

# INDIAN DERIVATIVES MARKETS<sup>1</sup>

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## 1. Rise of Derivatives

The global economic order that emerged after World War II was a system where many less developed countries administered prices and centrally allocated resources. Even the developed economies operated under the Bretton Woods system of fixed exchange rates.

The system of fixed prices came under stress from the 1970s onwards. High inflation and unemployment rates made interest rates more volatile. The Bretton Woods system was dismantled in 1971, freeing exchange rates to fluctuate. Less developed countries like India began opening up their economies and allowing prices to vary with market conditions.

Price fluctuations make it hard for businesses to estimate their future production costs and revenues.<sup>2</sup> Derivative securities provide them a valuable set of tools for managing this risk. This article describes the evolution of Indian derivatives markets, the popular derivatives instruments, and the main users of derivatives in India. I conclude by assessing the outlook for Indian derivatives markets in the near and medium term.

## 2. Definition and Uses of Derivatives

A derivative security is a financial contract whose value is derived from the value of something else, such as a stock price, a commodity price, an exchange rate, an interest rate, or even an index of prices. In the Appendix, I describe some simple types of derivatives: forwards, futures, options and swaps.

Derivatives may be traded for a variety of reasons. A derivative enables a trader to hedge some preexisting risk by taking positions in derivatives markets that offset potential losses in the underlying or spot market. In India, most derivatives users describe themselves as hedgers (FitchRatings, 2004) and Indian laws generally require that derivatives be used for hedging purposes only. Another motive for derivatives trading is speculation (i.e. taking positions to profit from anticipated price movements). In practice, it may be difficult to distinguish whether a particular trade was for hedging or speculation, and active markets require the participation of both hedgers and speculators.<sup>3</sup>

A third type of trader, called arbitrageurs, profit from discrepancies in the relationship of spot and derivatives prices, and thereby help to keep markets efficient. Jogani and Fernandes (2003) describe India's long history in arbitrage trading, with line operators and traders arbitraging prices between exchanges located in different cities, and between two exchanges in the same city. Their study of Indian equity derivatives markets in 2002 indicates that markets were inefficient at that time. They argue that lack of knowledge, market frictions and regulatory impediments have led to low levels of capital employed

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<sup>2</sup> Price volatility may reflect changes in the underlying demand and supply conditions and thereby provide useful information about the market. Thus, economists do not view volatility as necessarily harmful.

<sup>3</sup> Speculators face the risk of losing money from their derivatives trades, as they do with other securities. There have been some well-publicized cases of large losses from derivatives trading. In some instances, these losses stemmed from fraudulent behavior that went undetected partly because companies did not have adequate risk management systems in place. In other cases, users failed to understand why and how they were taking positions in the derivatives.

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in arbitrage trading in India. However, more recent evidence suggests that the efficiency of Indian equity derivatives markets may have improved (ISMR, 2004).

### **3. Exchange-Traded and Over-the-Counter Derivative Instruments**

OTC (over-the-counter) contracts, such as forwards and swaps, are bilaterally negotiated between two parties. The terms of an OTC contract are flexible, and are often customized to fit the specific requirements of the user. OTC contracts have substantial credit risk, which is the risk that the counterparty that owes money defaults on the payment. In India, OTC derivatives are generally prohibited with some exceptions: those that are specifically allowed by the Reserve Bank of India (RBI) or, in the case of commodities (which are regulated by the Forward Markets Commission), those that trade informally in “havala” or forwards markets.

An exchange-traded contract, such as a futures contract, has a standardized format that specifies the underlying asset to be delivered, the size of the contract, and the logistics of delivery. They trade on organized exchanges with prices determined by the interaction of many buyers and sellers. In India, two exchanges offer derivatives trading: the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). However, NSE now accounts for virtually all exchange-traded derivatives in India, accounting for more than 99% of volume in 2003-2004. Contract performance is guaranteed by a clearinghouse, which is a wholly owned subsidiary of the NSE.<sup>4</sup> Margin requirements and daily marking-to-market of futures positions substantially reduce the credit risk of exchange-traded contracts, relative to OTC contracts.<sup>5</sup>

### **4. Development of Derivative Markets in India**

Derivatives markets have been in existence in India in some form or other for a long time. In the area of commodities, the Bombay Cotton Trade Association started futures trading in 1875 and, by the early 1900s India had one of the world’s largest futures industry. In 1952 the government banned cash settlement and options trading and derivatives trading shifted to informal forwards markets. In recent years, government policy has changed, allowing for an increased role for market-based pricing and less suspicion of derivatives trading. The ban on futures trading of many commodities was lifted starting in the early 2000s, and national electronic commodity exchanges were created.

