Derivatives and Futures products in the real economy

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DERIVATIVES AND FUTURES FAMILIES

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INTRODUCTION

While derivatives may appear to us to be recent inventions of financial engineers disconnected from the real economy, the initial need for this type of hedging product has a much more distant origin. Thus, from the beginning of trade, the need to guard against an unfavorable price change was felt for certain activities. This is particularly the case in agriculture: since antiquity, farmers entered into futures contracts in order to sell their production before harvest.

The emergence of derivatives in their current form dates back to the 1970s with the creation of the first options trading marketplace, the Chicago Board Options Exchange. This innovation is the result of two concomitant and related events: the first was the financial uncertainty that prevailed at the time with the end of Bretton Woods' fixed exchange rate regime and thus the floating of currencies naturally implying a need for hedging of the currency risk. The second event was the options enhancement model developed by Merton, Black and Scholes, allowing stakeholders to converge on the same valuation of optional products.

INTRODUCTION

It is now estimated that the need for derivatives from the real economy accounts for only 10% of transactions, as the main growth drivers of the derivatives market have been speculation and arbitrage for the past 30 years.

The leverage effects of derivatives (i.e. the expectation of gain relative to the amount invested) have indeed attracted many investors. At the same time, arbitrage strategies of benefiting from temporary market inefficiency have contributed greatly to the explosion of the derivatives market, which today represents the largest financial market in terms of volume exchange.

DERIVATIVE DEFINITION

- A derivative is a contract between two or more parties whose value is based on an agreed-upon underlying financial asset, index or security.
- Common underlying instruments include Bonds, Commodities, Currencies, Interest rate, Market index and Stocks.
- Futures contracts, forward contracts, options, swaps and options are the most common used derivatives.

EQUITY DERIVATIVES

INDEX FUTURES

DEFINITION & MARKET

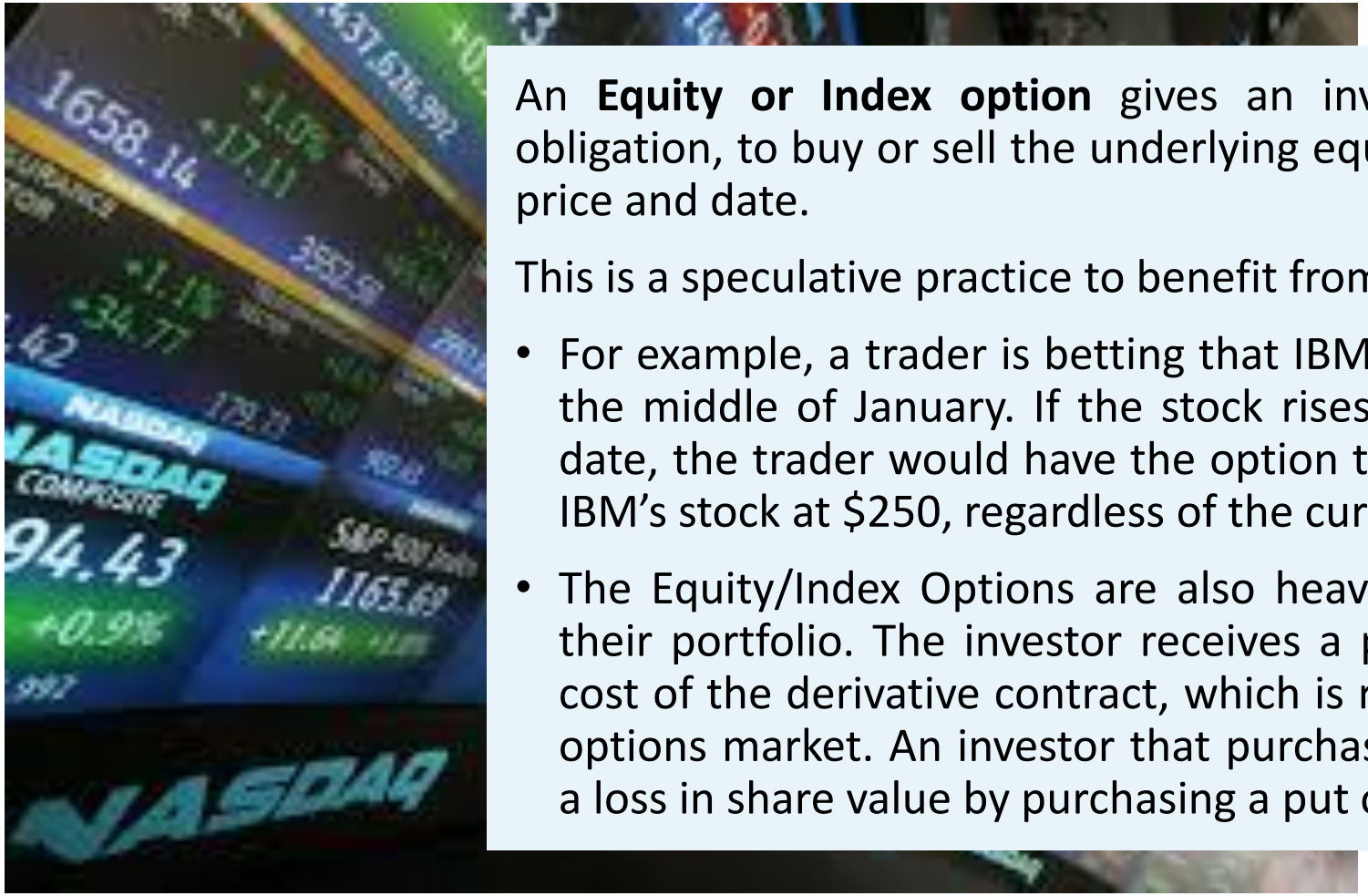
Index futures are futures contracts where a trader can buy or sell a financial index today to be settled at a future date. Index futures are used to speculate on the direction of price movement for an index such as the S&P 500 or CAC 40.

