

Does the type of settlement matter?

Evidence from Indian Derivatives Market.

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1 Introduction

A derivative contract has two modes of settlement- physical delivery or cash settlement. Under a settlement through physical delivery, the trader with a short-position is obliged to deliver the underlying asset at a specified location. The mode of physical delivery opens conversation about the quality of asset, the location of the asset, the storage, transportation and the insurance costs. The addition of several contractual specifications makes the contract lose its tradability in the market, especially in case of commodities. Under the alternative mode of cash settlement, a cash transfer is conducted by squaring off the difference between the prevailing market price and the agreed exercise price. As per conventional wisdom, cash settlement system leaves little scope for market manipulation techniques such as – market cornering or market squeezes, which otherwise have been rampant under the physical delivery mode of settlement. The study illustrates the comparative impact of the two settlement modes on the overall market welfare by analysing the case of India, where the Securities Exchange Board of India (SEBI) mandated a phased shift of all stock futures and options contracts from a cash settlement to a physical delivery system from April 2019 onwards. As per the mandate, phased transition would occur in two steps- 1) Stocks which were being cash settled shall be ranked in descending order based on daily market capitalization averaged for the month of December 2018; 2) Based on the ranking arrived above, the bottom 50 stocks shall move to physical settlement from April 2019 expiry, the next 50 stocks from the bottom shall move to physical settlement from July 2019 expiry, and the remaining stocks shall move to physical settlement from October 2019 expiry.

We measure the market welfare using three prominent constructs - volatility in the spot market, hedging efficiency of futures, and the price discovery in the futures market. We explain the plausible channels of impact of a physical mode of derivative settlements on the mentioned market welfare constructs as follows:

1. **Volatility in spot market:** A mandatory physical settlement of contracts, robs off the traders of the privilege of settling off their positions in the market by transferring cash on the expiry day. Therefore, the traders will have to roll-over their position ahead of expiry day, averting the lumping of roll-over positions on expiry day that leads to excess volatility.

At the same time, the need for owning/borrowing the stocks before indulging into a short position is likely to induce relatively higher activity and volatility in spot markets.

2. **Hedging Efficiency of futures:** With physical delivery of contracts upon expiry, a call option writer is redeemed from purchasing the contracts in spot market to deliver them to the buyer. Instead, he would transfer the shares he received at an agreed price to the respective option buyers, hence mitigating his hedging risk exposure.

However, physical deliveries may reduce short-selling as short-sellers would now be required to borrow stocks under the Securities Lending and Borrowing (SLB) mechanism which remains a shallow space in India. With higher cost of borrowing under the SLB mechanism, cost of hedging is also raised, lowering the efficiency of hedging in the market.