In the equity markets, a system of trading called “badla” involving some elements of forwards trading had been in existence for decades.<sup>6</sup> However, the system led to a number of undesirable practices and it was prohibited off and on till the Securities and

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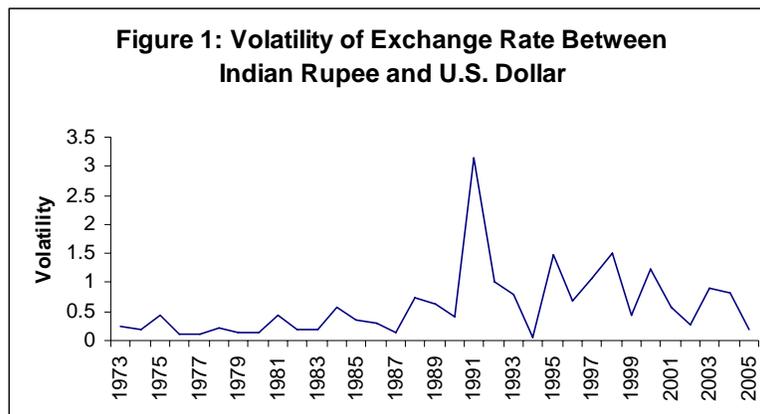
<sup>4</sup> A clearinghouse guarantees performance of a contract by becoming buyer to every seller and seller to every buyer.

<sup>5</sup> Customers post margin (security) deposits with brokers to ensure that they can cover a specified loss on the position. A futures position is marked-to-market by realizing any trading losses in cash on the day they occur.

<sup>6</sup> “Badla” allowed investors to trade single stocks on margin and to carry forward positions to the next settlement cycle. Earlier, it was possible to carry forward a position indefinitely but later the maximum carry forward period was 90 days. Unlike a futures or options, however, in a “badla” trade there is no fixed expiration date, and contract terms and margin requirements are not standardized.

Exchange Board of India (SEBI) banned it for good in 2001. A series of reforms of the stock market between 1993 and 1996 paved the way for the development of exchange-traded equity derivatives markets in India. In 1993, the government created the NSE in collaboration with state-owned financial institutions. NSE improved the efficiency and transparency of the stock markets by offering a fully automated screen-based trading system and real-time price dissemination. In 1995, a prohibition on trading options was lifted. In 1996, the NSE sent a proposal to SEBI for listing exchange-traded derivatives. The report of the L. C. Gupta Committee, set up by SEBI, recommended a phased introduction of derivative products, and bi-level regulation (i.e., self-regulation by exchanges with SEBI providing a supervisory and advisory role). Another report, by the J. R. Varma Committee in 1998, worked out various operational details such as the margining systems. In 1999, the Securities Contracts (Regulation) Act of 1956, or SC(R)A, was amended so that derivatives could be declared “securities.” This allowed the regulatory framework for trading securities to be extended to derivatives. The Act considers derivatives to be legal and valid, but only if they are traded on exchanges. Finally, a 30-year ban on forward trading was also lifted in 1999.

The economic liberalization of the early nineties facilitated the introduction of derivatives based on interest rates and foreign exchange. A system of market-determined exchange rates was adopted by India in March 1993. In August 1994, the rupee was made fully convertible on current account. These reforms allowed increased integration between domestic and international markets, and created a need to manage currency risk. Figure 1 shows how the volatility of the exchange rate between the Indian Rupee and the U.S. dollar has increased since 1991.<sup>7</sup> The easing of various restrictions on the free movement of interest rates resulted in the need to manage interest rate risk.



Source: Author’s calculations, based on daily exchange rate data.