The price of a future index will vary according to the price of cash, interest rates and dividends (possibly). The quantity of the underlying and the due date are predefined.

Portfolio managers use index futures to **hedge** their equity positions against a loss in stocks.

Speculators can also use index futures to bet on the market's direction.

EQUITY AND INDEX OPTION



An **Equity or Index option** gives an investor the right, but not the obligation, to buy or sell the underlying equity or index at an agreed upon price and date.

This is a speculative practice to benefit from the rise or fall of a value.

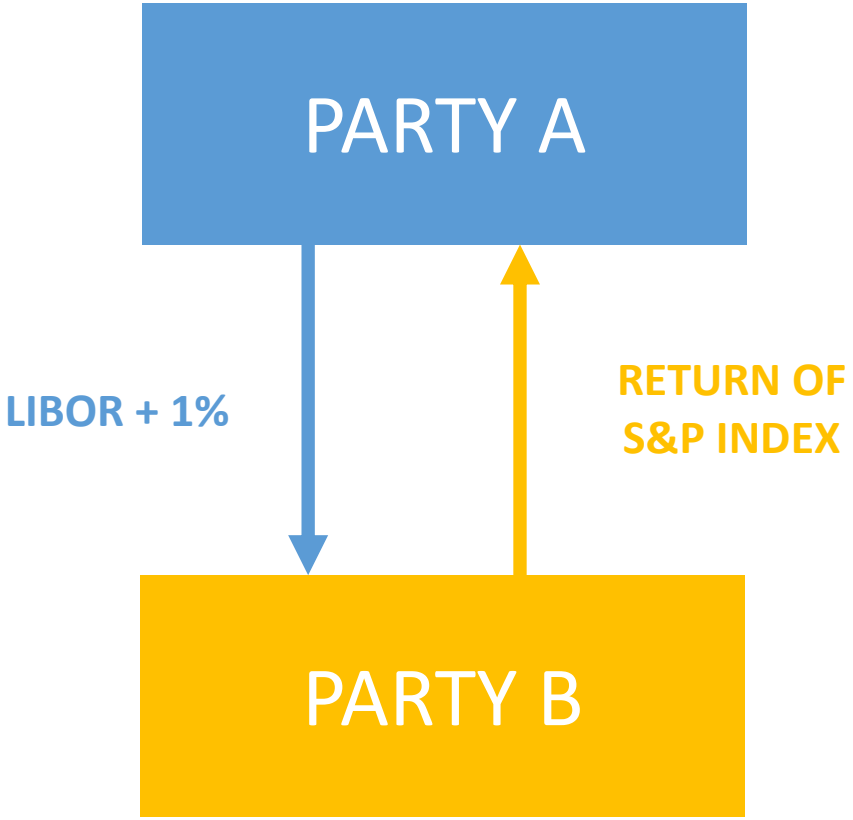
- For example, a trader is betting that IBM's stock will rise above $250 by the middle of January. If the stock rises above $250 by the expiration date, the trader would have the option to exercise or buy 500 shares of IBM’s stock at $250, regardless of the current stock price.
- The Equity/Index Options are also heavily used by investors to hedge their portfolio. The investor receives a potential payout by paying the cost of the derivative contract, which is referred to as a premium in the options market. An investor that purchases a stock, can protect against a loss in share value by purchasing a put option.

EQUITY SWAP

An equity swap is similar to an interest rate swap, but rather than one leg being the "fixed" side, it is based on the return of an equity index.

These swaps are highly customizable and are traded over-the-counter. Most equity swaps are conducted between large financing firms such as auto financiers, investment banks, and lending institutions.

Example: Consider two parties – Party A and Party B. The two parties enter into an equity swap. Party A agrees to pay Party B (LIBOR + 1%) on USD 1 million notional principal and in exchange Party B will pay Party A returns on S&P index on USD 1 million notional principal. The cash flows will be exchanged every 180 days.



