TEXPO Conference 2021:
Essential Learning for CTP Candidates
Session #4 (Tue., 4/13, 4:00 – 5:00 pm)

The Treasury Academy
New Frontiers in Treasury Education

- ***ETM6-Chapter 16:*** *Enterprise Risk Mgmt*
- ***ETM6-Chapter 17:*** *Financial Risk Mgmt*

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As a prep course for the CTP exam, significant portions of these lectures are based on materials from the ***Essentials*** text.

To Sign up for On-Line Access

- E-mail request to: treasuryacademy@gmail.com
- You will receive an invitation to join the class from Canvas-Instructure
- Click on link and use your e-mail address as Username and you can set your own password
- First place to go is MODULES
- Materials for all of the chapters in ETM6 are provided

Addition Information

- There will be a link to my DropBox Folder for this course on the Canvas site
- Copies of all session lecture notes from Texpo
- Additional handouts and other items of interest are provided there
- Please note that the full content and on-line support are all on the Canvas site, which requires you to e-mail me for an invitation
- You can also e-mail me directly at: djmasson@indiana.edu

ETM6: Chapter 16

The Treasury Academy

New Frontiers in Treasury Education

- ***Enterprise Risk Management***

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Overview of Chapter 16 Topics

- General Risk Management
- Enterprise Risk Management (ERM)
- Operational Risk Management
- Disaster Recovery/Business Continuity
- Managing Insurable Risks

Introduction

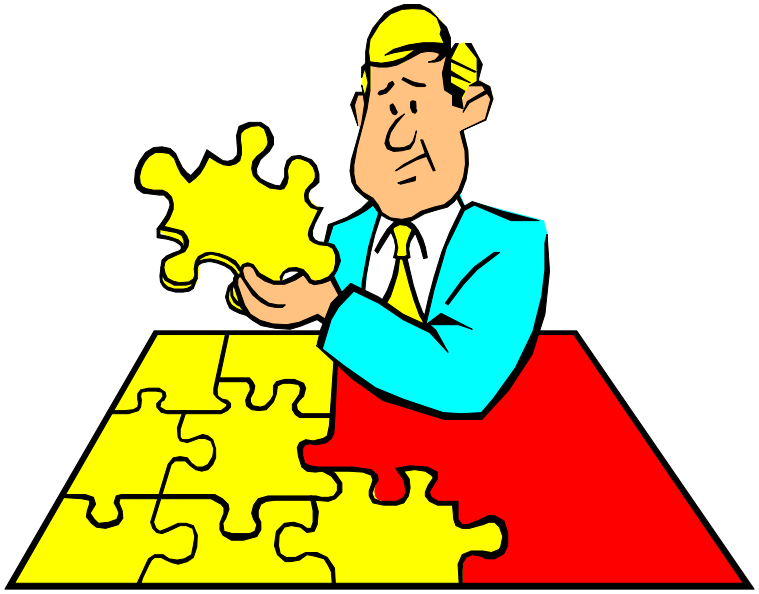
- The purpose of the risk management process in an organization is to:
  - Help managers identify future events that create uncertainty
  - Respond to negative possibilities by balancing the negative economic and/or regulatory effects against the costs to mitigate or eliminate them
  - Provide direction to guide recovery action when serious negative events occur

Enterprise Risk Management (ERM)

- Comprehensive, organization-wide approach to identifying, measuring, and managing the various risks that threaten the achievement of the organization's strategic objectives
- Ascertains if and how each department contributes to, or is impacted by, a particular risk category
- ERM's comprehensive approach allows the full scope of risk to be assessed across division lines

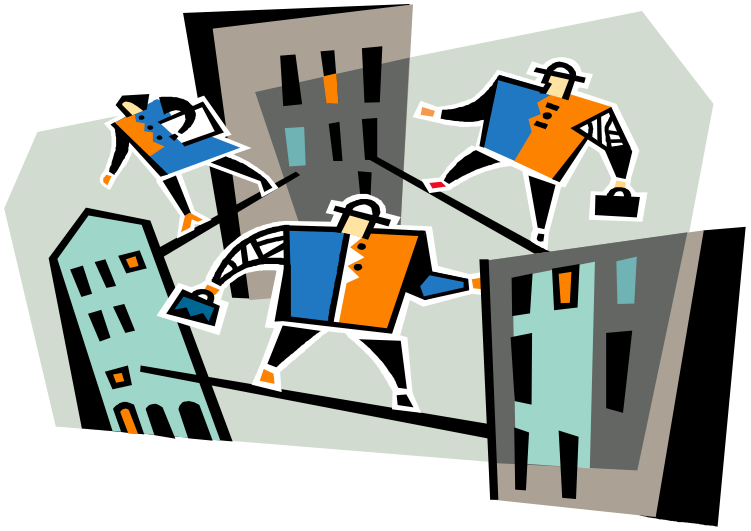
More on the Risk Management Process

- Determine Risk Tolerance
- Identifying Potential Exposures
  - Clearly in terms of both level and impact
- Quantify the Exposure
  - Both quantitative and qualitative assessment
- Compare current levels of risk to the target level of risk.
- Develop and Implement an Appropriate Risk Management Strategy
  - Avoid the Risk
  - Mitigate the Risk
  - Transfer the Risk
  - Retain the Risk
- Monitoring the Exposure
- Review and Modify the Strategy as Needed