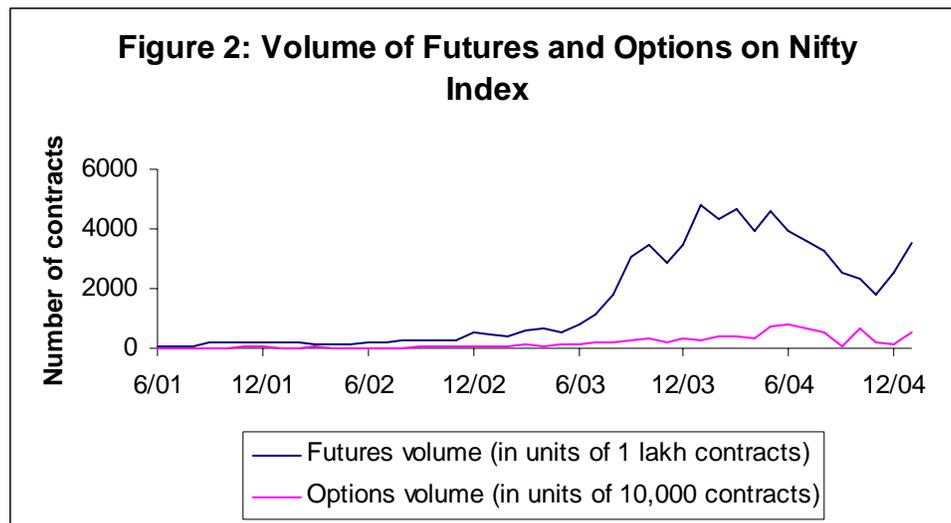
## 5. Derivatives Instruments Traded in India

In the exchange-traded market, the biggest success story has been derivatives on equity products. Index futures were introduced in June 2000, followed by index options in June 2001, and options and futures on individual securities in July 2001 and November 2001, respectively. As of 2005, the NSE trades futures and options on 118 individual stocks and

<sup>7</sup> Volatility is measured as the yearly standard deviation of the daily exchange rate series.

3 stock indices. All these derivative contracts are settled by cash payment and do not involve physical delivery of the underlying product (which may be costly).<sup>8</sup>

Derivatives on stock indexes and individual stocks have grown rapidly since inception. In particular, single stock futures have become hugely popular, accounting for about half of NSE's traded value in October 2005. In fact, NSE has the highest volume (i.e. number of contracts traded) in the single stock futures globally, enabling it to rank 16 among world exchanges in the first half of 2005. Single stock options are less popular than futures. Index futures are increasingly popular, and accounted for close to 40% of traded value in October 2005. Figure 2 illustrates the growth in volume of futures and options on the Nifty index, and shows that index futures have grown more strongly than index options.<sup>9</sup>



Source: Author's calculations, based on NSE data.

NSE launched interest rate futures in June 2003 but, in contrast to equity derivatives, there has been little trading in them. One problem with these instruments was faulty contract specifications, resulting in the underlying interest rate deviating erratically from the reference rate used by market participants. Institutional investors have preferred to trade in the OTC markets, where instruments such as interest rate swaps and forward rate agreements are thriving. As interest rates in India have fallen, companies have swapped their fixed rate borrowings into floating rates to reduce funding costs.<sup>10</sup> Activity in OTC markets dwarfs that of the entire exchange-traded markets, with daily value of trading estimated to be Rs. 30 billion in 2004 (FitchRatings, 2004).

Foreign exchange derivatives are less active than interest rate derivatives in India, even though they have been around for longer. OTC instruments in currency forwards and swaps are the most popular. Importers, exporters and banks use the rupee forward market

<sup>8</sup> Settlement represents the exchange of a security and its payment.

<sup>9</sup> Nifty is an index of 50 stocks comprising 60% of NSE's total market capitalization as of March 31 2005.

<sup>10</sup> In an interest rate swap, a company may receive a floating rate (linked to a benchmark rate) and pay a fixed rate. A forward rate agreement allows a company to lock in a particular interest rate.