CURRENCY DERIVATIVES

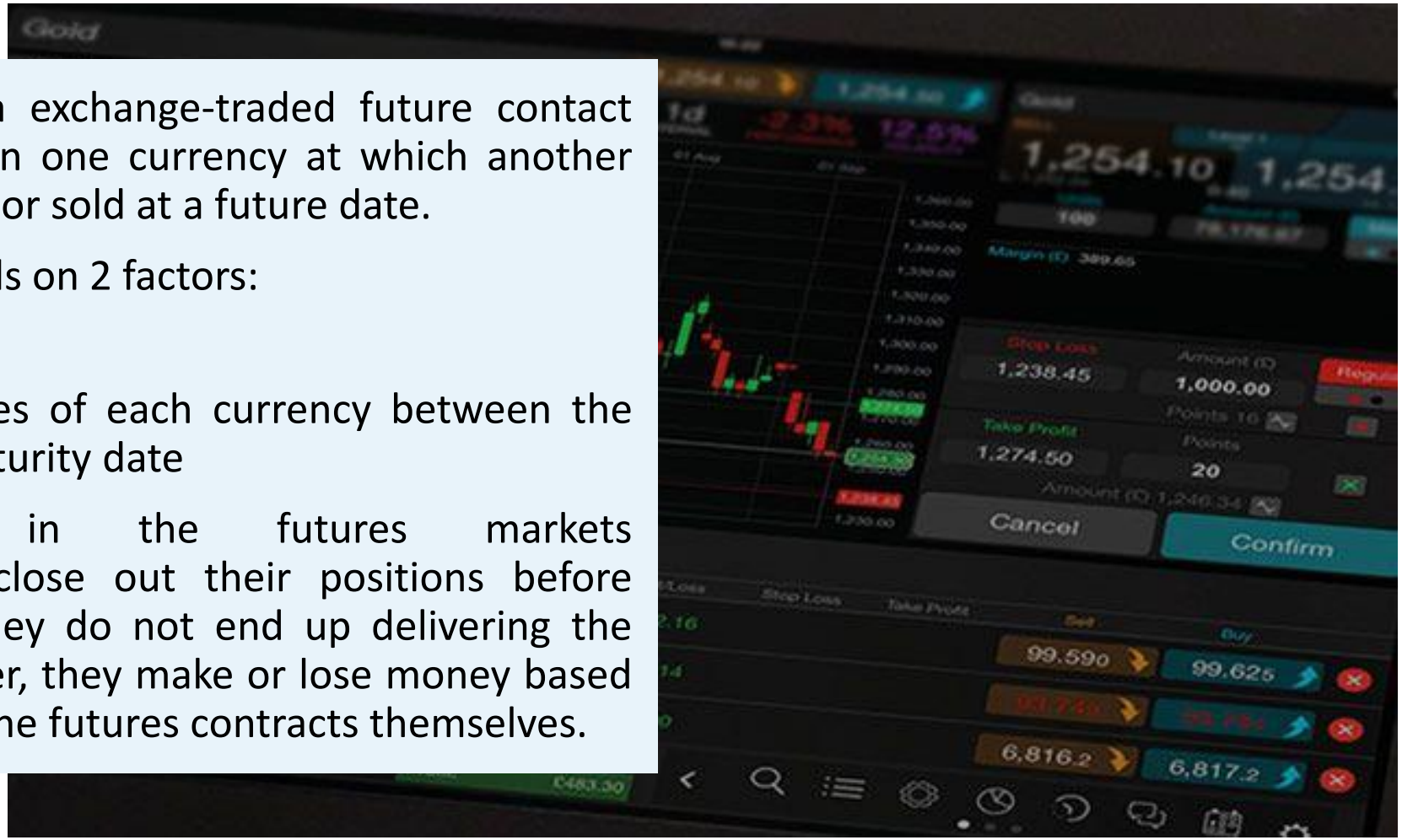
CURRENCY FUTURES

Currency futures are a exchange-traded future contact that specify the price in one currency at which another currency can be bought or sold at a future date.

