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Derivatives in Financial Market Development

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Abstract

This research paper examines the global and Indian derivatives markets, detailing their instruments, uses, risks, and regulatory frameworks. It outlines the structure and growth of key derivative products—futures, forwards, swaps, options, and credit derivatives—highlighting their role in risk management, speculation, and financial innovation. The paper contrasts developed and emerging market dynamics, presents notable corporate case studies illustrating leverage–volatility pitfalls, and analyses India's rapid market expansion across equity, currency, commodity, and nascent credit derivatives. It emphasizes infrastructure developments like GIFT City, interoperability of clearing corporations, and evolving SEBI, RBI, and IFSCA regulations, alongside global alignment efforts. While acknowledging derivatives' potential for market efficiency, hedging, and liquidity, the study warns of systemic risks, regulatory gaps, and the need for balanced oversight to foster sustainable growth and global competitiveness.

EXECUTIVE SUMMARY

Derivatives are a financial instrument that the payoff is based on other more primitive financial variables like a stock price, a commodity price, an index level, an interest rate or an exchange rate. Derivatives world market is a humongous one. The outstanding global derivatives market of over the counter (OTC) derivatives market amounts to $729.8 trillion and the gross market value of the global market is more than 17.1 trillion dollars. There is another $129.9 trillion of outstanding notion in the exchange-traded market. Both advanced economies and emerging markets have seen the rapid expansion of derivatives use over the past twenty years; in both over the counter and exchange-traded contracts; and in all underlying classes, including interest-rate, currency, equity, and the newest, credit.

Derivatives are exceedingly helpful tools in regard to risk management. They may be employed to hedge a pre-existing commitment in a market (forwards and futures), seek downside protection on a commitment though retaining the potential of upside action (options), alter the character of a commitment (swaps), and seek insurance against an eventuality (credit derivatives). In the case of corporations and other financial institutions interested in hedging exchange risk, input costs, or even financing costs or credit exposures, these are invaluable features and go a long way to explaining the high rate of growth of the derivatives market as globalization n and global interlinkages have increased in the world.

Derivatives are also very expensive instruments and that has its repercussion as well. Derivatives can be appealing to speculators (people who would rather gamble on the direction of prices) on the one hand as a result of leverage. It is not really a negative thing as speculators bring much liquidity to a market and by countering their trades make possible positions that hedgers wish to enter. But leverage compounds the impact of price movements, so ultimately unfavorable price movements can quickly become disastrous to the derivatives position and hence the bigger business

organization. In fact, the history of finance itself is cluttered with tales of companies and banks that had to pack up because of a decline in the market conditions resulting in huge losses on the derivatives portfolio-sometimes, even when the derivatives were used to hedge existing risks. The lethally toxic combination of leverage and volatility means that it is crucial that both users realize what volatility in the instruments can mean in terms of losses, and regulators the systemic implication of volatility surges.

OTC and exchange-traded Indian derivatives markets have grown extraordinarily quickly in the past ten years, and, compared to markets across the world have relatively few hiccups. The achievements are clear and tangible, Indian exchanges are ranked in the top world exchanges in terms of volume of derivative contracts deals and yet there have been no derivatives calamities of the kind that have rocked the big world economies. Yet even under the surface there are scruples. There are often underlying markets which will be illiquid and those that are shallow, which both heighten the demand to employ such alternative risk-management tools and makes it difficult to develop the derivatives markets based on it. There is also anecdotal evidence to the effect that Indian exchanges might be losing volumes to over - seas competition due to challenging regulations. The trick in such an environment is learning how to continue the growth and penetrate the market further and by so doing open more of the tools of risk management to corporates and especially to banks without indulging in speculative excesses.

The new Dodd-Frank reforms with the US can be used in this respect to emulate an appropriate way of thinking. Minimizing the systemic risks due to the use of derivatives and enhancing the transparency of OTC derivatives market are the objectives of the Dodd-Frank Act. To this end, the Act has required among others the following: of these OTC derivatives that can be sufficiently standardized to be traded on what I would call essentially exchanges, that is swap exchange facilities. This will on the one hand introduce an exchange like transparency and minimize counterparty risk, on the other hand the exchanges that will be formed in this manner will in actuality be too big to fail, which makes it an important challenge of monitoring the exchange on the regulatory front. There is also the Lincoln Rule and the Volcker Rule in the Act meant to deter speculative derivatives trading by the banks. Once more this provision works on both sides. Ideally, it would render banks safer. Conversely, it might also lead to the banks trading arms being consolidated into separate companies, that is, derivative trading would shift out of the controlled entities into the unregulated ones. Unfortunately, there are no easy solutions.

1. INTRODUCTION

This note explains how derivatives contribute to the financial markets and improve development. It is divided into several parts. Background is provided by section 2. It explains the size, composition and development of the derivative markets of the world; and presents the main distinctions between derivatives markets in the developed economies and the ones in the emerging economies. Appendix A defines the players and their characteristics in some detail as it has been simpler to do so in contrast with the novice viewer or reader who might not know about derivatives securities. The two directions of expanding on its premise involve sections 3 and 4. The former examines the rosy side of derivatives, at how the derivatives could be employed by individuals, corporations and other entities to manage or diffuse risk. In a nutshell, it corresponds to the following question: what (good) can we do with derivatives that we could not do without derivatives? In Section 4, it examines the other side of such advantages namely the dangers that are involved with using derivatives, namely the roller coaster leverage-volatility mix that the market rides with derivatives. A number of significant case studies are presented that show these risks. In section 5, the discussion is made to refer to derivatives markets in an Indian scenario, and some remarks are made on the scenario, both positive and negative. The section 6 has ended with a glance at regulatory issues and

developments, with special attention being focused on the Dodd-Frank Act in the US.

2. THE WORLD DERIVATIVES MARKET

A financial security that is dependent (or derived) on a more basic underlying financial quantity, the price of a commodity, the price of a stock, an exchange rate, an interest rate, an index level--or even the price of another derivative security--is termed a derivative security. Derivatives have now become omnipresent in the modern financial arena with successful exchanges in most of the significant nations and enormous over-the-counter market. Here in the introductory section, we outline the key categories of derivatives, and tabulate information on the market and component key market sizes and growth.

Basic Derivative Instruments

The three basic kinds of derivative securities are *forwards and futures; swaps;* and *options*. We begin with brief descriptions of each of these, as also of the relatively recent innovation of credit derivatives, particularly *credit default swaps*. A more detailed description of these instruments and their characteristics may be found in Appendix A.

Forwards: A futures contract is an agreement between two parties (known as the counterparties to the transaction) to do a given trade at a specified date in the future. Forward contract is a bilateral or over the counter (OTC) contract and therefore, is negotiated between buyer and seller. On the one hand, it implies that they can be tailored regarding the maturity date, the quality (grade) that should be provided, etc. Conversely, both parties also bear the risk of default of the other party.

Futures: A futures contract is nothing more than a forward contract traded on an organized exchange as opposed to one negotiated bilaterally. In the mid-19th century futures contracts evolved out of forward contracts. The terms of futures contracts (expiration dates, deliverable quality of the underlying, etc.) are standardized and the exchange provides performance assurance on the contract. Future market operators must post what is referred to as the margin or in simpler terms, collateral in case of default.

Swaps: Swaps, as forwards, are over-the-counter instruments. In forward, the two parties counterparty to single trade or single exchange of cash flows. Each counterparty, in a swap, obliges to an exchange of cash flows on a number of future dates. The most common type of swaps can be found in an interest-rate derivatives market where the standard form of contract involves the process of one party swapping one interest index with another calculated on a stated notional amount. (As an example, one counterparty in the swap might pay a floating swap based on Libor and the other a fixed payment on the same amount of principal.) They also find wide application in the currency market where the swap will entail an exchange of principal and currency in one place with principal and currency in another.

Options: Finances options are financial security that provides the holder the right but not the obligation to participate in a given trade in a specified matter. Options come in two fundamental flavors (and a huge number of variants of these structures). The holder of a call option may exercise the right, but not the duty, to purchase the indicated underlying asset having a particular price set-out in the contract (the strike price). In a put option, the person who holds the option can sell the underlying asset at a certain strike price. The person holding the option is also known by different names sometimes long position in option and in other times buyer of option. The one into whose hands the option contract has passed--that party who has the duty to participate in the option trade in case the buyer of the option takes advantage of his right--is referred to as the seller or writer of the option or the short position in the option. In return the option writer offers the option holder an optionality about the trade and in response he/she incorporates a fronted payment to the writer commonly referred to as the option cost or the option premium. Options trade on the organized

exchanges as well as over the counter (OTC). Exchange-traded options can be in terms of equity, equity index, currencies, and interest rates and bonds among others. Strike prices and expiry dates of options traded on an exchange market are standardised. The OTC options are tailor-made and display considerably more variety.