Business-wide risks

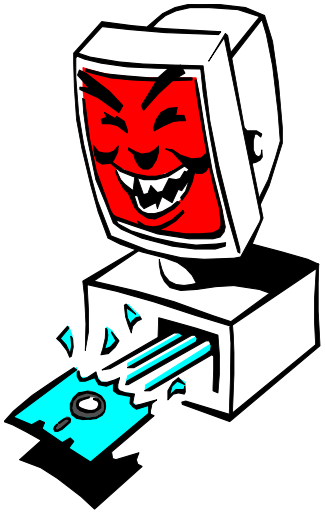
- Market Risk
  - Equity Price Risk
  - Interest Rate Risk
  - FX Risk
  - Commodity price
- Credit Risk
- Operational Risk
- Liquidity Risk
- Legal and Regulatory Compliance Risk
- Event Risk
- Strategic and Business Risk
- Geopolitical Risk
- Reputation Risk
- Cyber Risk



Who is Responsible for Risk?

- Direct Responsibility of Treasury
  - Market Risk
  - Credit Risk
  - Liquidity Risk
- Other Types of Risk
  - Operational Risk
  - Legal and Regulatory Risk
  - Event Risk
  - Business Risk
  - Strategic Risk
  - Reputation Risk

Cyberrisk



- Security breaches involving employee, customer, and corporate data
- Breaches may come from both internal and external sources
  - May include data corruption or theft
  - Denial of service attacks
  - Current and former employees represent the primary source of cyberrisk for an organization
  - External sources include hackers, activists, financial criminals and intellectual property thieves
  - Cyerrisk insurance may be available

Operational Risk Management

- Generally defined as the risk of direct and indirect losses resulting from external events that impact an organization's operations, or inadequate and failed internal processes, people and systems.
- Operational risk can be a significant cause of financial loss.
- Most financial disasters are attributed to a combination of exposure to market or credit risk, along with some failure of controls or the internal audit function.
- In many cases a single employee can cause a major disaster when controls are lacking

Operational Risks related to Treasury

- Internal Operational Risks
  - Employee Risk
  - Process Risk
  - Technology Risk
- External Operational Risks
  - Financial Institutional Risk
  - Counterparty Risk
  - Legal and Regulatory Compliance Risk
  - Sovereign Risk
  - Supplier Risk
  - External Theft/Fraud Risk
  - Physical and Electronic Security Risk
  - Event Risk

Techniques Used to Measure Risk

- Sensitivity Analysis
  - Examines the impact of a change in the value of a variable on a selected outcome measure
- Scenario Analysis
  - Similar to sensitivity analysis, but changes more than one variable at a time
- Value at Risk (VaR)
  - Developed in FI trading rooms to estimate the possible losses for an entire trading operation in a one-day period
- Cash Flow at Risk (CaR)
  - A variation of VaR used to assess the risk of cash shortfall over a longer period of time
- Monte Carlo Simulation
  - A sophisticated extension of sensitivity analysis that employs a series of probability distributions of input variables to a model in order to determine the distribution of the output variable(s) of interest

Managing Insurable Risks

- Insurance is a method for transferring and/or mitigating risk with 4 specific goals:
  - Insure against catastrophic loss
  - Decide when and what to insure
  - Manage the purchase and use of insurance
  - Obtain efficient pricing for insurance needs
- Using Insurance Contracts to Manage Risk
- Dealing with Insurance Providers
- Insurance Risk Management Services
- Risk Financing Techniques

Disaster Recovery and Business Continuity

- Disaster Recovery
  - Refers to restoration of treasury systems and communications after an event causes an outage
- Business Continuity
  - Refers to actions taken with regard to crisis management, alternative operating procedures, and communications to staff and customers
- Key Parties in Financial Supply Chain
  - Internal Resources: treasury staff, systems, etc.
  - External Financial Counterparties: FIs, market information providers, vendors, markets

ETM6: Chapter 17

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New Frontiers in Treasury Education

- ***Financial Risk Management***

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Overview of Chapter 17 Topics