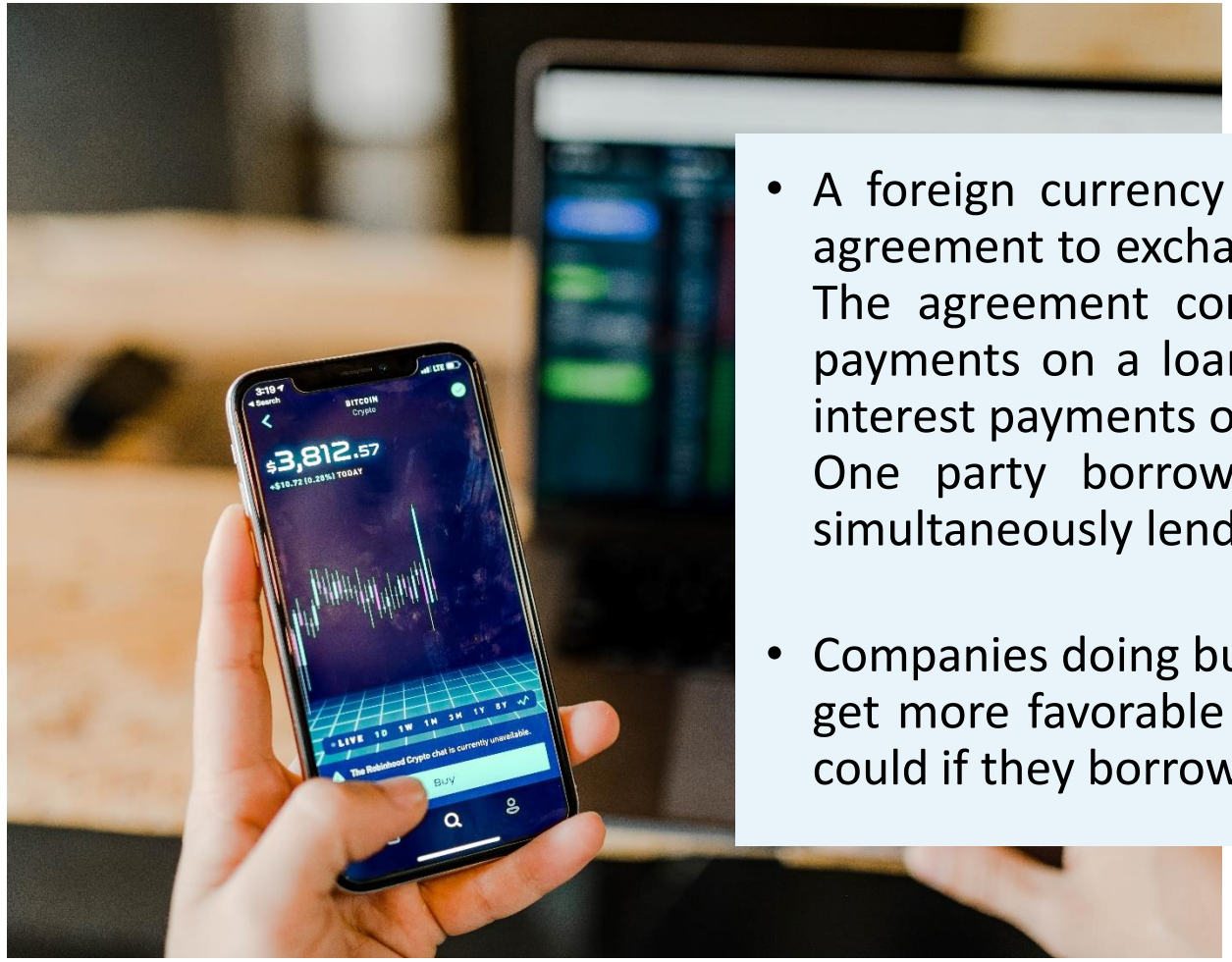
The future price depends on 2 factors:

- The Spot rate
- The two interest rates of each currency between the spot date and the maturity date

Most participants in the futures markets are speculators who close out their positions before futures expiry date. They do not end up delivering the physical currency. Rather, they make or lose money based on the price change in the futures contracts themselves.



CURRENCY SWAP



- A foreign currency swap, also known as an **FX swap**, is an agreement to exchange currency between two foreign parties. The agreement consists of swapping principal and interest payments on a loan made in one currency for principal and interest payments of a loan of equal value in another currency. One party borrows currency from a second party as it simultaneously lends another currency to that party.

- Companies doing business abroad often use currency swaps to get more favorable loan rates in the local currency than they could if they borrowed money from a bank in that country.

FOREIGN EXCHANGE OPTIONS

DEFINITION & MARKET

A foreign exchange option is a derivative instrument that gives the **right** but not the obligation to exchange money denominated in one currency into another currency at a pre-agreed exchange rate on a specified date.

The foreign exchange options market is the deepest, largest and most liquid market for options of any kind. Most trading is over the counter (OTC) and is lightly regulated, but a fraction is traded on exchanges like the International Securities Exchange, Philadelphia Stock Exchange, or the Chicago Mercantile Exchange for options on futures contracts.

PLAIN VANILLA

European if the exercise is done at the maturity date or American when the exercise can be done at any time on or before its expiry.

BARRIER OPTION

A pre-defined level of spot rate that will triggers the activation of de-activation of the option if the spot rate reaches the barrier before the maturity date.

AVERAGE OPTION

The return is calculated based on the average price of the underlying during a period of time.