Credit Derivatives: The credit derivatives are derivatives that are written against credit risk of some reference entity. Credit default swap or CDS is by far the most popular type of credit derivative. Similar to default insurance, a CDS is linked to a particular credit instrument issued with a given entity (as an example, a particular bond offered by Ford Motor Company). A party to the CDS contract (the buyer of protection) pays a fixed payment at regularly scheduled intervals to the other party to the contract (the seller of protection); in return, the seller of protection will make payments to the buyer of protection in the event that the specified reference obligation suffers any loss in value as a result of a credit event (e.g. default) occurring during the lifetime of the CDS contract. CDS indicesCDS indices are indices based on CDS prices similarly to the construction of equity indices on the basis of equity prices. There are 2 prominent families of credit indices; iTraxx indices covering Europe and CDX indices covering North America and Asia. Credit derivative trading which includes trading of CDSs and CDS index contributes to about three-quarters of the credit derivatives market.

2.2 Market Size and Growth

The size and growth of the world derivatives market are described in table 1-3. Tables 1 and 2 relate to the over-the counter derivatives market (those that are bilaterally negotiated), whereas Table 3 addresses exchange traded derivatives (i.e. standardized derivatives traded on organized exchanges). In both the tables the information is subsequently broken down further within the tables firstly by underlying and secondly by instrument-type. The data has been collected by the Bank for International Settlements (BIS) in all cases.

Derivatives markets are immense in size. As of December 2011, the total notional outstanding[1]

Table 1: The OTC Derivatives Market I: 2023-2024

	Notional amounts outstanding				Gross market value			
	2023-S1	2023-S2	2024-S1	2024-S2	2023-S1	2023-S2	2024-S1	2024-S2
All contracts	712,881	667,058	729,535	699,476	19,835	18,122	16,845	17,615
Foreign exchange contracts	118,467	118,004	129,885	130,093	4,310	4,197	3,668	4,874
Interest rate contracts	573,587	529,813	578,805	548,341	14,389	12,783	11,985	11,547
Equity-linked contracts	7,837	7,783	8,686	8,901	570	582	673	662

All figures in USD billions.

Source: The Bank for International Settlements, http://www.bis.org.

The aggregate amount outstanding in the OTC derivatives market as of December 2011 was $699 trillion (a gross market value of $17.6 trillion). In comparison, the value of world equity market capitalization in December 2024 will be of the order of about US$47 trillion, the face value of world bond markets in December 2024 will be of the order of about US$95 trillion and world GDP in 2011 is estimated to be some $.65 trillion. The tables show that interest-

[1] Notional outstanding refers, loosely speaking, to the principal amount of the contracts. For example, if a forward contract calls for the delivery of 1,000 oz of gold at a price of $1,800/oz, the notional outstanding in the contract is $(1, 800 ↠ 1, 000) = $1.80 million. If an option gives the holder the right to buy 10,000 shares of Google at $500/ share, the notional outstanding in the contract is $(10, 000 ↠ 500) = $5 million. If a swap calls for the exchange of floating cash flows for fixed cash flows on a principal of $100 million, the notional outstanding in the swap is $100 million. And so on.

rate derivatives- derivatives written on interest rates or interest-rate sensitive securities like bonds-have always been the far and away the most important kind of derivatives in the OTC market, representing more than 75% of the total face value outstanding (more than 500 trillion dollars by the end of year 2024). The second largest segment of the market by notional outstanding is currency derivatives with total notional outstanding of over 130 trillion in December 2024 compared to nearly 9 trillion in notional outstanding of OTC equity derivatives, up significantly on nearly 7 trillion in December 2023. Especially remarkable is the increase in the segment of credit derivatives. Two decades ago credit derivatives literally did not exist, yet they had reached a notional outstanding of nearly $30 trillion making them the third largest sector within the OTC derivatives market as of today (measured by notional outstanding).

Table 2: The OTC Derivatives Market II: 1998-2011

	Notional amounts outstanding				Gross market value			
	2023-S1	2023-S2	2024-S1	2024-S2	2023-S1	2023-S2	2024-S1	2024-S2
Commodity contracts	2,277	2,203	2,446	2,408	305	301	254	257
Credit derivatives	10,120	8,708	9,196	9,229	203	209	201	213
Credit default swaps	9,900	8,547	9,012	9,045	168	177	171	182
Other derivatives	592	546	518	505	58	50	64	61
Gross credit exposure					3,535	3,046	2,819	2,961

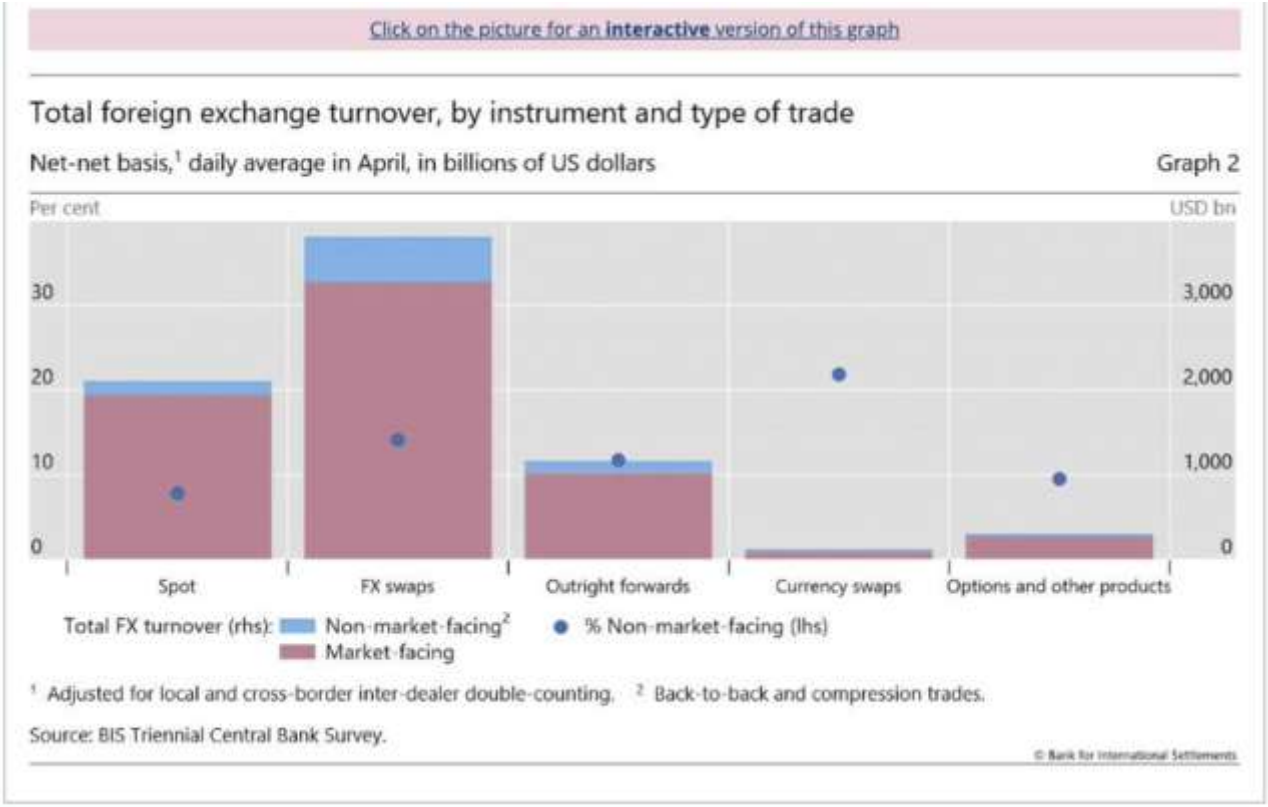
Amounts in the table refer to notional outstanding. All figures in USD billions.
Source: The Bank for International Settlements, http://www.bis.org.

The growth of the over-the-counter derivatives market as presented in table 2 has been very fast during the past decade and half or so only slowing down since 2007-08 following the financial crisis. This was a compound annual rate of increase of more than 17 per cent by December 2024 compared with December 1998 when the market- wide notional outstanding was over 8.7 times the 1998 level. All parts of the market saw high growth in this period, with interest rate derivatives, commodity derivatives and equity derivatives increasing elevenfold, sixfold and sixfold respectively.