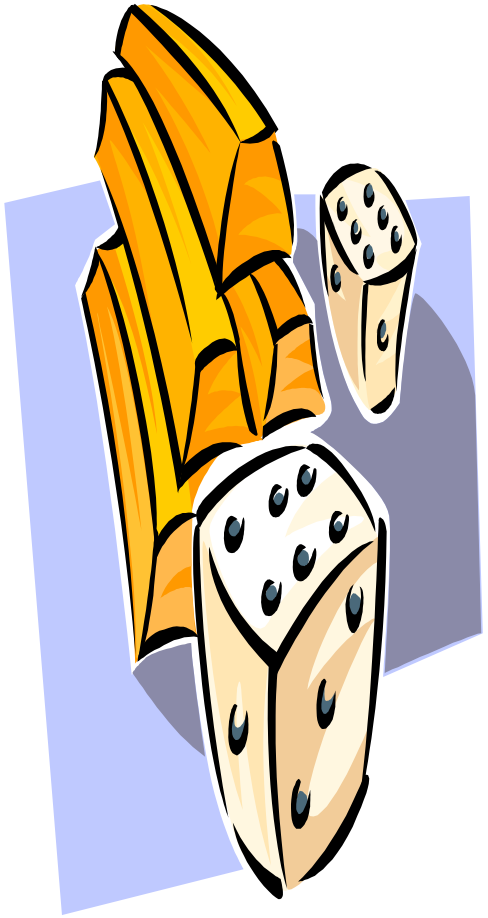
- Overview of Financial Risk Management
- Managing Financial Risk
- Derivative Instruments as Financial Risk Management Tools
- Managing Interest Rate Exposure
- Managing Foreign Exchange Exposure
- Managing Commodity Price Exposure
- Accounting and Tax Implications of Financial Risk Management
- Hedging Policy Statement

Basics of Financial Risk Management

- Financial risk is the risk of direct or indirect losses resulting from uncertainties surrounding the future levels of interest and FX rates, as well as commodity prices.
- It is treasury's responsibility to take actions that mitigate these financial risks
- Financial risk has increased significantly in recent years due to:
  - The speed of business brought about by advances in technology and communications
  - The scope of business brought about by the trend toward globalization

Key Financial Risk Issues

- Interest Rate Risk
- Foreign Exchange (FX) Risk
  - Economic
  - Transaction
  - Translation
  - Implicit versus Explicit FX Risk
- Commodity/Input Price Risk
- Managing Financial Risk
  - Natural Hedges and Correlations
  - Active Hedging
  - Speculation versus Arbitrage



Hedging, Speculation and Arbitrage

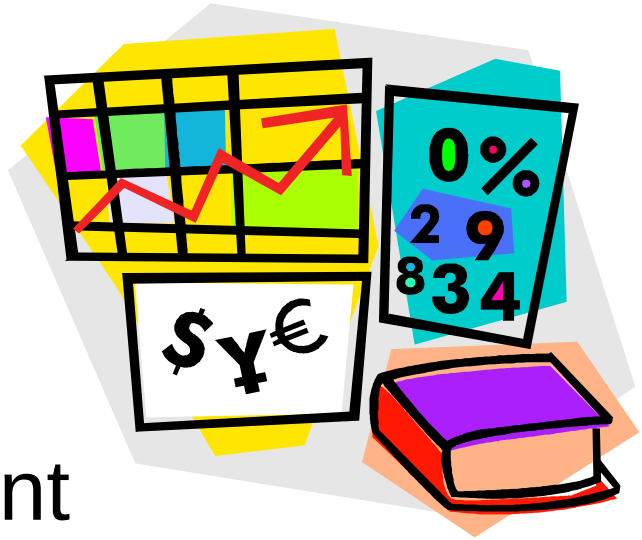
Hedging	**Reducing or eliminating risk associated with the uncertain future price of an owned asset.**
Speculation	**Assuming risk and betting on the direction of the market and whether the price of an asset will go up (long) or down (short).**
Arbitrage	**Assuming no risk but attempting to profit from market inefficiencies by buying an asset in one market and simultaneously selling in another.**

Benefits of Financial Risk Management

- Greater predictability in future cash flows makes the company more attractive to shareholders.
- The company gains an enhanced borrowing advantage in credit markets because lenders view the firm as being less risky.
- The company's probability of financial distress decreases because the firm can assess costs and revenues more accurately.

Derivative Instruments as Financial Risk Management Tools

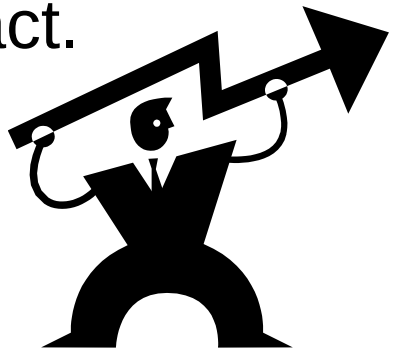
- A derivative instrument is a financial product that derives its value through a connection to another asset
- The four primary derivatives used are:
  - Forwards
  - Futures
  - Swaps
  - Options
- ISDA master agreement