FOREIGN EXCHANGE OPTIONS

USE CASE EXAMPLE

From a corporate point of view, buying a FX OTC option can be compared to an insurance subscription.

- A French company (whose accounting currency is EUR) sells luxury watches in USD. As a consequence, its results are negatively sensitive to a USD drop against EUR. This company is willing to insure its results against the contingency that the USD decreases against EUR. In the meantime, this company wants to benefit from a potential increase of the USD.
- The company is going to buy a Call EUR Put USD with a pre-defined strike (maximum value under which the company will have the guarantee to buy EUR against USD).
- The value (premium) of an option depends on several market parameters (spot, interest rate in both currencies, volatility).

INTEREST RATE DERIVATIVES

FORWARD RATE AGREEMENT

DEFINITION & MARKET

Forward rate agreements (FRA) are over-the-counter contracts between parties that determine the rate of interest to be paid on an agreed upon date in the future. The notional amount is not exchanged, but rather a cash amount based on the rate differentials and the notional value of the contract.

Usage of FRA: the FRA contracts booked in the CIB portfolio mainly come from corporate trades.

USE CASE

1. A company A has a floating loan indexed on LIBOR 3 months. Due to the economic climate, they anticipate an interest rate increase and want to cover their risk for the next interest payment of this loan.

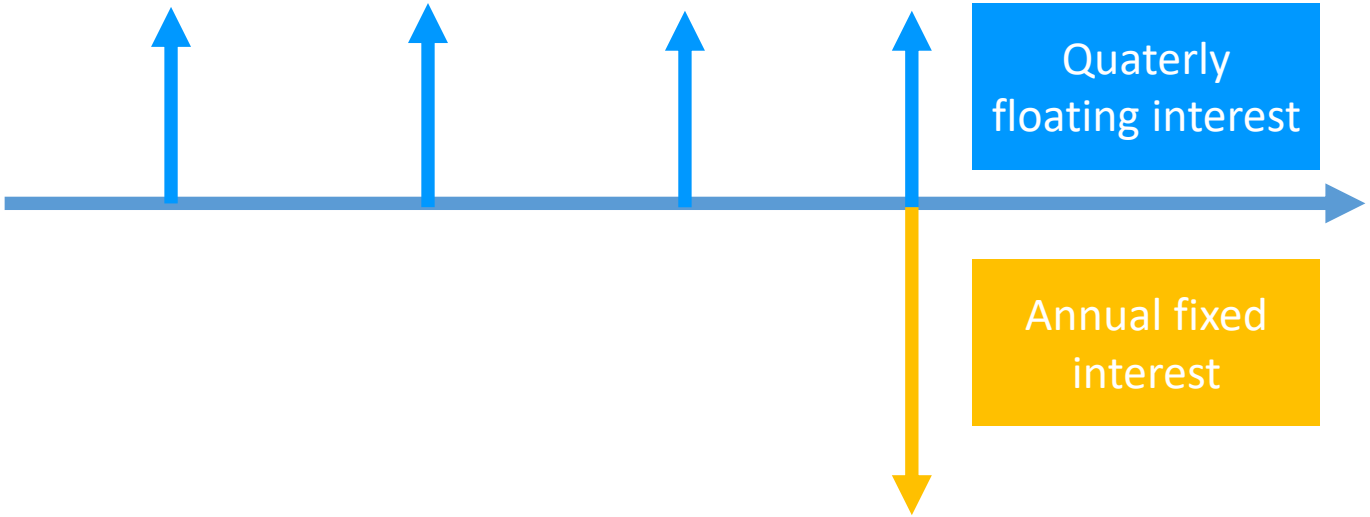
2. The Company A enters into a FRA contract in which they will receive the difference between the agreed fixed rate and the LIBOR 3 months.

3. Combined with its current loan, at the next fixing date, the company will:
   - Pay LIBOR fixing for the loan
   - Receive (FRA Rate – LIBOR fixing)

INTEREST RATE SWAP

The most common type of **interest rate swap** is one in which Party A agrees to make payments to Party B based on a fixed **interest rate**, and Party B agrees to make payments to Party A based on a floating **interest rate.**

FIXED/FLOATING SWAP CASH FLOWS



INTEREST RATE SWAP

BIA GROUPE

USE CASE

Company A wants to invest in a new technology company and funds its investment by a loan with a fixed rate of 2% with Bank A. The loan is now booked in the Bank A portfolio and by nature increases the Interest Rate bank risk exposure. To reduce its risk exposure, the Bank A enters into an Interest Rate Swap to exchange the fixed interest Cash Flows by floating interest Cash Flows.

SWAP TYPES

- Fixed/Floatin
- Floating/Floating
- With or without notional exchange at the beginning, at the end, the beginning and at the end
- Cross currency swap

SWAPTION

DEFINITION & MARKET

A **swaption**, also known as a swap option, refers to an option to enter into an interest rate swap or some other type of swap. In exchange for an options premium, the buyer gains the right but not the obligation to enter into a specified swap agreement with the issuer on a specified future date.