Table 3: The Exchange-Traded Derivatives Market: 1998-2011

	TOT	USD	EUR	JPY	GBP	CHF	CAD
Notional amounts outstanding							
Total foreign exchange contracts	130,093	114,295	40,241	18,443	14,629	6,091	9,076
Total contracts including gold	131,118						
Gross market values							
Total foreign exchange contracts	4,874	4,238	1,722	819	410	182	208
Total FX contracts including gold	4,917						
Herfindahl indices							
Outright forwards, forex swaps and currency swaps	481	485	475	486	520	797	635
Total options	713	745	1,110	793	911	1,071	2,359

Amounts in the table refer to notional outstanding. All figures in USD billions.
Source: The Bank for International Settlements, http://www.bis.org.



down from a peak of $79 trillion in December 2007.[2]

Interest-rate futures derivatives also control the notional outstanding values in futures markets, and in fact, even more than OTC markets, which are about 90 % of all. The second largest segment is equities, and the currency market is by far a small part. Similarly, the derivatives on exchanges expanded very quickly with the market increasing over fivefold in the 1998-2007 years. Not even despite the decline on the market since that, the market has a CAGR over 11 percent during the period between 1998 and 2011 quite comfortably.

2.3 Emerging Markets versus Advanced Economies

What is the difference in derivatives activities in the emerging economies as compared to the advanced economies? An answer is given by a 2010 study put out by the Bank for International Settlements. Comparison of derivatives turnover in emerging markets (EMs) and more developed economies (AEs) is conducted in the study along multiple aspects, such as market size and market composition. This is the summary of findings.

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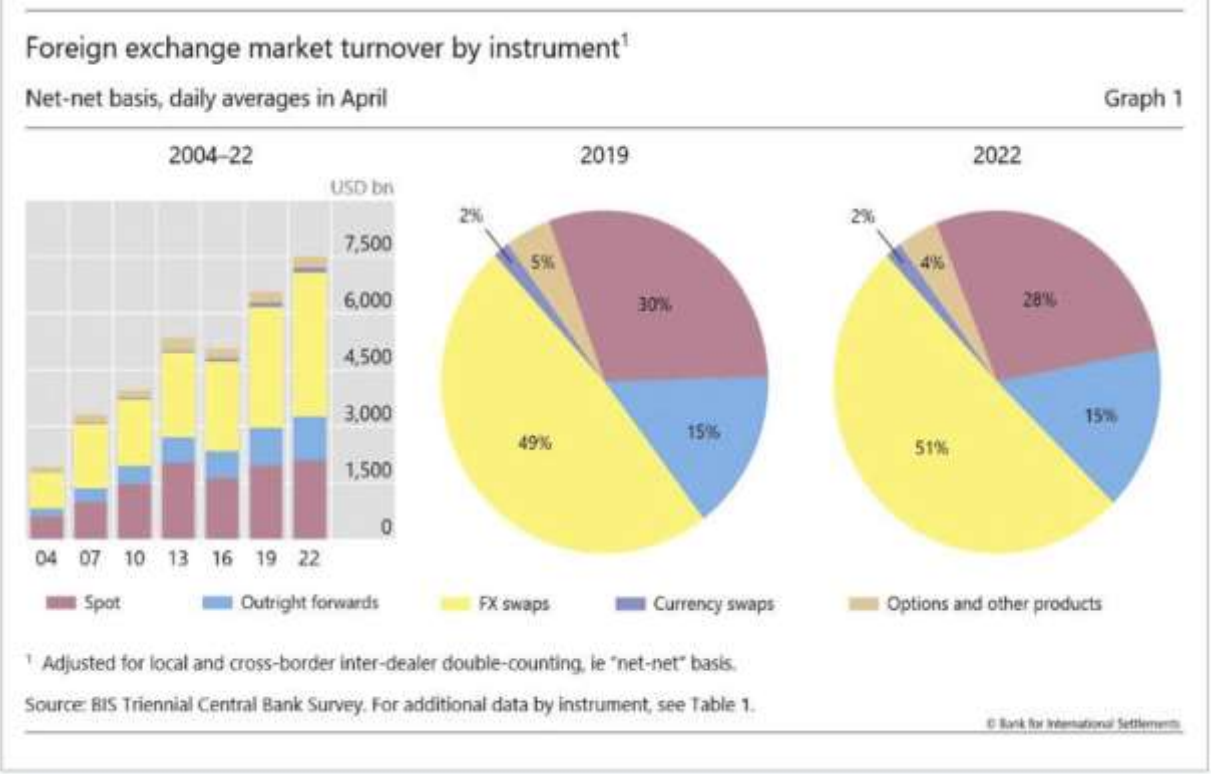
[2] The notional outstanding figures across OTC and exchange-traded markets are not comparable. In OTC markets, the risk in a contract is often laid o↵ by opening another o↵setting contract with a di↵erent counterparty, which inflates the notional outstanding amount. In the exchange traded market, the original contract is closed out by taking the opposite position in the same contract, which leaves the notional outstanding the same or smaller.

Figure 1: Emerging Markets Derivatives Turnover



The figure shows emerging market daily derivatives turnover in 2024. The figures are in USD billions.
Source: The Bank for International Settlements, http://www.bis.org.

Size and Growth Owing to the smaller size of the financial system in the EMs, the derivatives turnover in EMs is one order of magnitude compared to AEs ($15 trillion vs. $4.9 trillion a day, respectively). However, EM market expanded slightly quicker in the timeframe 2011-24 at a growth of more than 300%, as opposed to 250 percent by the AEs.

Where is the trading done? 66 percent of the total turnover in AEs was done on exchanges and 34 percent was on OTC market. Overall, in EMs, the division was almost 50-50 which means that in EM, OTC markets are, comparatively speaking, more significant. However, the events OTC-exchange divergence are significantly divergent between EMs. Among the four biggest EM derivatives markets (Hong Kong, Singapore, Brazil and Korea), derivatives traded over the counter had absolutely dominant market share in Hong Kong and Singapore, with the exchanges holding sway in Brazil and Korea. As Figure 1 shows, OTC and exchange markets are of similar size in a small number of countries (primarily India and Israel and to some degree China). In all other situations either one or the other prevails.

Which risks are transacted? The risks that are traded through derivative contracts are likewise dramatically different in AEs and EMs. Interest-rate derivatives represent 77 percent of the total turnover in AEs. About half the sum turnover of derivatives in EMs is in the currency derivatives, and 30 percent in equity derivatives; interest rate derivatives are reasonably insignificant. These figures presumably show that the exchange-rate risk is a large issue in emerging markets,9 whereas EM bond markets are nowhere near the AEs in terms of development.

What trades in titary EM OTC markets? The turnover of derivatives in OTC markets of EMs is virtually entirely related to currency derivatives (approximately 90%) and with the rest occupied mostly by interest-rate derivatives. (Unlike that, OTC derivatives in currency and interest rates are in AEs of about the same

volume.) The leading centers of OTC derivatives trading in EMs are Singapore and Hong Kong which contribute more than 60 percent of total OTC derivatives trading.

What is exchanged on EM exchanges? Averages conceal huge variation among markets with equity derivatives making up more than 50 percent of all exchange- traded derivatives turnover in EMs. The most well-developed exchanges trading in derivatives can be found in Brazil and South Korea (indeed, approximately 90 percent of overall exchange turnover). In Brazil, interest rate derivatives dominate turnover, followed at a distant second by currency derivative, and further to the rear is equity derivatives. Equity derivatives form a massive part of the exchange-traded market in South Korea where the turnover is more than 270 billion a day (an almost fifth of all derivatives action in emerging markets and in the rest of the world second behind the CME in equity-derivatives turnover). Brazil, Hong Kong, India and Singapore are among other countries that have equity-derivatives markets and exchange turnovers in excess of of $10 billion daily.

3. USES OF DERIVATIVES

This segment touches the usage of the derivatives in a broad aspect of risk management, talking about the instrument usage. The material discussed here is complemented by section 4 which talks about the risks in these instruments. The ordinary uses of derivatives--hedging, insurance, speculation, etc. --well-read readers may pass on to the next section.