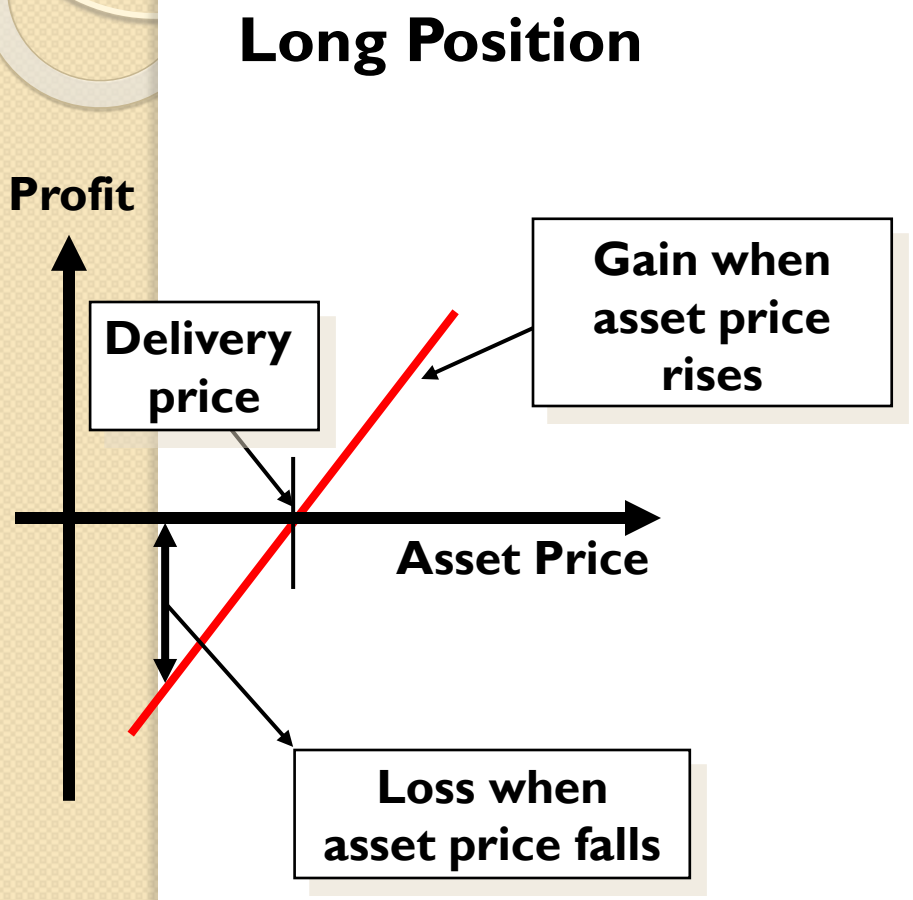
Forward Contracts

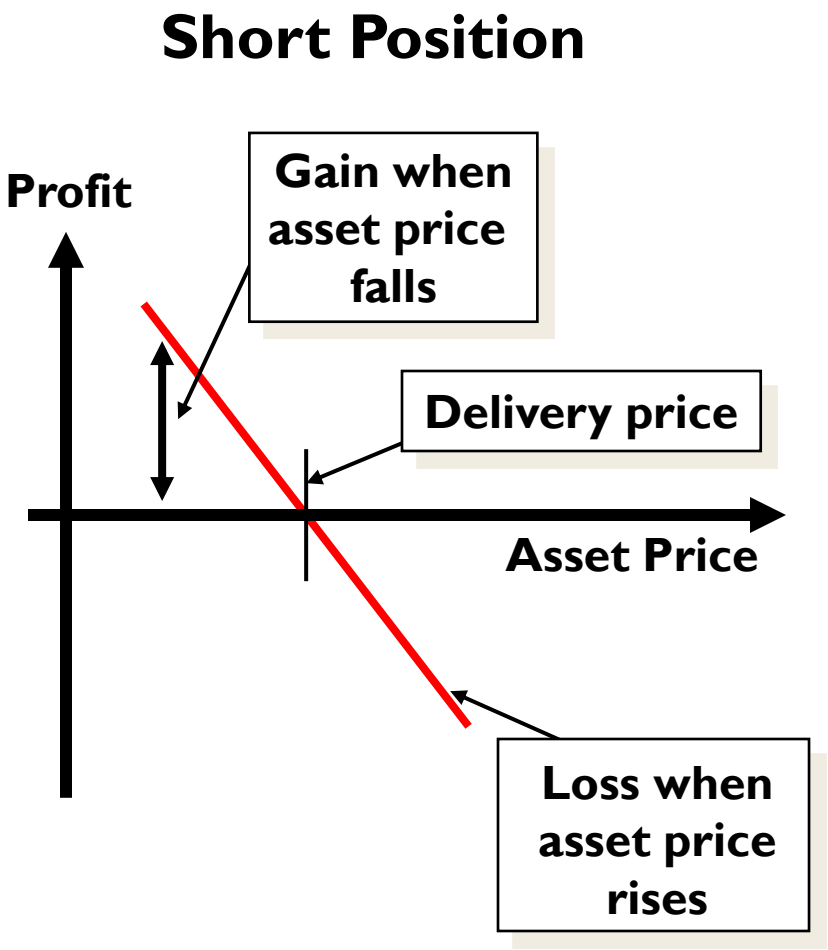
A* customized *agreement between two parties to buy or sell a fixed amount of an asset at a future date at a price agreed upon today