Swaptions are over-the-counter contracts and are not standardized, like equity options or futures contracts.

SWAPTION TYPES

Bermudan
The purchaser is allowed to exercise the option and enter into the specified swap on a predetermined set of specific dates.

European
The purchaser is only allowed to exercise the option and enter into the swap on the expiration date of the swaption.

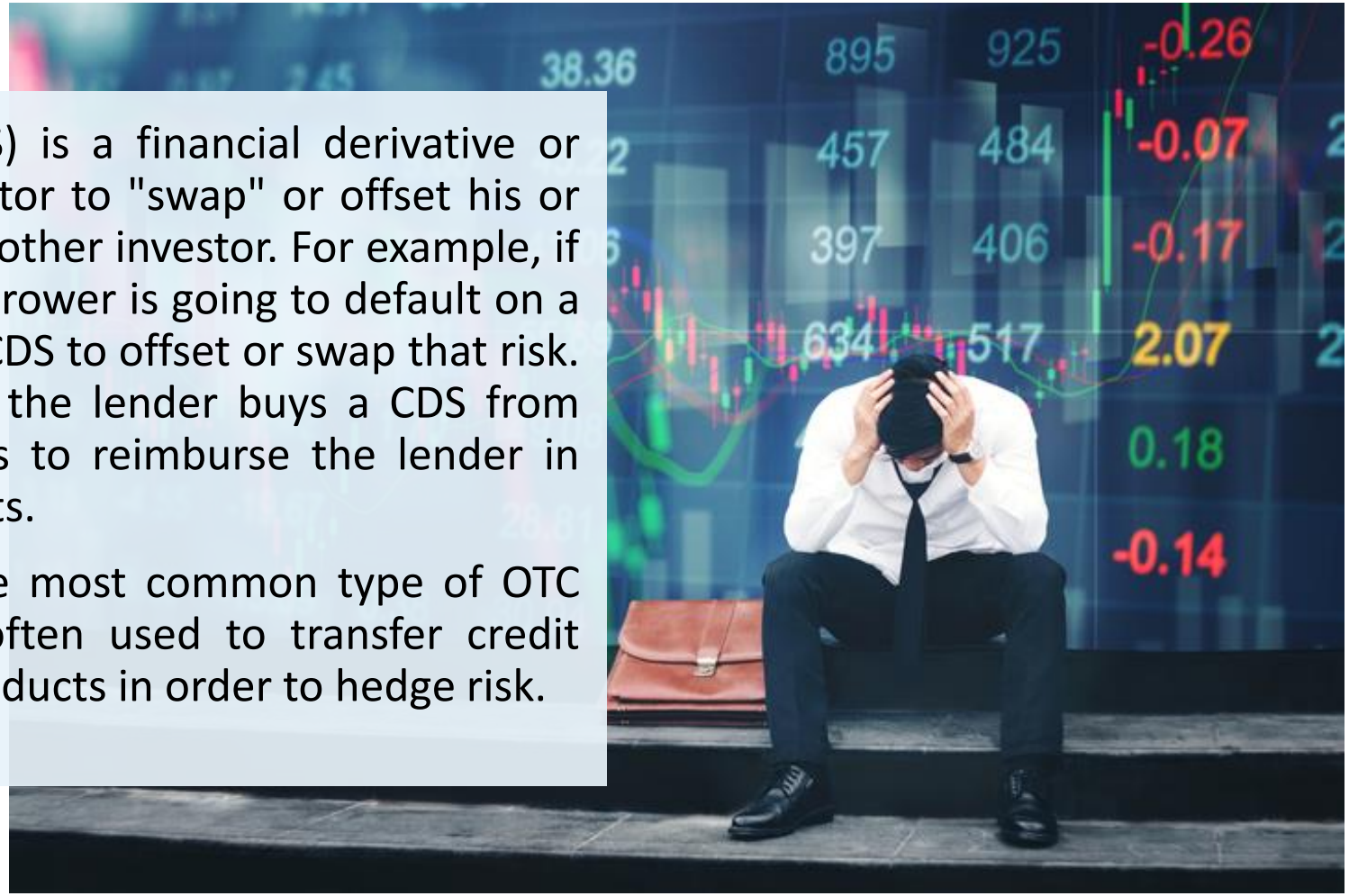
American
The purchaser can exercise the option and enter into the swap on any day between the origination of the swap and the expiration date.

CAP & FLOOR

- A **Cap** is an over-the-counter contract between two counterparties which allows its buyer to hedge against an increase in interest rates beyond a predetermined level (strike rate), subject to immediate payment of a premium. At each observation, if the level of the variable rate observed is higher than the exercise price, the buyer receives from the seller the rate differential, applied to the nominal amount and related to the number of days of the interest period.
- A **Floor** is an interest rate contract which, subject to the payment of a premium, allows its buyer to cover itself or take advantage of a fall in monetary rates below a certain level (floor rate or strike).

