070	184
Q3	214,400	29	1,717,300	139
Small	-	-	432,251	113

mentation of the revised SLBS. The table further indicates that the number of shares traded increased significantly post implementation of SLBS. Out of 100 stocks, only 32 stocks had some trading activity in the SLB segment at NSE. However, the total traded quantity of Nifty stocks active on SLBM segment is 4.7 million, while the Nifty spot market volumes are 11 billion. Thus the SLB market activity is still significantly small in comparison to the Nifty spot market, though it has increased after the revision of the earlier SLBM structure.

We next test the impact of the revised scheme on market quality by testing the quality of price efficiency and volatility before the revision, and after the revision.

3.1 Impact on price efficiency

- Average Basis (\bar{B}), where \bar{B}_{pre} stands for the average basis before the SLB revisions, and \bar{B}_{post} is the value of the basis after.

Table 2 shows that the average basis rose for most of the stocks with and without active SLB trading after the SLB revisions were implemented. Only one stock (in the 3rd quartile) with active SLB trading shows a decrease in average basis after the revisions.

- Positive basis B^+ which is the basis when futures was more expensive compared to spot, and negative basis B^- , when spot was more expensive.

Table 3 shows a significant increase in positive basis for all stocks with and without active trading in SLBM. There is a significant decrease in negative basis of one stock in Q3 with active SLB trading but over all there is increase in negative basis across all stocks with and without SLB trading.

Table 2 Is $|\bar{B}|_{pre} = |\bar{B}|_{post}$?

Index/Stocks	$ \bar{B} _{pre}$	σ_{pre}	$ \bar{B} _{post}$	σ_{post}	$\Delta\bar{B}$	$\Delta\sigma$
Nifty	0.14	0.18	0.29	0.26	-0.15	-0.08

Trading activity in SLBM						
Q1	0.29	0.40	0.45	0.45	0.16	0.04
Q2	0.45	0.55	0.59	0.69	0.15	0.14
Q3	0.62	0.64	0.52	0.55	-0.11	-0.08
Q4	0.33	0.38	0.55	0.47	0.22	0.10

No trading activity in SLBM						
Q1	0.27	0.30	0.43	0.38	0.16	0.08
Q2	0.33	0.30	0.51	0.39	0.18	0.08
Q3	0.33	0.34	0.49	0.39	0.16	0.05
Q4	0.36	0.36	0.56	0.39	0.20	0.03

Table 3 Question: Is $\bar{B}_{pre}^+ = \bar{B}_{post}^+$? and Is $|\bar{B}|_{pre}^- = |\bar{B}|_{post}^-$?

Trading activity in SLBM						
Stocks	\bar{B}_{pre}^+	\bar{B}_{post}^+	$ \bar{B} _{pre}^-$	$ \bar{B} _{post}^-$	$\Delta\bar{B}^+$	$\Delta\bar{B}^-$
Q1	0.24	0.43	0.33	0.38	0.20	0.05
Q2	0.24	0.40	0.55	0.67	0.16	0.13
Q3	0.28	0.43	0.69	0.54	0.16	-0.15
Q4	0.29	0.50	0.35	0.50	0.21	0.14

No trading activity in SLBM						
Stocks	\bar{B}_{pre}^+	\bar{B}_{post}^+	$ \bar{B} _{pre}^-$	$ \bar{B} _{post}^-$	$\Delta\bar{B}^+$	$\Delta\bar{B}^-$
Q1	0.25	0.46	0.24	0.28	0.21	0.03
Q2	0.28	0.51	0.25	0.32	0.23	0.06
Q3	0.33	0.50	0.27	0.39	0.17	0.12
Q4	0.34	0.56	0.39	0.42	0.22	0.02

- Basis risk

Basis risk is calculated as the monthly standard deviation in basis (between the futures and spot market price). Table 4 shows that there has been a significant *increase* in basis risk for all stocks with and without SLB trading. Only one stock (once again, in the 3rd quartile) with active trading in SLB shows a decrease in basis risk.

Table 4 Summarising basis risk

Index/Stocks	$\bar{B}_{\sigma_{pre}}$	$\bar{B}_{\sigma_{post}}$	$\Delta \bar{B}_{\sigma}$
Nifty	15.69	18.64	2.54
Trading activity in SLBM			
Q1	25.46	36.75	11.29
Q2	42.75	50.29	7.54
Q3	44.99	43.62	-1.37
Q4	31.30	37.71	6.41
No trading activity in SLBM			
Q1	25.17	30.33	5.16
Q2	24.11	32.26	8.15
Q3	28.34	33.25	4.91
Q4	25.29	34.62	9.33

3.2 Impact on volatility

Table 5 summarises the impact of SLBS for equity volatility. We see that the overall market volatility has decreased in this period, which is also true for stocks with and without active SLB trading. So, the decrease in volatility is a market phenomenon and cannot be attributed to the efficiency of SLBS.