Futures & Forwards: Another popular reason in using a forward or futures contract is to hedge some already existing market exposure i.e. to lower the uncertainty with regard to cash flow and the exposure. Look at this way, a farmer who planted soybeans in October and expects to harvest the produce after three months has a crop of 10 tons. The farmer is subjected to price volatility of the soybean and this presents the risk of declining soybean prices in three months. Through a three-month soybean forward contract, selling the crop forward, the farmer is able to sell the expected crop at a fixed price thus stabilizing the price fluctuations that could be experienced on revenues that might be realized in three months. The counterparty to the forward contract in the given example can be a hedger having a contradictory exposure, e.g., an agribusiness that uses soybeans as an input material in its manufacturing process and who wants to fix a price at which it will buy the soybean. Alternatively the buyer could be having no prior experience to price of soybean and could be speculating i.e. in looking to bank on an increase on soybean prices in relation to the price payable in contract entry. The other typical motivation in entering into forwards or futures is speculation, and, yes, speculators constitute a key ingredient of the market which is a significant source of market liquidity as well as the chance of having a counterparty to their forwards or futures. The cash flow requirement at the time the forwards or futures are transacted is relatively small--collateral in the case of forwards, margin in the case of futures; therefore, these instruments provide substantial leverage to investors and this aspect is of special interest to speculators (but it also increases the riskiness of these instruments as we will see in the discussion in Section 4).

Large futures/ forward market is a diverse one. Growth in outstanding derivatives (notional amounts) increased at the end of June 2024 compared with the same date in the previous year (2 percent yoy). There was a decrease of 6 percent of amounts in the second half of 2023 and an increase of 9 percent in the first half of 2024. The value of foreign exchange (X) swaps and forward increased during the first half of 2024.

Options: Although a forward contract is a hedging type, an option is a kind of a financial insurance. Just to give a case in point, an investor who is considering to purchase gold in three months. The investor considers purchasing and holding a call option with a strike value of 1800/oz, and having a three-month expiry period. When the price of the gold in three months is higher than what is being demanded by the value in the price of the gold today which is in the case of the price of the gold being $1,840/oz then the investor will exercise his right in the contract and will purchase it at the contract price of the gold stipulated which is at 1800. But in case of pricing lower than the initial price in 3

months (say it is priced at 1780/oz instead of 1800/oz), then the investor has the option of terminating the contract and in case he/she wants to continue holding it, he/she can buy the gold directly in the market where the price is cheaper; (in the above example this expected lower price is 1780/oz). Therefore, the call option gives the investor safety in case the price rises above the level of the strike, even though it also lets her enjoy the full benefit of price falls. The provider of such insurance is the writer of the call option who enters the opposite side of the contract.

Similarly, the option put in gold assures the possible seller of gold insurance against a fall in the price. As an example, say an investor is considering selling gold in three months and sells a put option on gold with a strike of 1,800/oz with a three-month expiration. Assuming that the price of gold in three months will be less than $1,800/oz, the investor would have the right in the put to sell the gold at the price of 1,800/oz but in case the price of gold increased to more than 1,800/oz, then the investor would have exercised an option to have the put to lapse with the selling of the gold at the higher price at the market. Buying the put hedges the investor against the price of falling below the $1,800/oz.

Options provide investors with a risk-avoiding solution to forwards because they focused on the realized future prices. In contrast with forwards, with an option there is an initial expenditure of purchasing the option (viz., the option premium), but paying that cost is mitigated by the fact that there is no obligation to exercise the option (should exercising do so provide a loss). In other words a regret of exercise-time is never encountered in an option.

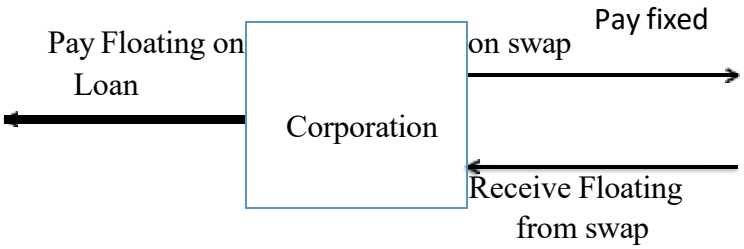
The options can be used together, in portfolios, to form richer sought-after payoff patterns. An example would be that an investor holding some position in a stock seeks protection against a decline in stock prices despite earning in the event rises in the price. This can be done by introducing a put option having strike K in the portfolio. The combined portfolio, a protective put, has the particular characteristic that its value will never fall below K--the investor is always able to exercise the put and sell the stock at K--but shares fully in price increases of the stock.

To give a second example, suppose an investor who is indifferent as to whether the market is going to rise or fall, but nonetheless assumes a fair amount of volatility (i.e., large price moves) will result in either event. A call with strike K and maturity T combined with an otherwise identical put gives the investor a portfolio (also known as a straddle) which is neutral with respect to direction (the call makes money when it goes up and the put when it goes down) but whose value is sensitive to volatility (the broader the price movement in either direction, the greater the payoff to the investor).

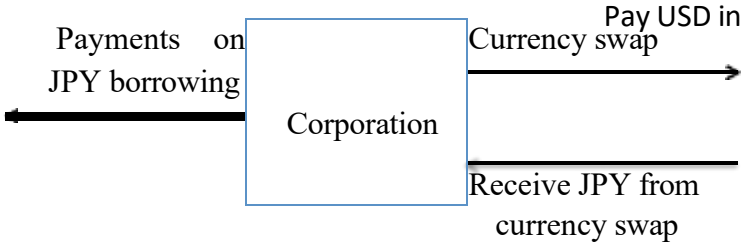
A typical option has a ratio of about a fraction of the value of the underlying and grants the holder one-to-one exposure to price movements past the strike (calls to price gains above the strike, puts price drops below the strike). Hence, options are as well highly leveraged instruments. Calls are similar to levered long positions in the underlying and levered puts to levered short. However, the simplest forms of options are not a simple levered long or short but will entail various combinations of nature and size of implied leverage that depend on the moneyness of the option, i.e., how far out of the money the current price of the underlying is to the strike.

Swaps: Swaps can be used to transfer exposures -- or risk -- to one stream of cash flows to the risk of a different stream. As an illustration, interest-rate swaps may be used to convert fixed-rate cash flows to floating-rate cash flows. Currency swaps are applied when cash flows in a currency (from some source) are to be transformed into cash flows in an alternative currency. Equity swaps can be employed to convert fixed-income stream to equity-linked stream (or other way around). Etc.

To take an example, suppose a corporation, having a floating rate loan, indexed to say LIBOR, wants to swap this out into a fixed rate position. This can be easily achieved by entering a fixed-for-floating interest rate swap under which the corporation pays a flat rate to the swap counterparty and gets the floating-rate payment related to LIBOR as counterparty. The net cash flow of payments incurred by the corporation and illustrated in the following figure is a fixed-rate payment; it receives floating out of the borrowing, pays floating in the swap and the income floating out of the swap.



To give a second example, we may suppose a corporation which has borrowed funds in (say) Japanese yen and desires to hedge its risk by converting this exposure to the US dollar. The company may engage in a USD-JPY currency swap whereby it will make payments to the counterparty of the exchange in dollars and get payments back in JPY. Together with the JPY borrowing this gives a net USD outflow of cash.



One of the basic applications of swaps is financing. Swaps allow companies to take cheap money in the market in which they find it and then swapping that into the form of exposure of their choosing. An example can be seen whereby a big international firm may have more people willing to take its debt in Japan than in the US, yet it requires dollar funding. Under this scenario, the company would be able to borrow funds in yen and then exchange the loan with the help of currency swap and into dollars, such as shown above.

Swaps are a highly flexible tool that is applied variously. As an example, they give companies energy when it comes to finances. The company which expects the interest rates in future to be lower can borrow floating at present and beautify this to fixed when the interest rates go down. And swaps can be specified of course as well. The same investor who expects interest rates to rise in the future may engage in a pay-fixed/receive-floating interest rate swap; when rates do rise as expected, the floating payments delivered to the investor rise while the received-fixed payments remain constant causing the swap to be worth a positive amount.