CREDIT DEFAULT SWAP

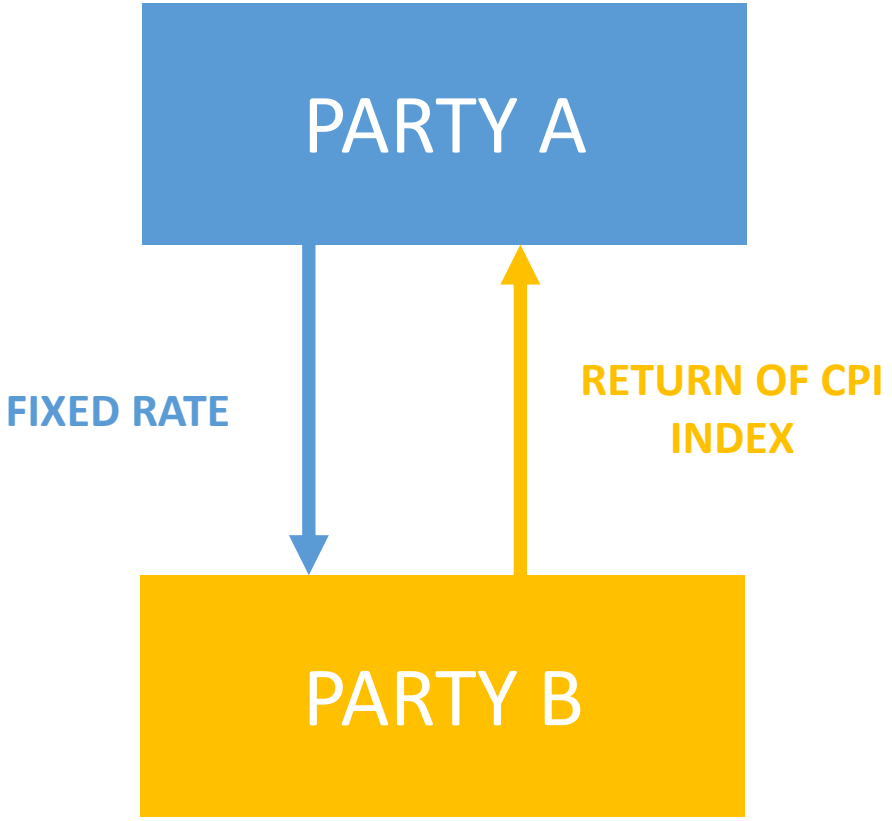
- A **Credit Default Swap** (CDS) is a financial derivative or contract that allows an investor to "swap" or offset his or her credit risk with that of another investor. For example, if a lender is worried that a borrower is going to default on a loan, the lender could use a CDS to offset or swap that risk. To swap the risk of default, the lender buys a CDS from another investor who agrees to reimburse the lender in the case the borrower defaults.
- Credit Default Swaps are the most common type of OTC credit derivatives and are often used to transfer credit exposure on fixed income products in order to hedge risk.



INFLATION SWAP

An **Inflation Swap** is a contract used to transfer inflation risk from one party to another through an exchange of fixed Cash Flows. In an inflation swap, one party pays a fixed rate cash flow on a notional principal amount while the other party pays a floating rate linked to an inflation index, such as the Consumer Price Index (CPI). The party paying the floating rate pays the inflation adjusted rate multiplied by the notional principal maturity.

Inflation Swaps are used by financial professionals to mitigate (hedge) the risk of inflation and to use the price fluctuations to their advantage.



COMMODITIES DERIVATIVES

COMMODITIES MARKET

DEFINITION & MARKET

A commodity market is a physical or virtual marketplace for buying, selling, and trading raw or primary products. There are currently about 50 major commodity markets worldwide that facilitate trade in approximately 100 primary commodities.

The major U.S. commodity exchanges are the Chicago Board of Trade, the Chicago Mercantile Exchange, the New York Board of Trade, and the New York Mercantile Exchange.

During the Covid-19 crisis, the US oil futures crashed below 0$. For more information, read this article for more details.

Metals – Gold, silver, platinum, copper…

Energy – Crude oil, heating oil, natural gas, gasoline…

Meat – Lean hogs, pork bellies, live cattle, feeder cattle…

Agriculture – Corn, soybeans, wheat, rice, cocoa, coffee, cotton, sugar…

COMMODITIES FUTURES

A popular way to invest in commodities is through a futures contract, which is an agreement to buy or sell a specific quantity of a commodity at a set price at a later time. Futures are available on every category of commodity.