Table 5 Summarising volatility impact

Index/Stocks	$\text{med}(\sigma_{pre})$	$\text{med}(\sigma_{post})$	$\Delta \text{med}(\sigma)$
Nifty	0.39	0.38	-0.01
Niftyfut	0.35	0.40	0.05
Trading activity in SLBM			
Q1	0.97	0.93	-0.04
Q2	1.09	1.08	-0.01
Q3	1.33	1.06	-0.27
Q4	1.18	1.22	0.04
No trading activity in SLBM			
Q1	1.20	0.99	-0.21
Q2	1.20	1.04	-0.16
Q3	1.31	1.13	-0.18
Q4	1.29	1.17	-0.12

Note: $\sigma_Q = \sqrt{\Sigma \sigma_i^2 / n}$

4 Operationalising reverse-cash-and-carry today

It would appear that despite the improved volumes in SLB trading, there has not yet had much impact of SLB on the market efficiency or volatility that we had expected for the arbitrage traders. One reason could be that lenders have not yet noticed the high lending fees in the market place, that could substantially improve their returns from equity holdings. Another reason could be that the arbitrageurs are not yet implementing reverse cash-and-carry positions in the market.

We next discuss the details of how a trader could structure the reverse cash and carry arbitrage positions, and try to understand whether there are fundamental market structure issues that act as a barrier to these arbitrageurs entering into the market. For this, we construct a set of positions that denote a reverse cash-and-carry, and examine how the revised SLB mechanism would influence this activity as follows:

The reverse cash and carry (RCnC) arbitrage portfolio

The RCnC is taken by a trader on a particular stock when its futures price ("F") is lower than its share price ("S") at the same point in time. In other words if the basis i.e. $\ln(F_t/S_t)$ is negative. To operationalise the position, the trader has to take a long position in futures while simultaneously selling the spot. Traders who do not own the shares can short sell the security and settle the trade by borrowing the shares from the SLB market. He will take this position only if his profit = (spot - future - lending fee) > 0. The portfolio the arbitrageur takes is as shown in Box 4.

Box: Arbitrage portfolio:

Trading strategy start date: 20 Jan 2011

Security = S

Spot price = Rs 712

Futures price = Rs 600

Long Futures of stock S

- Quantity: 1000 shares
- Contract size: Rs. 5 lakhs
- Margin requirement: Rs X
- Expiry of futures contract: 27 Jan 2011

SLB : Borrow stock S

- Borrow stock S
- 1st leg settlement: 21 Jan 2011
- Reverse leg settlement: 3 Feb 2011
- Quantity borrowed: 1000 shares
- Lending fees per share: Rs 40
- Price of stock on 19 Jan 2011: Rs 711
- Borrowers obligation: total lending fees + lending price (closing price on 19 Jan 2011) in cash collaterals payable on 21st Jan 2011.
- Lenders obligation: Deliver 1000 shares of S on 21st Jan 2011.
- Margin on 20th Jan 2011: Lender - X_1 , Borrower - Total lending fees
- Margin 21 Jan - 3rd Feb: Lender - Nil, Borrower- X_2

Short sell 1000 shares of stock S

In order for this portfolio to be implemented, the arbitrageur has to have access to a deep and resilient SLB where there is a constant supply of securities lent. For this, it is critical that the SLB structure has the correct incentives for long term shareholders to continuously lend securities into the market. This depends upon the returns and risk these shareholders face from lending securities to the market, which are as follows:

1. Returns earned from lending in SLB

The present rates earned when securities are lent are quite high at 8.9%.

These rates itself are very attractive compared to the 7.9 % returns the

investor can earn from a Fixed Income mutual fund or a 6.25% returns from a fixed deposit scheme.

2. Risk of lending in SLB.

Since the securities loan is made on the exchange platform, there is no risk to the lender of not receiving the fee because these trades are covered by the clearing corporation. However, there is the risk of market illiquidity if the shareholder needs to close out the loan prior to the maturity of the SLB contract.

This is operationalised by the lender placing an *early recall request*. The lender has to quote the lending fee he is willing to forego for the balance period. However, the early recall request is at a best effort basis – the exchange does not guarantee the liquidity so that there is a matching order on the other side offering securities to the recall order. The lender has to wait to find a match for his early recall order. In case the lender fails to find any match, the lender will have to keep the loan position open till the reverse leg day. At present, there is no mechanism available to meet the lenders early recall request in case of no matching order.

For example, the lender (say, a mutual fund) makes an early recall on 25th January 2011 in order to fulfil his clients order to redeem. The MF has to quote a lending fee he is willing to forego for the balance period. He will quote a fee \leq Rs 40 in order to make a profit \geq 0. However if there is no order match at this price, the MF will suffer a loss in placing an early recall order in that they will still have to make good the redemption claim to their client.

This example illuminates one aspect of the current SLB market design that most likely needs to be strengthened to reduce the risk to lenders, so that they will be incentivised to provide liquidity on the lending side of the SLB market.

5 Conclusion

Post SLBM revision, stocks have on an average shown an increase in basis, positive basis and negative basis. The expected impact of SLBM on futures price efficiency has not taken place. The volatility of these stocks have decreased. However, in this period, overall market volatility has also decreased, so this could be a overall phenomenon rather than impact of the SLBM. Thus, the SLBM even post revision has not yet reached the volumes where it has any significant impact on market quality.

One of the reasons that have led to a weak SLB market as documented by NSE is the lack of lenders in the SLB segment. This could be a result of the fact that lenders face a risk in being able to readily recall securities lent into the SLB market.