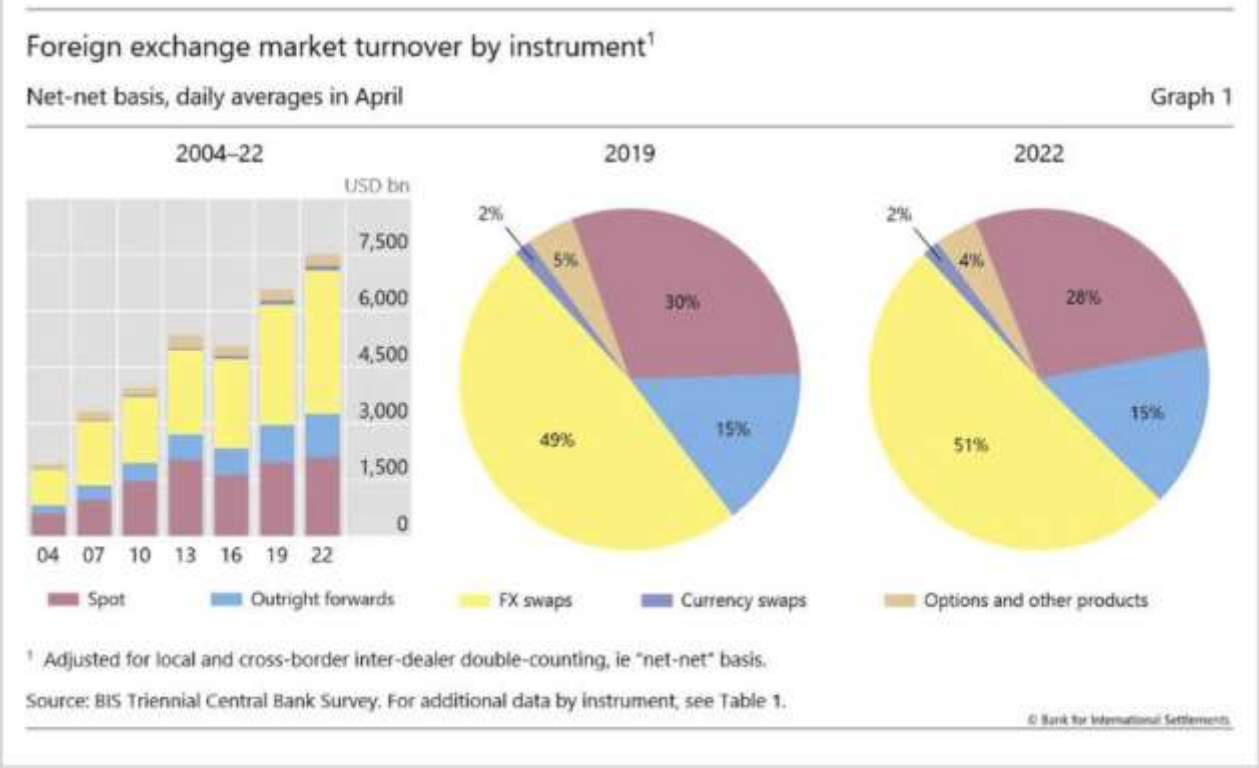
Credit Derivatives: Credit derivatives are derivatives based on credit risk subject to which an investor trades on the basis of the credit performance of a given instrument regardless of other risks. In this way, e.g. a bank will be able to sell the credit risk in a loan (or portfolio of loans) to an investor in a CDS, in exchange receiving an unvarying stream of fixed size "premium" payments to the investor.

On the part of the bank, the CDS offers a platform through which the risks in question can be traded despite regular illiquidity. In effect, the CDS gives the bank an avenue of getting a short position in the credit but not transfer the credit of the books of the bank; hence not lose any voting and other servicing rights that may be attached to it. This causes a release of the bank capital in order to issue more loans. Theoretically, it can also facilitate the management of portfolios as well as internal and regulatory restrictions.

In the view of the investor, the CDS offers an avenue to gain exposure to an entire asset class (e.g., syndicated loans) in which otherwise one would not have access to. The fact that the investor would often only have to set aside collateral on the security equivalent to a small percentage of the face value of the securities financing loan/bond also gives the investor a great deal of leverage in making this exposure as well.

Hardly an instrument entered the market with such success as it was shown in the case of credit derivative in the first half of 2000s. These products went from a market that amounted to almost nothing in the year 2000 to a market of nearly 667.1 trillion as of December 2023 (Figure 2).

Figure 2: Foreign Exchange Turnover by Instrument



Source: Bank for International Settlements

4. THE POTENTIAL RISKS OF DERIVATIVE USAGE

The risk of the use of derivatives arises because of the interplay of three factors which create a potentially fatal mix in case appropriate understanding and management of the risks are lacking. Leverage is the first one. Derivatives are very leveraged instruments. As an example, the margin requirement on futures contracts in actual practice would typically be 10% (or even lower) of the contract value but offer one-to-one leverage to the dynamics of the futures price, so would therefore offer 10 to 1 or greater leverage. The leverage makes it possible to earn great profits as well as suffer significant losses when the market turns the other way. The second one is volatility. The effect of the leverage is multiplied by market volatility. The influence of leverage continues to worsen as volatility in the price of the underlying rises and there is an absolute surprise in large price moves, thus resulting in potentially higher losses on the downside.

The third is (il)liquidity. During such times of market turmoil liquidity can also rapidly dry up, specifically run on a few markets or products. This complicates exit of unprofitable strategies (or even hedge the derivative with the underlying) making the derivatives position riskier. A combination of these factors has been the cause of almost every major derivative-related corporate debacle. It is time we consider the real life situations as far as some of the companies have managed to lose enormous money in the derivatives market.

4.1 UBS

United Bank of Switzerland (UBS) is a diversified international financial services firm based in Switzerland. It is the largest private wealth asset manager and the 2nd biggest European bank. At the end of the 2000s UBS was under the spotlight because of dubious practices. In 2008, Federal Tax Authority inspectors requested the names of certain 20,000 American citizens who they suspect of concealing up to 20 billion of dollars to evade at least 300 million and pay to Uncle Sam in federal taxes on the money in offshore accounts. The justice department of the U.S. then brought up a case against the UBS accusing them sheltering the Swiss banking account of its American clients to avoid paying

taxes. In 2009, UBS settled the lawsuit against it after agreeing to pay 780 million dollars. But tax evasion accusations were not the only issues that UBS had to deal with. Similar to other banks, it was a victim of subprime crisis that resulted in its high reliance on derivatives and mortgage-related securities.

4.2 BANKERS TRUST VS. P&G

In 1994, P&G took the decision to enter the risky complex derivative dealings by using Bankers Trust which was famous as the leading risk management firm. P&G and Bankers Trust had talked on hedging with vanilla swaps. It has signed two of such agreements. In 1994 Greenspan did what the market could have anticipated. He increased rates. P&G went at a huge loss. On its part, Bankers Trust had failed to elaborate on the underlying risk presented in its contracts. P&G took BT to court with the claim of 195million dollars. BT argued that P&G had established its panel of experts to undertake interest rate forecasting and when they realized hefty profits they have not registered any complaints. Later, it ended in an out-of-court settlement of net $78 million between the parties. BT had a grievous reputational risk, had lost the appreciation of customers regarded as the valued clientele and had exposed the gaps in the process in its system. With clients such as P&G, the financially savvy clients who, despite their sound judgment may not have understood deeply about the functioning of the more complex derivatives, BT could have used some time to make them aware about the risks.

4.3 Amaranth

The hedge fund that originally dealt primarily in convertibles, Amaranth was headquartered in Greenwich, Connecticut but also had offices in Toronto, Singapore, and London with hundreds of employees. In 2002, Amaranth entered the energy (especially natural gas) trading business. The energy

In 2005, the group was spectacularly successful as its directional bets with the use of options handily succeeded when Hurricane Katrina sent natural gas prices soaring that year. Early in 2006, the fund placed another sequence of wagers on the dynamics of the natural gas prices in 2006-07. The bets could be simply described as follows: summer 2006 prices will be lower than winter 2007 (“short summer, long winter”). Their bets were executed on the basis of futures contracts. It entailed a huge leverage. In 2006, Amaranth reached the apex with a position of $50 billion in natural gas futures, as compared to the total capital of the fund of less than 10 billion dollars. This is in a market (natural gas) that was known to be a volatile one. Another important factor was and should have been liquidity. Amaranth was a very large player in the market with its huge futures positions. As an example, e.g., in mid-2006, Amaranth controlled 52 percent of the open interest in Jan-07 futures, and 57 percent of the open interest in Nov-06 futures. As of the end-July, Amaranth controlled 40 percent of the total open interest on the winter months contracts. The strategy of Amaranth appeared profitable on a marked-to-market basis during the build-up and well into 2006, but this was perhaps illusory, and it was only a result of Amaranths trading. Huge Futures transactions by the fund shifted the prices, and this made its previous trades in the same contract to look as profitable. Its purchases of Jan-07 futures, to give one example, increased the price of that contract, thus rendering earlier purchases of that contract to appear profitable.) In fact, as Amaranth sought to close down some of its transactions, it could not make this step without having to move prices against it materially.

Prices began to move against Amaranth in early fall 2006, but the firm realized it could use neither margin nor its massive positions to leave the market without necessarily causing additional price movement to its disadvantage. Within three weeks in September, the company lost more than 45 per cent of the $9.7 billion of its capital. By the time it folded shortly thereafter it had lost over six billion dollars.