Two types of investors participate in the futures markets:

- commercial or institutional users of the commodities
- speculators

MARKET PARTICIPANTS

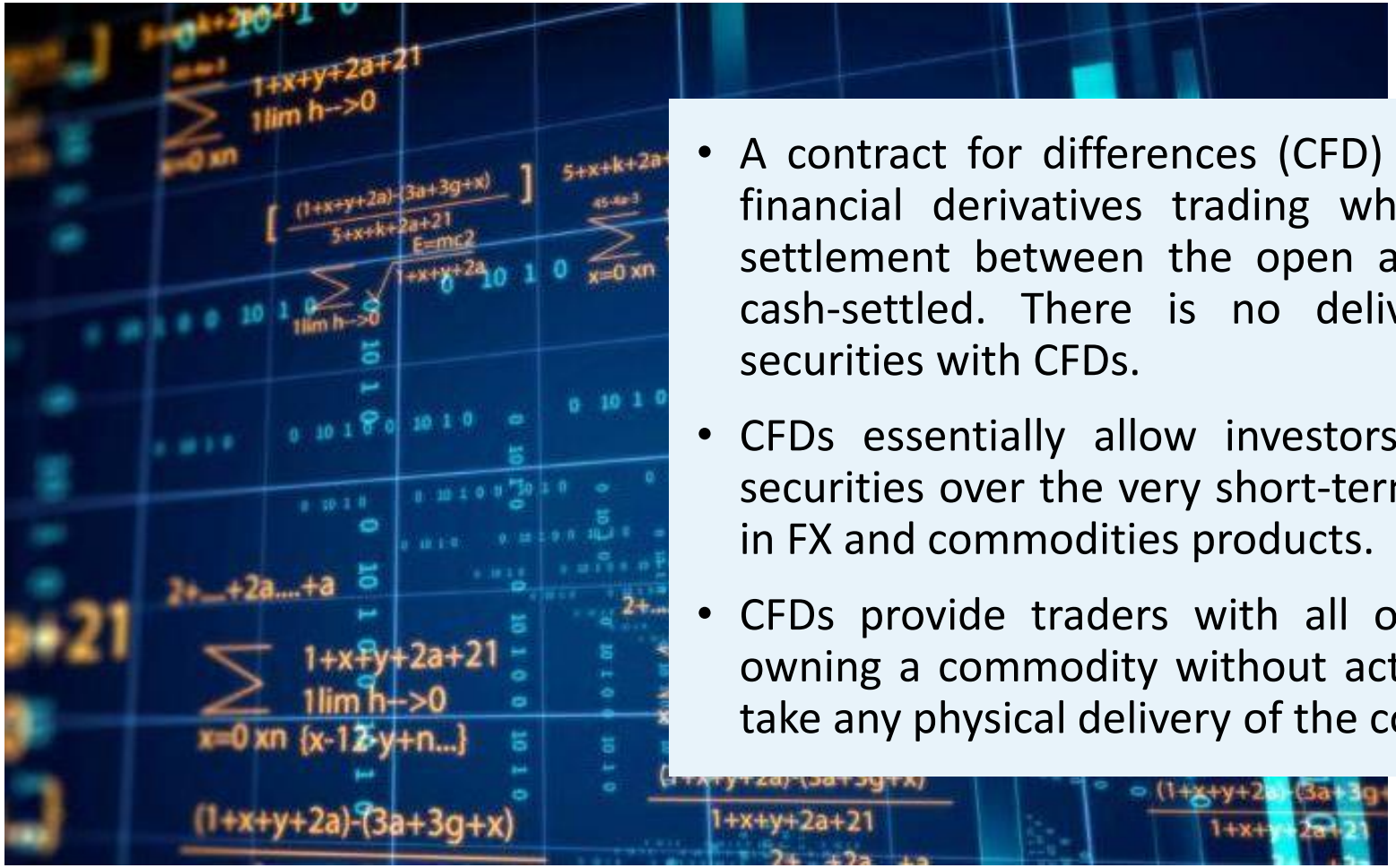
Manufacturers and service providers:

These hedgers may use the commodity markets to take a position that will reduce the risk of financial loss due to a change in price. The airline sector is an example of a large industry that must secure massive amounts of fuel at stable prices for planning purposes.

Speculators:

The second group is made up of speculators who hope to profit from changes in the price of the futures contract. Speculators typically close out their positions before the contract is due and never take actual delivery of the commodity (e.g. grain, oil, etc.) itself.

CONTRACT FOR DIFFERENCE



- A contract for differences (CFD) is an arrangement made in financial derivatives trading where the differences in the settlement between the open and closing trade prices are cash-settled. There is no delivery of physical goods or securities with CFDs.
- CFDs essentially allow investors to trade the direction of securities over the very short-term and are especially popular in FX and commodities products.
- CFDs provide traders with all of the benefits and risks of owning a commodity without actually owning it or having to take any physical delivery of the commodities.