- Asset involved is called the underlying asset.
- Future date (maturity date of the contract).
- Price is delivery price of contract.
- Company buying asset is one party; the other is called the counterparty (bank or FX dealer).
- Buying party is long a forward contract; counterparty is short a forward contract.
- At maturity, delivery of the underlying asset usually takes place
- Used to lock-in prices/availability



Payoffs for Forward Contracts





Source: ETM3 - © AFP

Futures Contracts

A* standardized *contract between two parties traded on an organized exchange

- Similar to forwards in intent (payoff profiles from long and short positions are the same) but differ in execution (e.g., counterparty is the exchange itself).
- Size of contract and its maturity date set by exchange.
- Trading requires a margin account.
- Futures contracts are rarely settled by actual delivery and are usually closed out prior to maturity.

- Profit/loss from future offsets Loss/profit from business transaction

Swap Agreements

An agreement between two parties to exchange (swap) a set of cash flows at a future point in time

Types of swaps include:

- **Currency swap** -- obligation in one currency swapped into another currency
- **Commodity swap** -- floating commodity price swapped for fixed price
- **Interest rate swap** -- fixed rate swapped for floating rate

Options

A contract where one party has the right (but not the obligation) to buy or sell a fixed amount of an underlying asset at a fixed price through a specified date

- Writer of the option: Counterparty selling the option receives a premium from the buyer
- May be exchange traded or negotiated with a counterparty
- Call option: Contract giving the owner the right to *buy* an asset
- Put option: Contract giving the owner the right to *sell* an asset
- Strike/exercise price: The fixed or contracted price of the underlying asset
- American option: exercise any time through delivery date
- Bermudan option: exercise at specified dates over option life
- European option: exercise only on delivery date

Pricing of Options

- The premium (or price) of an option represents a combination of intrinsic value and time value
- Intrinsic Value
  - Determined by the relationship between the option's strike price and the price of the underlying instrument in the open market
  - In-the-Money vs. Out-of-the-Money
- Time Value
  - This is the part of the premium that is based on the probability that the value of the underlying asset will increase or decrease over the life of the contract

Relationship Between an Option Premium and Strike (Exercise) Price

Call or put option	**At-the-money**	**If the underlying asset price is equal to the strike price of the option**
Call option	**Out-of-the-money**	**If the asset price is less than the strike price of the option**
Put option	**Out-of-the-money**	**If the asset price exceeds the strike price of the option**
Call option	**In-the-money**	**If the asset price is greater than the strike price of the option**
Put option	**In-the-money**	**If the asset price is less than the strike price of the option**

Source: ETM6 - © AFP

Call Option Pricing

A CALL OPTION WITH A $50 STRIKE PRICE IS PURCHASED WHEN THE UNDERLYING ASSET IS SELLING FOR $46 PER UNIT. THE PREMIUM PAID IS $1.00.

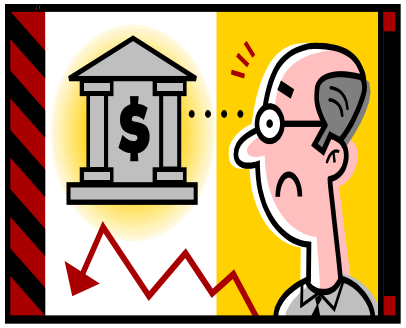
PRICE OF UNDERLYING ASSET ($)	PREMIUM PAID ($)	$50 CALL OPTION VALUE ($)	PROFIT (+) OR LOSS (-) ($)	CALL OPTION IS IN-, AT- OR OUT-OF-THE-MONEY
46	1	0	-1	OUT
47	1	0	-1	OUT
48	1	0	-1	OUT
49	1	0	-1	OUT
50	1	0	-1	AT
51	1	1	0	IN
52	1	2	+1	IN
53	1	3	+2	IN
54	1	4	+3	IN
55	1	5	+4	IN

Source: ETM6 - © AFP

Benefits of Options

- Companies use options in a variety of ways, including to safeguard their profit margins or to protect contingent positions
- Options provide a degree of certainty in volatile markets – setting floors or ceilings on prices of key items
- They can be a useful tool to guarantee a certain asset price (often FX rates) when bidding on a business contract or during M&A activity

Interest Rate Exposure and Risk Management



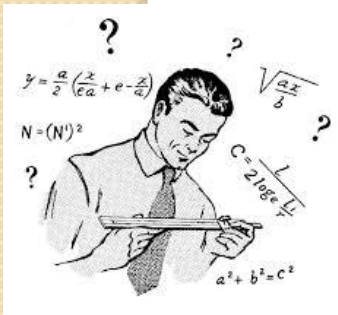
- Many organizations face financial risks attributable to interest rate changes.
- The risk exposure arises from the nature of the firm's operating and/or financing activities.
- Organizations with variable interest rate investments face the possibility of lower earnings when interest rates fall, while organizations with debt tied to variable interest rates face higher borrowing costs when interest rates rise.
- Interest rate forwards (including forward rate agreements), futures, swaps and options are typical instruments used to manage interest rate risk.