4.4 Aracruz Cellulose

Aracruz Cellulose, the largest producer of bleached eucalyptus pulp in the world was the first Brazilian company to be listed on the New York Stock Exchange. It posted more than 2007 earnings. It was worth $1.4 billion, and it had a

market capitalization of about 7 billion at the time in the midst of 2008. Over 90 percent of the company revenue in US$, was in exports, whereas all its costs were in the Brazilian real (BRL), thus the company was vulnerable to movements in the BRL/USD currency exchange. The company hedged against this risk (as a part of its routine) by using currency derivatives (predominantly forwards and futures). In the most effectual way, the company swapped a rate, through which it can sell the USD at a later date, but by BRL, and hence securing its BRL revenues.

Up to the year 2008, the value of the derivatives positions held by the company was approximately similar to the amount of revenue that the company expected to generate, thus the derivatives had countered the prevailing foreign-exposure risk. But in 2008, the company massively expanded the size of its derivatives positions-one study10 estimated the derivatives positions were almost 6 times the exposure of the company, so the company was engaged in an enormous speculation against the USD on the BRL. The instruments with which it dealt were, naturally, correspondingly forceful, e.g. target forwards where the loss the company would incur were the dollar to appreciate was twice the reward it stood to gain were the dollar to have dropped by a matching amount. During the period of 2003 to mid-2008, the USD had actually appreciated steadily against the BRL with the exchange rate appreciating over this period (BRL 3.50/USD in 2003 to BRL 1.60/USD in mid 2008). However, in September and October of 2008, this pattern took a sharp U-turn and the USD went up to gain 25 per cent against the BRL in less than a month. In October 2008, Aracruz reported more than 2 billion of losses on its derivative position. This led to a steep decline in its stock price which later dropped by more than 80%. Its competitor Votorantim bought the company later and the merged company was named Fibria grading led counterparties to the CDS contracts demanding huge additional collateral, in excess of 100 billion dollars in total. This was money that AIG simply did not have, and led to the enormous--and controversial--US government bailout out of AIG that up to early-2009 had cost US taxpayers more than $180 billion. Although it was the precipitous fall of the US real estate market and hence the subsequent losses incurred on mortgage-backed securities that furnished the immediate cause of the collapse of AIG, the factor that made such causes more than a mere manageable financial blow to the insurance giant was again the leverage volatility combination this time the hundreds of billions of dollars of protection AIG had taken and now, left unhedged.

4.5 AIG

The US giant American Insurance Group (AIG) has its financial subsidiary, AIG Financial Products which sold about 450 billion in credit default swap (CDS) protection, on a diversified range of reference obligations including super-senior tranche of Collateralized Debt Obligations or CDOs. The exposures could not be hedged. One would assume that the rationale here is that at low probability of default on an individual and a diversified portfolio should not have defaults cluster together in such numbers that they lead to disastrous losses in the portfolio. In effect, AIG had sold put option on the US macroeconomy or it was betting that there would not be an all markets at the same time systemic crisis in the US economy. Such a crisis unfortunately did strike, and during economic crisis, defaults do tend to cluster and default correlations to rise in general but an increasing number of defaults did not cause AIG to collapse. Instead, being the seller of CDS protection, AIG had been under obligation to collateralize protection buyers. In 2008 when the US real estate prices fell drastically, AIG was obliged to reduce the value of its portfolio of mortgage backed securities as the regulations require. This decreased its capital reserves and subsequently caused a drastic downgrading of AIG by the big rating agencies. The down grading led counterparties to the CDS contracts demanding huge additional collateral, in excess of 100 billion dollars in total. This was money that AIG simply did not have, and led to the enormous--and controversial--US government bailout out of AIG that up to early-2009 had cost US taxpayers more than $180 billion. Although it was the precipitous fall of the US real estate market and hence the subsequent losses incurred on mortgage-backed securities that furnished the immediate cause of the collapse of AIG, the factor that made such causes more than a mere manageable financial blow to the insurance giant was again the leverage

volatility combination this time the hundreds of billions of dollars of protection AIG had taken and now, left unhedged.

4.6 Heeding the Lessons?

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5. DERIVATIVES IN THE INDIAN CONTEXT: SOME COMMENTS

The derivatives markets in India have grown phenomenally since the early 2000s. The National Stock Exchange (NSE) is one of the world's largest exchanges in terms of contract volume. The population of Capital Market derivatives have evolved due to a combination of regulatory incentives, improved technology infrastructure, liberalization of the financial sector, and increasing demand from both domestic and international investors. Today India's derivatives markets are diverse and have multiple instruments. They span equity futures and options, currency derivatives, interest rate derivatives (IRDs), and commodity derivatives, on both exchange-traded and over-the-counter (OTC) platforms.

Equity derivatives, especially index-based options and futures, comprise the vast majority of India's derivatives market. In 2024, NSE saw more than 1.7 billion index options and 250 million stock options trades each month (SEBI, 2024). Nifty 50 futures and Nifty 50 options maintain market relevance because of the liquidity, spreads, order-book depth, and exchange traded venue for proper price discovery, standardized contracts, and settlement. Alongside equity derivatives, NSE and BSE have expanded single-stock derivatives diversification on the platforms which increased accessibility to retail investors. In SEBI's 2024 report on derivatives participation, more than 6.7 million retail investors participated in the equity derivatives markets, a year-over-year increase of 36%, illustrating increased penetration of the market.

The shift of SGX Nifty to the NSE International Financial Services Centre (IFSC) at GIFT City in 2023 was a turning point. The introduction of Gift Nifty brought global liquidity under Indian regulatory oversight while enhancing trading time up to 21 hours (NSE IFSC, 2024). This move bolstered India's mission to make GIFT City an international financial center. NSE IFSC and India INX now provide an increasing range of equity index and single stock derivatives for foreign portfolio investors.

Institutional players such as mutual funds, alternative investment funds (AIFs), and foreign portfolio investors (FPIs) are increasingly influencing the market. Retail volumes may rule in terms of number of contracts, but institutional players provide a major share in terms of notional turnover and stability. The recent go-ahead to allow mutual funds to invest in commodity derivatives, subject to prudential guidelines, is likely to usher in new demand.

The currency derivatives segment has evolved consistently. USD/INR contracts are most prominent, with

NSE and BSE combined daily turnover of over USD 12 billion (RBI, 2024). Products offered comprise USD, EUR, GBP, and JPY against INR futures and options. One major regulatory change was when the Reserve Bank of India (RBI) in 2024 required exchange-traded currency derivatives to be applied solely for hedging (RBI, 2024). Participants are required to prove underlying exposure, thereby limiting speculative trades (RBI, 2024).

In spite of this, offshore trading in non-deliverable forwards (NDFs) continues to be strong, particularly in markets such as Singapore and Hong Kong. RBI policy focus has been to onshore this business by opening up access to hedging instruments to foreign investors. This involves widening participation in the OTC segment through authorized dealer banks and IFSC banking units. NSE IFSC now provides USD/INR derivatives to non-resident investors with flexible trading hours and limited capital controls (IFSCA, 2024).

Interest Rate Derivatives (IRDs) have developed more slowly than equity and currency segments. The product family was first launched in 2003 with products such as interest rate futures (IRFs), overnight indexed swaps (OIS), and MIBOR-based forward rate agreements (FRAs). In 2024, the rupee-denominated notional outstanding in IRS stood over $80 billion (CCIL, 2024). OIS segment is where most of this is anchored, which banks, mutual funds, and primary dealers mainly utilize for duration risk management.

RBI has increasingly broadened access to these products. Recent regulations allow Small Finance Banks, cooperative banks, and insurance companies to utilize IRS and FRAs for liability hedging. At the same time, the IFSC market has expanded at a fast pace, with IFSC Banking Units (IBUs) registering foreign-currency IRS positions above $110 billion and INR IRS around $80 billion in 2024 (IFSCA, 2024). The freedom provided within GIFT City enables market players to design cross-currency swaps, caps/floors, and callable IRS instruments.

A key progress is the evolution of clearing mechanisms in the form of the Clearing Corporation of India Ltd. (CCIL). Compulsory clearing of IRS transactions through CCIL provides lesser counterparty risk and greater transparency. Margining norms and default fund contribution have also moved to global standards according to CPMI-IOSCO.

Commodity derivatives have grown in terms of product range and inclusion. The Multi Commodity Exchange (MCX) dominates the non-agricultural space with crude oil, gold, silver, natural gas, copper, and zinc contracts. As of FY2024, MCX daily turnover breached INR 45,000 crore (SEBI, 2024). The National Commodity and Derivatives Exchange (NCDEX) deals in agricultural futures such as soybean, guar, chana, and wheat. Introductions like commodity options, composite indices (i.e., iCOMDEX), and mini contracts have drawn retail investors.