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to hedge their foreign currency exposure. Turnover and liquidity in this market has been increasing, although trading is mainly in shorter maturity contracts of one year or less (Gambhir and Goel, 2003). In a currency swap, banks and corporations may swap its rupee denominated debt into another currency (typically the US dollar or Japanese yen), or vice versa. Trading in OTC currency options is still muted. There are no exchange-traded currency derivatives in India.

Exchange-traded commodity derivatives have been trading only since 2000, and the growth in this market has been uneven. The number of commodities eligible for futures trading has increased from 8 in 2000 to 80 in 2004, while the value of trading has increased almost four times in the same period (Nair, 2004). However, many contracts barely trade and, of those that are active, trading is fragmented over multiple market venues, including central and regional exchanges, brokerages, and unregulated forwards markets. Total volume of commodity derivatives is still small, less than half the size of equity derivatives (Gorham et al, 2005).

## **6. Derivatives Users in India**

The use of derivatives varies by type of institution. Financial institutions, such as banks, have assets and liabilities of different maturities and in different currencies, and are exposed to different risks of default from their borrowers. Thus, they are likely to use derivatives on interest rates and currencies, and derivatives to manage credit risk. Non-financial institutions are regulated differently from financial institutions, and this affects their incentives to use derivatives. Indian insurance regulators, for example, are yet to issue guidelines relating to the use of derivatives by insurance companies.

In India, financial institutions have not been heavy users of exchange-traded derivatives so far, with their contribution to total value of NSE trades being less than 8% in October 2005. However, market insiders feel that this may be changing, as indicated by the growing share of index derivatives (which are used more by institutions than by retail investors). In contrast to the exchange-traded markets, domestic financial institutions and mutual funds have shown great interest in OTC fixed income instruments. Transactions between banks dominate the market for interest rate derivatives, while state-owned banks remain a small presence (Chitale, 2003). Corporations are active in the currency forwards and swaps markets, buying these instruments from banks.

Why do institutions not participate to a greater extent in derivatives markets? Some institutions such as banks and mutual funds are only allowed to use derivatives to hedge their existing positions in the spot market, or to rebalance their existing portfolios. Since banks have little exposure to equity markets due to banking regulations, they have little incentive to trade equity derivatives.<sup>11</sup> Foreign investors must register as foreign institutional investors (FII) to trade exchange-traded derivatives, and be subject to position limits as specified by SEBI. Alternatively, they can incorporate locally as a

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<sup>11</sup> Under RBI directive, banks' direct or indirect (through mutual funds) exposure to capital markets instruments is limited to 5% of total outstanding advances as of the previous year-end. Some banks may have further equity exposure on account of equities collaterals held against loans in default.

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broker-dealer.<sup>12</sup> FIIs have a small but increasing presence in the equity derivatives markets. They have no incentive to trade interest rate derivatives since they have little investments in the domestic bond markets (Chitale, 2003). It is possible that unregistered foreign investors and hedge funds trade indirectly, using a local proprietary trader as a front (Lee, 2004).

Retail investors (including small brokerages trading for themselves) are the major participants in equity derivatives, accounting for about 60% of turnover in October 2005, according to NSE. The success of single stock futures in India is unique, as this instrument has generally failed in most other countries. One reason for this success may be retail investors' prior familiarity with "badla" trades which shared some features of derivatives trading. Another reason may be the small size of the futures contracts, compared to similar contracts in other countries. Retail investors also dominate the markets for commodity derivatives, due in part to their long-standing expertise in trading in the "havala" or forwards markets.

## **7. Summary and Conclusions**

In terms of the growth of derivatives markets, and the variety of derivatives users, the Indian market has equalled or exceeded many other regional markets.<sup>13</sup> While the growth is being spearheaded mainly by retail investors, private sector institutions and large corporations, smaller companies and state-owned institutions are gradually getting into the act. Foreign brokers such as JP Morgan Chase are boosting their presence in India in reaction to the growth in derivatives. The variety of derivatives instruments available for trading is also expanding.

There remain major areas of concern for Indian derivatives users. Large gaps exist in the range of derivatives products that are traded actively. In equity derivatives, NSE figures show that almost 90% of activity is due to stock futures or index futures, whereas trading in options is limited to a few stocks, partly because they are settled in cash and not the underlying stocks. Exchange-traded derivatives based on interest rates and currencies are virtually absent.