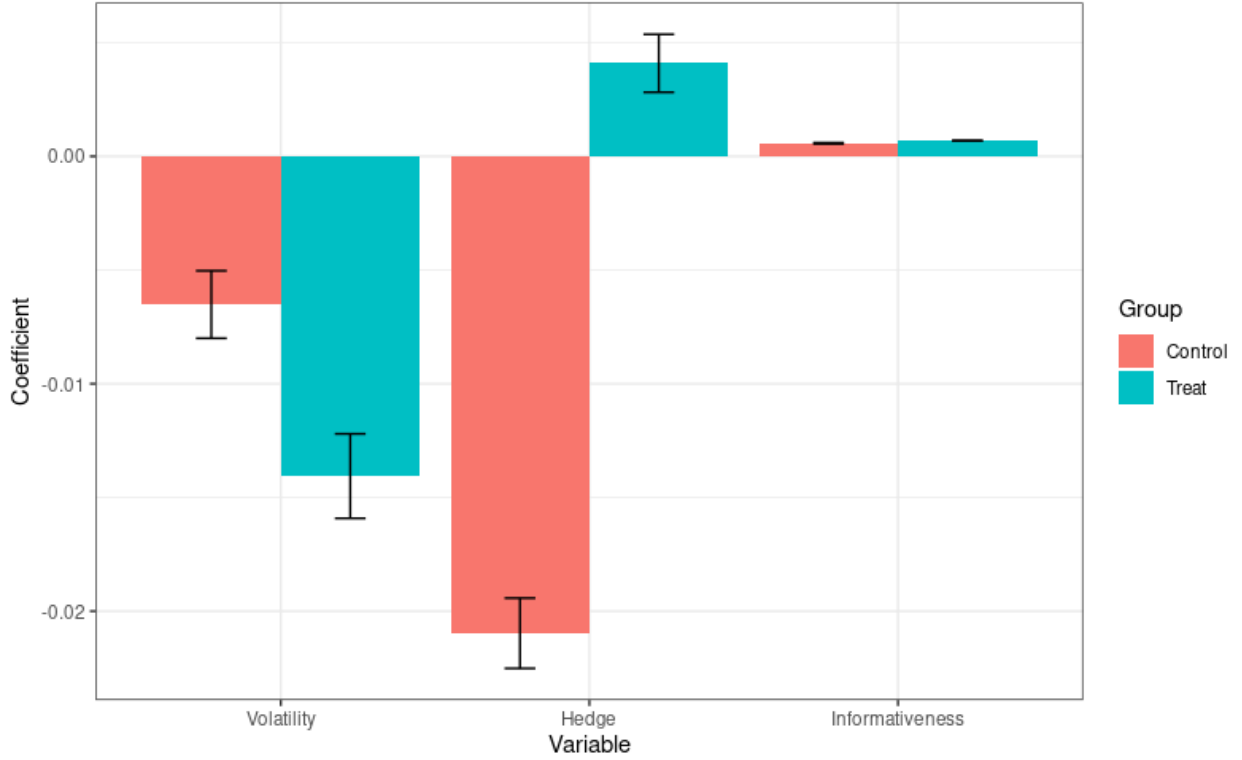
3. **Price Discovery of futures:** The distinction between futures and spot markets is removed upon introduction of physical settlement in the spot markets. This convergence in prices may enhance the information dissemination between spot and futures.

On the other hand, a consequent shift in traded volumes from equity spot and futures market to cash-settled equity-indices may dry up the stock futures and options market. A drop in volume may exacerbate the bid-ask spread and adversely impact the price-discovery mechanism.

2 Findings

We find that upon the adoption of physical settlement of derivatives in April 2019, the stock that experienced the intervention (treated) experienced a decline in volatility, and the decline in volatility for the treated group is significantly lower than the change in volatility for the untreated (control) group stocks. The same has been presented in [Fig. 1](#). One plausible explanation for the observed decline in volatility is the reduction in speculation that SEBI targeted for. When stocks cannot be settled by squaring-off cash-differences, traders are likely to refrain from excess speculation wherein an over-ambitious trade-position could multiply their risk several times. Therefore, traders have to be wary while trading in the derivatives segment, as they may end up paying the full contract value besides the margin money. As a result, traders are cautioned to roll-over their positions ahead of the expiry week when settlement can only be done through physical delivery. This mitigates the lumping of roll-over positions on expiry day curbing volatility in the market. At the same time, the hedge ratio determined from DCC-GARCH model demonstrates a significant increase in the hedging-efficiency of the futures contracts. The results therefore lead us to believe that hedging ratio of futures contracts increased significantly upon introduction of physical settlement. We also witness a significant rise in the informativeness of the futures contracts in the market. Even though investor's attention is likely to shift towards the cash settled indices, the significant rise in the convergence of the spot and futures market reflects as a rise in informativeness of futures contracts.

Figure 1: Impact on market welfare upon adoption of physical settlement of derivatives



The plots provide a visual representation of the difference in the changes of outcome variables for treated group and control group. The bars represent α (estimated impact on control group stocks) and $\alpha + \beta$ (estimated impact on treated group of stocks). Error bars represent 95% confidence intervals using robust standard errors.

3 Conclusion

The study investigates if the mode of settlement of futures contract - cash or physical-delivery has any significant influence on the volatility in the spot market, the hedging efficiency of futures, and the price-discovery function of futures contracts. With a treatment sample of 46 stocks that were moved to physical delivery system by SEBI from April, 2019 expiry and a control group of 45 stocks that were mandated to switch to a physical settlement mode from July, 2019. The analysis takes onto a Difference in Difference approach to look for significant deviations in the market upon the said intervention by SEBI. The empirical evidence suggests a significant decline in spot-market volatility. At the same time, hedging ratio is recorded to rise accompanied with improvement in price discovery efficiency. However, the effect of intervention on the market is likely to fade away with time as markets adjust to the newness.