SEBI has been instrumental in facilitating new contract structures. Recent developments include futures contract options and index derivatives. Furthermore, BSE and NSE have introduced commodity platforms, though they are yet to emulate MCX or NCDEX in size. Importantly, mutual fund use of commodity derivatives is being considered with the possibility of extending institutional involvement.

India's credit derivatives market is in its nascent stage. Though Credit Default Swaps (CDS) guidelines were brought in 2011, the product didn't take off until 2023, when SEBI released a new consultation paper outlining simpler eligibility, broader participant inclusion, and reduced documentation (SEBI, 2023). If adopted, the new CDS structure can be able to complement corporate bond market development through easier credit risk transfer.

There is also emerging interest in newer derivative types in India, including volatility futures and ESG-

linked derivatives. Although yet to be officially sanctioned, both NSE and BSE have released white papers discussing the feasibility of such products. Internationally, these segments have gained significant traction, and India is likely to do the same through pilot projects or sandbox projects.

At the market structure level, SEBI introduced interoperability of clearing corporations in 2022. It enables participants to net positions and margins between exchanges (e.g., NSE and BSE), enhancing the efficiency of capital. The action also promotes competition between clearing agencies, which can lower transaction costs.

Development of GIFT City is the core of India's internationalization strategy. NSE IFSC and India INX now allow trading in global derivatives within one regulatory regime under the International Financial Services Centres Authority (IFSCA). Liberalized capital controls, global trading hours, and access to USD-INR NDFs, cross-currency swaps, and offshore interest rate swaps are some of the salient features. Products listed include the India-USD index futures, SGX Gift Nifty, and gold mini contracts with physical delivery (IFSCA, 2024).

To conclude, we see that the Indian derivatives ecosystem has matured significantly, is supported by strong exchange infrastructure and has many products, is developing regulatory oversight, and features relatively shallow liquidity in the interest rate and credit segments, and deep markets for equity, commodity and currency. With the introduction of interoperability, the move to GIFT City, and an increasing emphasis on hedging and not speculation, the derivatives ecosystem is evolving, and a maturing ecosystem is crucially linked to the global finance ecosystem.

6. REGULATION AND ITS CHALLENGES

A multi-agency framework underpins India's derivatives regulation. The Securities and Exchange Board of India (SEBI) regulates exchange-traded derivatives (ETDs), the Reserve Bank of India (RBI) regulates over-the-counter (OTC) derivatives and currency products, and the International Financial Services Centres Authority (IFSCA) regulates the GIFT City financial space. This three-way framework ensures expertise in each regulatory agency, but at the same time creates issues of harmony and policy certainty.

SEBI mandates that derivative contracts offer a high degree of market transparency, investor protection, and the management of system-level risks. All exchange-traded derivatives contracts are subject to strict disclosures, daily mark-to-market settlements, and uniform margin requirements. Dynamic margin models with Value at Risk (VaR) and Expected Shortfall (ES) were rolled out by SEBI in 2024, which adjust margins according to market volatility. A daily stress test, default simulation, and liquidity measurement are required to be performed by exchanges (SEBI, 2024).

The 2022 interoperability framework further supported risk management. It enables traders to clear trades between different exchanges via a single clearing corporation, making the best use of capital. It has increased market resilience by minimizing concentration risk in one clearing entity. In addition, interoperability increases liquidity and provides participants with cost efficiencies crucial for scaling India's derivatives ecosystem.

The regulatory framework of RBI targets prudential standards and macro-financial stability. In January 2024, RBI consolidated its regulations under the Rupee Interest Rate Derivatives Directions, 2025. These specify eligible participants, product types (e.g., IRS, OIS, FRAs), collateral, and risk management guidelines. One of the important provisions is required variation and initial margin exchange for non-centrally cleared OTC derivatives, which conforms to international Basel III standards (RBI, 2024).

RBI also imposes a hedging-only requirement on exchange-traded currency derivative contracts.

Participants are required to show evidence of underlying exposure to trade USD/INR, EUR/INR, and analogous contracts. This policy, which comes into effect mid-2024, is intended to check speculative volatility and bring domestic practices in line with global prudence standards.

The IFSCA has established a forward-looking regulatory regime for derivative trading under GIFT City. Its structure allows wider access to OTC and ETD products, including USD/INR NDFs, foreign currency IRS, and structured swaps. Margin, collateral, and KYC standards are harmonized with global best practices to facilitate global investors while maintaining Indian regulatory interests (IFSCA, 2024). IFSCA's 2024 circulars also facilitated liquidity schemes for bullion contracts and allowed IFSC banks to be market makers.

Cross-border cooperation is strengthening. SEBI, RBI, and IFSCA cooperate in initiatives like the SGX–NSE IFSC Connect, which has been rebranded Gift Nifty. Such alliances enable global clearing connectivities and shared surveillance arrangements. Regulatory technology (RegTech) and AI-powered surveillance are being used to track high-frequency and cross-border transactions. SEBI has also collaborated with schools of learning and international watchdogs to create sophisticated surveillance analytics for tracking derivative-linked market manipulation.

Even with these advances, there are still regulatory issues. Regulatory fragmentation between SEBI, RBI, and IFSC leads to inconsistency at times. For example, whereas RBI limits domestic currency futures to hedgers, IFSC gives wider access to non-residents. This can lead to regulatory arbitrage and uneven capital flows.

Tax complexity is another impediment. Taxation of derivatives varies by asset type, residency, and exchange jurisdiction. Algorithmic trading and high-frequency strategies add another layer of complexity in enforcement and audit trails. SEBI and IFSCA are currently considering blockchain-based audit tools to enhance traceability.

Legal enforceability of OTC contracts, particularly for exotic derivatives and cross-border swaps, is also an evolving issue. RBI's 2024 rules improve clarity, but discrepancies in jurisdictional recognition remain. Greater reliance on central clearing parties (CCPs) and standardized master agreements is recommended to mitigate counterparty risk.

Cybersecurity and operational resilience are increasing issues. Exchanges now fall under SEBI's 2024 cybersecurity framework that requires recurring penetration testing, multi-factor authentication, and disaster recovery measures. IFSCA has enacted comparable norms for IFSC institutions as well. RBI's IT Framework for Financial Institutions also encompasses prescriptive norms for data breach management and cyber-attacks.

A future-driven regulatory agenda consists of designing regulatory sandboxes and innovation centers. SEBI and IFSCA have introduced pilot labs where fintechs and financial institutions can launch new derivatives products under a liberal regime. They have pilot-tested ESG-linked swaps, digital asset-based futures, and smart contract-based settlement protocols. These models are designed to provide regulatory flexibility while not inhibiting innovation.

Another area gaining prominence is India's alignment with international regulatory bodies like IOSCO and the Basel Committee. Active participation in Financial Stability Board (FSB) working groups has informed SEBI and RBI's roadmap for implementation of non-bank margin requirements, central clearing incentives, and data standardization via Unique Transaction Identifiers (UTIs).

Overall, India's derivatives regulation has transitioned from a control-based regime to one that facilitates such derivatives. Currently, it promotes healthy market development while also maintaining a solid risk

and governance framework. However, to make India a globally recognised derivatives hub, further coordination among SEBI, RBI and IFSCA, legal harmonisation, tax certainty, and technology-based compliance instruments would be necessary.

A Derivatives Instruments

A.1 Forwards

Forward contracts are the oldest of the derivatives, and are indeed one of the oldest type of financial contract per se, thousands of years old. Extremely significant in their own right (see Section 2 for market size statistics), they are also the simplest building block of the world of derivatives. The exchange-traded version of forwards came along as futures contracts some 160 years ago; swaps, portfolios of forwards in effect, some 30 years ago.

In a forward contract, two parties (the "counterparties" to the deal) commit to a given trade to be executed on a given date in the future. All of the terms of the trade, the underlying asset, the amount, the price the buyer will pay, and so forth— are laid out in the agreement. Buyer and seller are both committed to the given trade. Forward contracts are written on a wide range of “underlyings” including commodities (wheat, gold, copper,oil,. . .), financial variables (equity prices, exchange rates, interest rates,. ..), and other instruments (including once-exotic underlyings like electricity and market volatility).

Forward contracts are "over the counter" contracts, i.e., they are bilateral con- tracts that are negotiated directly between seller and buyer. The advantage is that forwards are tailored to the particular requirements of the counterparties. The disadvantage is that, in the absence of other arrangements, each party is bearing the credit risk of the other counterparty, i.e., that the other counterparty will default on its obligation under the contract.