Interest Rate Forwards

- Locks in the future price of an asset
- Buyer has to pay the agreed-upon-price on the settlement date
- Seller is required to deliver the asset on the settlement date
- No up-front fee or margin required
- Interest rate forwards are typically cash-settled rather than through delivery
- One party is obligated to pay the other the difference between the contract value of the forward and its spot value at the maturity date
- Most popular type: Forward Rate Agreement (FRA)

Settlement Amount for FRA

- Settlement amount is calculated from the interest differential on the settlement date
- The settlement amount must be adjusted to reflect it is paid at the beginning of the FRA period rather than at the end



$$\text{Interest Differential} = (r_s - r_c) \times \frac{d}{y} \times \text{Notional Principal}$$

Where:

r_s = Settlement Rate

r_c = Contract Rate

d = Numer of Days in the Period

y = Number of Days in the Year

$$\text{Settlement Amount} = \frac{\text{Interest Differential}}{1 + \left(r_s \times \frac{d}{y} \right)}$$

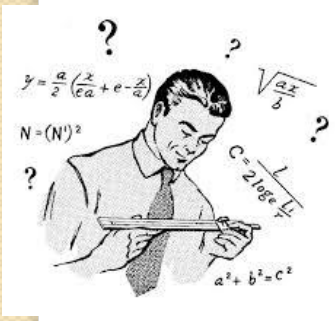
FRA Calculation Example

- A company wants to borrow $1M for three months, starting four months from now.
- It purchases a 4x7 FRA at a contract rate of 2.3% (rc)
- On settlement date, the reference 3-month rate is 2.4% (rs)
- Assume a 92-day period (d) and 360-day year (y)

$$\text{Interest Differential} = (r_s - r_c) \times \frac{d}{y} \times \text{Notional Principal}$$

$$= (0.024 - 0.023) \times \frac{92}{360} \times \$1M = \$255.50$$

$$\text{Settlement Amount} = \frac{\text{Interest Differential}}{1 + \left(r_s \times \frac{d}{y} \right)}$$



$$= \frac{\$255.50}{1 + \left(0.024 \times \frac{92}{360} \right)} = \$253.94$$

Interest Rate Futures

- Contracts on an underlying asset whose price is dependent solely on the level of interest rates
- The most popular types are U.S. T-bill contracts and Eurodollar contracts traded on the CME as bank CDs
- Underlying asset in a T-bills futures contract is the 90-day T-bill rate
- Most actively traded long-term interest rate contracts are 5 and 10-year U.S. Treasury notes and 30-year U.S. Treasury bonds
- Margin accounts are typically required

Interest Rate Swaps

- An OTC agreement between 2 parties to exchange the cash flows of two different securities throughout the life of the contract
- Can be viewed as series of forwards, and the contract is binding on both sides of the contract.
- A very flexible hedging instrument used by treasury for asset/liability management and by portfolio managers to reduce or extend the average maturity or exposure of an open position
- Most common type is fixed-floating swap

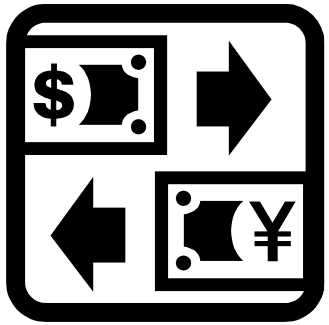
Interest Rate Options

- Option-type derivatives where the payoff depends on the level of interest rates
- Basic types of options include:
  - Interest rate cap: caps the rate on a floating-rate loan for a borrower
  - Interest rate floor: provides a floor on the rate paid to an investor
  - Interest rate collar: combination of a cap and a floor – locking in a range for the rates
  - Costless collar: income received on selling a floor to lender matches premium paid by borrower to get cap

Foreign Exchange (FX) Exposure

- Foreign Exchange (FX) Rates
  - FX rates are quoted in several ways, depending on the currencies and the markets involved
  - An FX rate is expressed as the equivalent unit of one currency per unit of another currency at a given moment in time

Sample Foreign Currency Quotation Formats



Currency	USD Equivalent	Unit of Currency per one USD
GBP-British pound	***GBP/USD 1.3199***	USD/GBP 0.7576
CAD-Canadian dollar	CAD/USD 0.7744	***USD/CAD 1.2914***
EUR-Euro	***EUR/USD 1.1307***	USD/EUR 0.8844
JPY-Japanese yen	JPY/USD 0.009976	***USD/JPY 100.24***

Most common formats are in ***Bold/Italic***

Foreign Exchange (FX) Rates

Example: The quoted rate for the USD equivalent is EUR/USD 1.1307. How many euros would $2 million buy?

$$\frac{\$2{,}000{,}000}{1.1307} = \text{EUR}1{,}768{,}816$$

Example: The quoted rate for the USD equivalent is GBP/USD 1.3199. How many pounds would $2 million buy?