Liquidity and transparency are important properties of any developed market. Liquid markets require market makers who are willing to buy and sell, and be patient while doing so. In India, market making is primarily the province of Indian private and foreign banks, with public sector banks lagging in this area (FitchRatings, 2004). A lack of market liquidity may be responsible for inadequate trading in some markets. Transparency is achieved partly through financial disclosure. Financial statements

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<sup>12</sup> In practice, some foreign investors also invest in Indian markets by issuing Participatory Notes to an off-shore investor.

<sup>13</sup> Among exchange-traded derivative markets in Asia, India was ranked second behind S. Korea for the first quarter of 2005. How about China, with who India is frequently compared in other respects? China is preparing to develop its derivatives markets rapidly. It has recently entered into joint ventures with the leading U.S. futures exchanges. It has taken steps to loosen currency controls, and the Central Bank has allowed domestic and foreign banks to trade yuan forward and swaps contracts on behalf of clients. However, unlike India, China has not fully implemented necessary reforms of its stock markets, which is likely to hamper growth of its derivatives markets.

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currently provide misleading information on institutions' use of derivatives. Further, there is no consistent method of accounting for gains and losses from derivatives trading. Thus, a proper framework to account for derivatives needs to be developed.

Further regulatory reform will help the markets grow faster. For example, Indian commodity derivatives have great growth potential but government policies have resulted in the underlying spot/physical market being fragmented (e.g. due to lack of free movement of commodities and differential taxation within India). Similarly, credit derivatives, the fastest growing segment of the market globally, are absent in India and require regulatory action if they are to develop.<sup>14</sup>

As Indian derivatives markets grow more sophisticated, greater investor awareness will become essential. NSE has programmes to inform and educate brokers, dealers, traders, and market personnel. In addition, institutions will need to devote more resources to develop the business processes and technology necessary for derivatives trading.

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<sup>14</sup> See Chitale (2002) for an assessment of reforms needed for the development of credit derivatives.

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## APPENDIX: Forwards, Futures, Options, and Swaps

I begin with a description of the simplest types of derivatives: forwards, futures, options and swaps. To illustrate a **forward** contract, consider the following example (unless otherwise stated, all prices are in rupees per gram). Jewelry manufacturer Goldbuyer agrees to buy gold at Rs. 600 (the **forward or delivery price**) three months from now (the **delivery date**) from gold mining concern Goldseller. This is an example of a **forward** contract. No money changes hands between Goldbuyer and Goldseller at the time the forward contract is created. Rather, Goldbuyer's payoff depends on the spot price at the time of delivery. Suppose that the spot price reaches Rs. 610 at the delivery date. Then Goldbuyer gains Rs. 10 on his forward position (i.e. the difference between the spot and forward prices) by taking delivery of the gold at Rs. 600.

A **futures** contract is similar to a forward contract, with some exceptions. Futures contracts are traded on exchange markets, whereas forward contracts typically trade on OTC (over-the-counter) markets. Also, futures contracts are settled daily (marked-to-market), whereas forwards are settled only at expiration.

Returning to the example above, suppose that Goldbuyer believes that there is some chance for the spot price to fall below Rs. 600, so that he loses on his forward position. To limit his loss, Goldbuyer could purchase a **call option** for Rs. 5 (the **option price or premium**) at a **strike or exercise** price of Rs. 600 with an **expiration date** three months from now. The call option gives Goldbuyer the right (but not the obligation) to buy gold at the strike price on the expiration date.<sup>15</sup> Then, if the spot price indeed declines, he could choose not to exercise the option, and his loss would be limited to the purchase price of Rs. 5. Alternatively, Goldbuyer may anticipate that the spot gold price is very likely to decline, and attempt to profit from such an eventuality by buying a **put option**, giving him the right to sell gold at the strike price on the expiration date.

**Swaps** are derivatives involving exchange of cash flows over time, typically between two parties. One party makes a payment to the other depending upon whether a price is above or below a reference price specified in the swap contract.

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<sup>15</sup> The example describes a European option. By contrast, an American option would have allowed the buyer to exercise the option on or before the exercise date.