There are two types of settlement in a forward contract. In a physically-settled forward contract, the seller is required to deliver the agreed quantity under the contract, and the the buyer needs to pay the agreed price under the contract. In a cash-settled contract, the spot price at the maturity of the contract ST is matched with the price agreed in the contract F and

the loser has to pay the gainer the amount of this difference. That is, if ST > F, then the buyer's locked-in price on the forward contract is "better" for the buyer by ST — F than the spot market price, so the seller pays the buyer the amount of this difference. If ST < F, then the buyer pays the seller F — ST.

Futures

Futures contracts are simply forward contracts traded on an exchange. Although the first futures exchange would be the Dojima Rice Exchange in Osaka Japan around 1730, modern futures trading history is more precisely understood beginning with the grain markets of Chicago, with the formation of the Chicago Board of Trade in 1848.

In a forward contract, terms of the contract are negotiated unilaterally by the buyer and seller. In a futures contract, the exchange determines everything but the price of the contract: the exchange determines what the commodity or financial instrument underlying the futures contract is, how much of the underlying is in one futures contract, when the futures contract is to be delivered, the minimum acceptable grade or quality of the underlying, etc. Buyers and sellers send orders to the exchange indicating how many contracts they would like to buy/sell, and what prices they would like to buy/sell at. The exchange then discovers the prices by matching buy orders with sell orders.

Futures exchanges offer contracts on a broad number of underlyings, including agricultural commodities, metals, oil, equities and equity indices, interest rates, bonds, and currencies. The majority of futures contracts are physically settled but certain ones like stock index futures and interest-rate futures are frequently cash-settled.

Forwards and futures have the same economic purpose, yet the exchange's involvement creates some

significant differences in the contracts:

1. Forward contracts can be tailored to the specific requirements of the counterparties. Futures contracts are standardized with respect to the contract size, the potential delivery date and locations, and the grade of the commodity or asset that can be delivered. Therefore, futures contracts in general will not be as good of a hedge as forward contracts unless the hedging requirements of the investor just happen to match the terms of the standardized contract.
2. Under a forward contract, both parties take the other's credit risk. Under a futures contract, the exchange is responsible for performing on the contract and thus becomes the counterparty to everyone. Both parties are merely taking on exposure to the exchange's credit risk, and this generally ends up being less credit risk in a futures contract than in a forward.

Futures market investors must maintain "margin," which is effectively collateral against default. The margin balances are marked-to-market daily, i.e., they are charged for gains and losses resulting from daily movement in futures prices. The working of margin accounts is an important ingredient in preserving the financial health of futures contracts.

A.2 Swaps

Swaps, as with forwards, are over-the-counter contracts. In a forward, the two parties agree to one trade or single exchange of cash flows. In a swap, the parties agree to multiple exchanges of cash flows on multiple dates in the future.

Swaps are quite new as a product category, appearing for the first time only in the late 1970s. They are now, however, by far the largest individual contributor to the world deriva- tives market, responsible, in notional outstanding terms, for more than 60% of the over-the-counter derivatives market (see Section 2).

The most popular use of swaps is in the interest rate market ("interest-rate swaps"). An interest-rate swap is the exchange of one interest rate for another on a given notional principal in a specific currency. ("Notional" in that no principal is ever exchanged, only the payments on principal interest.) For instance, one party to the swap might pay floating rates based on Libor while the other pays fixed rates on the same principal. These types of swaps facilitate the conversion of an exposure denominated in one interest rate (e.g., floating rates) to another (e.g., fixed).

Swaps can also be employed to swap interest-rate exposure in a given currency for interest-rate exposure in some other currency ("currency swaps"). In a currency swap, the principal is not notional; instead it is paid at the start of the swap and repaid at the termination of the swap. This renders the currency swap essentially an exchange of loans between the two counterparties.

Some other types of swaps are equity swaps, which swap exposure in equity for exposure in interest rates (or for another exposure in equity); commodity swaps which usually entail the swapping of the difference between a given fixed rate and the true floating rate of a commodity (e.g., oil); and credit swaps in different varieties, including total return swaps and credit default swaps. The uses of swaps are elaborated upon later in Section 3.

A.3 Options

Forward contracts are marked by obligation to the trade/exchange of cash flows under the contract, as are the contract varieties that descend from forwards like futures and swaps. Options, by contrast, which live up to their name, are marked by optionality. A standard option contract states the terms of an exchange in the future, but in an option one of the parties to the contract has the right to exercise or opt out of the contract.

- In a call option, the person holding the option is entitled to buy the underlying asset at the price agreed upon in the contract (referred to as the "strike price").
- In a put option, the holder of the option has the right to sell the underlying asset at the specified strike price.

The party that owns the right in the option contract is alternatively known as the buyer or holder of the option or

alternatively as the long position in the option. The other party to the option transaction—who has a commitment to be involved in the transaction described in the contract if the option buyer chooses to exercise his right—is alternatively known as the seller or writer of the option or the short position in the option.

Option payoffs are not linear in terms of the price of the underlying. For instance, a call option that allows the option buyer to purchase 100 ounces (oz.) of gold on March 3 at $1,800 per oz. would pay out if the gold price on March 3 is over $1,800 per oz. (again, say, $1,840 per oz.), he will exercise his contractual right and purchase the gold at the strike price of $1,800 per oz. The contract being for 100 oz., the buyer makes $4,000, and the seller is thus that much out. But if the gold price on March 3 is below $1,800 per oz., the buyer will opt not to enforce the contract, and to purchase the desired amount of gold directly in the market directly at the lower market price. The option holder then can gain, but cannot lose, from the exercise choice. In return for assuming the opposite side of the contract, the buyer of the option pays the seller an advance charge known as the option price or the option "premium.".

A.4Credit Derivatives

Traditionally, finance separates market risk (the risk of price changes of one type or another—commodity prices, equity prices, index levels, exchange rates, interest rates, etc.) from credit risk, the risk that payments will not be made as agreed. Market risk can be dealt with by the traditional derivative forms outlined above. For instance, a forward contract might be utilized to protect cash flows against the impact of price fluctuations; an option might be utilized to acquire a floor price or ceiling price. Credit derivatives are a fairly recent generation of products intended to hedge or offset credit risk. They were initially brought into existence in 1993, but have developed extremely rapidly since then, and are now the third-largest segment of the derivatives market by notional outstanding, after interest-rate derivatives and currency derivatives (see Section 2).

The most widely used credit derivative by far is the credit default swap (CDS). A CDS is similar to insurance covering default on a given "reference obligation," which may be a bond or loan issued by a corporate or sovereign entity. The protection buyer in a CDS pays a periodic payment (referred to as the CDS "premium") to the protection seller. The payments go on till maturity or default on the reference obligation, whichever event occurs first. For that, in the event of default on the reference obligation, the protection seller agrees to make the buyer whole by paying an amount equal to the loss-given-default on the reference obligation.

Effectively, the protection buyer has a short exposure in the credit risk of the reference obligation (one that rises in value as credit risk worsens) whereas the protection seller has a synthetic long exposure in the credit risk (i.e., an exposure to the credit risk of the reference obligation even if they do not own the obligation). CDSs can be employed by banks and other financial institutions to hedge the risks of bonds and loans the institutions carry. They can be employed speculatively as well: an investor who is not exposed to the credit risk of a reference instrument but who thinks the credit risk will decrease in quality can purchase protection on the instrument and hope to make money if the perception comes to fruition. In fact, as much as the first market in CDSs was driven by hedging considerations, in most countries, CDSs today have become the instrument of choice for assuming credit risk exposure. In several senses, the CDS market is more liquid than the underlying credits' market.

CDS indices are indices formed from credit default swap prices in a way analogous to forming equity indices from equity prices. There are two large families of credit indices, the iTraxx indices for Europe, and the CDX indices for North America and Asia. Trading in CDSs and the CDS indices accounts for approximately three-quarters of the credit derivatives market.

References

1. Clearing Corporation of India Ltd. (2024). *Annual Report*. https://www.ccilindia.com
2. Futures Industry Association. (2024). *Global Derivatives Report*. https://www.fia.org
3. India INX. (2024). *Market and Product Updates*. https://www.indiainx.com
4. International Financial Services Centres Authority. (2024). *Regulatory Guidelines*. https://www.ifsca.gov.in
5. National Stock Exchange IFSC. (2024). *Gift Nifty and Derivatives Overview*. https://www.nseifsc.com
6. Reserve Bank of India. (2024). *Report on Currency and Finance*. https://www.rbi.org.in
7. Securities and Exchange Board of India. (2023). *Credit Derivatives Consultation Paper*. https://www.sebi.gov.in
8. Securities and Exchange Board of India. (2024). *Handbook of Statistics on Indian Securities Market*. https://www.sebi.gov.in