$$\frac{\$2{,}000{,}000}{1.3199} = \text{GBP}1{,}515{,}266$$

Foreign Exchange (FX) Rates

Example: The quoted rate for the Japanese yen USD/JPY 100.25. How many yen would $2 million purchase?

$$\$2{,}000{,}000 \times 100.25 = JPY200{,}500{,}000$$

Example: The quoted rate for the Can. dollar is USD/CAD 1.2914. CAD2,000,000 would be equivalent to how many USD?

$$\frac{CAD2{,}000{,}000}{1.2914} = USD1{,}548{,}707$$

Foreign Exchange (FX) Rates: Bid-Offer Spreads and Dealer Profit

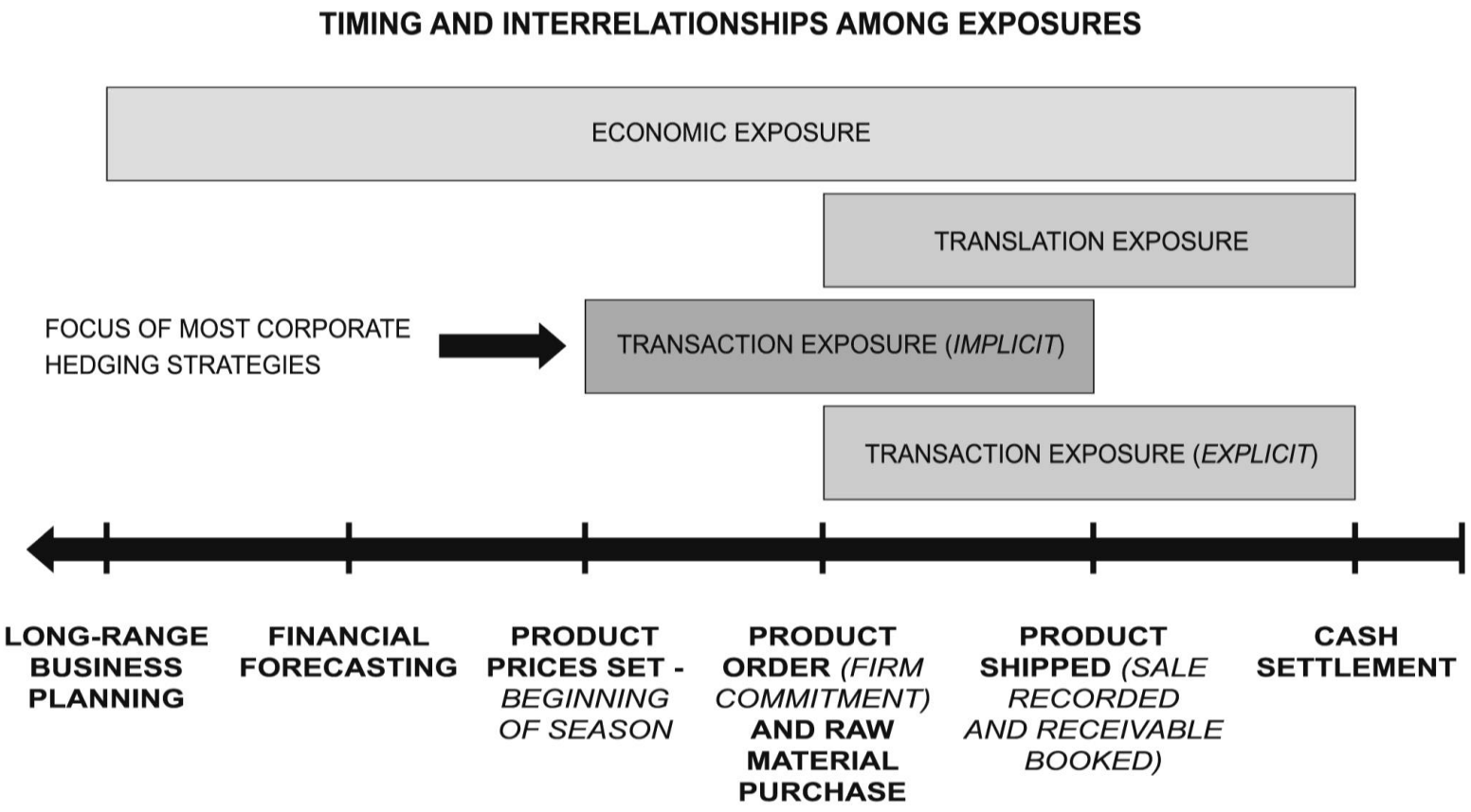
- Bid rate: Dealer buys currency
- Offer rate: Dealer sells currency
- Bid/offer spread or bid/ask spread: Difference between rates (dealer's profit)
- Dealer bid-offer quote; e.g., USD/JPY 100.22/26

Scenario	Company Delivers	Dealer Buys	Dealer Sells	Company Receives
Company wants to *buy* JPY	**USD**	**USD at *bid* rate (JPY100.22)**	**JPY**	**JPY**
Company wants to *sell* JPY for USD	**JPY**	**JPY**	**USD at *offer* rate (JPY100.26)**	**USD**

Foreign Exchange (FX) Markets

- Spot Market (spot rate)
- Forward Market (forward rate)
  - Par
  - Discount
  - Premium
  - Points
- Interest Rate Parity

FX Rate Exposure



IMPLICIT AND EXPLICIT TRANSACTION EXPOSURES ARE TWO PIECES OF A SINGLE TRANSACTION – IMPLICIT IS THE PIECE FROM EXPOSURE INITIATION TO BALANCE SHEET REALIZATION; EXPLICIT IS THE PIECE FROM BALANCE SHEET REALIZATION THROUGH CASH FLOW.

SOURCE: PRICEWATERHOUSECOOPERS LLP. 2007

FX Rate Exposure

- Types of FX Exposure
  - Economic
  - Transaction
  - Translation

- Types of Derivatives
  - Currency or FX forwards
  - Currency futures
  - Currency swaps
  - Currency options

Currency or FX Forwards

- A commitment to buy or sell a specified amount of foreign currency on a future date at an agreed-upon exchange rate
- Available in most major currencies in maturities of 1, 2, 3, 6, 9 and 12 months
- Because these are credit instruments, the dealer or counterparty is often a bank
- The forward rate depends on 3 factors:
  - The current spot rate
  - The term of the forward contract
  - Current interest rates in the two countries during the term

Types of Forwards

- Window Forwards
  - A variation on the standard forward contract
  - Allows for settlement during a given “window” of time
  - Provides flexibility in dealing uncertainty over the actual delivery date
- Average-rate Forwards
  - A tool that is used when the hedger will be trading funds at some point in the future, but does not know the exact dates and volumes of the individual trades
  - Allows the user to lock in forward points and a spot rate today
- Non-Deliverable Forwards (NDFs)
  - Typically used with exotic currencies, considered a “proxy: hedge
  - A synthetic instrument that is cash-settled in a major base currency

Currency Futures

- Similar to currency forwards except that futures are traded on organized exchanges and are standardized in terms of their amount and maturity date
- Contracts are generally offered for 6-month maturities in a quarterly cycle

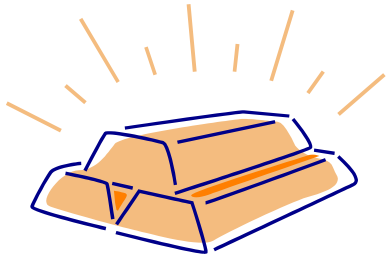
CURRENCY PAIR	CONTRACT SIZE	MARGIN REQUIRED
EUR/USD	EUR 125,000	$3,350
USD/JPY	JPY 12,500,000	$4,100
GBP/USD	GBP 62,500	$3,600
USD/CHF	CHF 125,000	$3,600
USD/CAD	CAD 100,000	$1,450

Note: CHF is the designation for the Swiss franc.

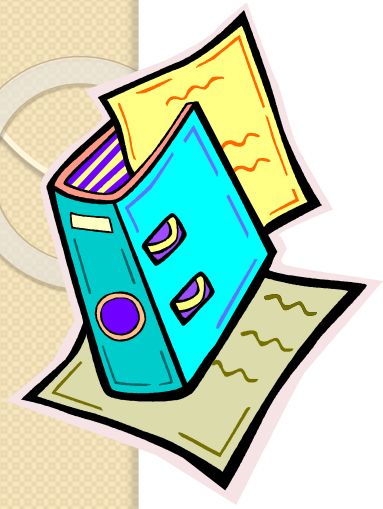
Source: ETM6 - © AFP

Commodity Price Exposure

- Most common markets are for agricultural and meat products, oil and gas, minerals and metals
- Commodity price exposure includes price exposure and delivery exposure
- Commodity price risk can be managed by using forwards, futures, swaps, options or combinations of these derivative instruments



Other Issues Related to Financial Risk Mgmt



- Accounting Issues
- Valuation and Disclosure of Derivative Instruments
  - What is the right value?
  - What if the markets are volatile or illiquid?
- Guidelines for Disclosure (Topic 815)
  - A discussion on the company's objectives and strategies for using derivatives
  - The current fair market value of the company's derivative positions
  - Any contingent, credit-related features of the company's derivative positions
  - Locations and amounts of derivatives in the company's financial statements

Other Financial Risk Mgmt Issues

- Tax Issues Related to Hedging
  - Can be very complex and errors can be costly
- Hedging Policy Statement
  - Requires approval of general hedging policy and implementation of that policy
  - Should address FX, interest rate and commodity hedging

Session Wrap-up
ETM6: Chapters 16 & 17

- ***What did we learn in this session?***
- ***What topics do we need to learn more about?***

TEXPO Conference 2021
Essential Learning for CTP Candidates

End of This Session

We will reconvene at 9:45 am Tomorrow

The topic will be:

Financing in the Short-Term

Short-Term Investing/Borrowing