


Essential Learning for CTP Candidates

Carolinas Cash Adventure 2018 – Session #CTP-10

Carolinas Cash Adventure – 2018: CTP Track
Risk Management
Session #10 (Tues. 10:30 – 11:30 am)



- ❖ **ETM5-Chapter 16:**
Enterprise Risk Management
- ❖ **ETM5-Chapter 17:**
Financial Risk Management


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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.

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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



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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

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General Risk Management



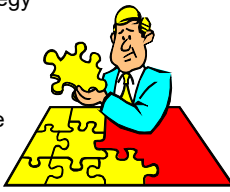
- Risk Management Process
 - Determining an organization's risk tolerance
 - Identifying the impact and level of exposures
 - Quantify the exposures (Measuring the impact and level of exposures)
 - Develop and implement an appropriate risk management strategy to manage those exposures
 - Reporting and monitoring the exposure to evaluate and measure the strategy
 - Review and modify the strategy as needed

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More on the Risk Management Process

- Determining Risk Tolerance
- Identifying Exposure
 - Clearly in terms of both level and impact
- Measuring Exposure
 - Both quantitative and qualitative
- Developing and Implementing an Appropriate Risk Management Strategy
 - Avoid the Risk
 - Transfer the Risk
 - Mitigate the Risk
 - Keep the Risk
- Monitoring the Exposure and Evaluating the Strategy




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The Risk Profile

- Refers to how the company's overall value changes as the price of financial variables changes
- The risk profile analysis identifies the risks, classifies each risk into clearly defined categories, and quantifies the risks with respect to the probability of occurrence and the impact on value and/or cash flows
- Sometimes called a risk (control) self-assessment or RCSA
- May be requirement for SOX



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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
- 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



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Enterprise Risk Management (ERM)


- 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
- Business Risk
- Strategic Risk
- Reputation Risk



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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




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Different Operational Risks

- Internal Operational Risks
 - Employee Risk
 - Process Risk
 - Technology Risk
- External Operational Risk
 - Financial Institution Risk
 - Counterparty Risk
 - Legal and Regulatory/Compliance Risk
 - Supplier Risk
 - External Theft/Fraud Risk
 - Physical and Electronic Security Risk
 - Natural Disaster Risk
 - Terrorism Risk



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Fundamental Factors for Operational Risk Management Strategy


- Importance of Organizational Culture
 - Develop a culture that promotes individual responsibility and is supportive of educated risk taking
- Importance of Technology
 - Necessary to help gather and analyze the information needed and then to monitor operational controls and procedures
- Importance of Guidelines for the Board of Directors
 - Lines of reporting and procedures are important, especially for trading activities



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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




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Insurance Management




- 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

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Overview of Chapter 17 Topics

- Overview of Financial Risk Management in Treasury
- Derivative Instruments Used as Financial Risk Management Tools
- Foreign Exchange (FX) Risk Management in Treasury
- Currency Derivatives Used to Hedge Foreign Exchange
- Interest Rate Exposure and Risk Management
- Commodity Price Exposure
- Other Issues Related to Financial Risk Management



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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


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Key Financial Risk Issues

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



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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.

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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.



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Derivative Instruments Used 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



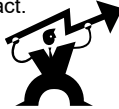
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Forward Contracts

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



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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



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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
- **Basis swap** -- one rate basis swapped for another (Prime for LIBOR)

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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
- European option: exercise only on delivery date

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Using Options



- Contract which gives the purchaser the right, but not the obligation, to buy or sell a fixed amount of an underlying asset
- Used to offset potential exposure in rates, commodities, currencies
- Purchaser allows option to expire if market conditions are more favorable
- Seller keeps premium paid for the option whether purchaser exercises or not

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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

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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

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Put Option Pricing

A PUT OPTION WITH A \$50 STRIKE PRICE IS PURCHASED WHEN THE UNDERLYING ASSET IS SELLING FOR \$54 PER UNIT. THE PREMIUM PAID IS \$1.00.


PRICE OF UNDERLYING ASSET (\$)	PREMIUM PAID (\$)	\$50 PUT OPTION VALUE (\$)	PROFIT (+) OR LOSS (-) (\$)	PUT OPTION IS IN-, AT- OR OUT-OF-THE-MONEY
54	1	0	-1	OUT
53	1	0	-1	OUT
52	1	0	-1	OUT
51	1	0	-1	OUT
50	1	0	-1	AT
49	1	1	0	IN
48	1	2	+1	IN
47	1	3	+2	IN
46	1	4	+3	IN
45	1	5	+4	IN

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How Companies Really Use Derivatives



- Forward contracts are typically settled with delivery of the underlying asset
- Futures and options contracts typically involve using the gains or losses on a financial contract to offset the real operating losses or gains
- Most futures and options contracts are closed out prior to delivery

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Hedging Example




- Assume a small oil refinery is worried about the future price of oil
 - Current oil price is \$50/bbl
 - The refinery would be hurt by rising prices
 - They could buy a futures contract that would allow purchase of oil @ \$50/bbl in 30 days
 - A call options contract is also available would allow them to buy oil @ \$50/bbl in 30 days
 - The option premium is \$1/bbl

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The Results in 30 Days

<i>Futures Contract</i>	<i>Options Contract</i>
<ul style="list-style-type: none"> • If Oil = \$55 <ul style="list-style-type: none"> ◦ Futures contract has profit of \$5/bbl ◦ Company buys oil at spot rate of \$55 ◦ Net price = \$50 • If Oil = \$45 <ul style="list-style-type: none"> ◦ Futures contract has loss of \$5/bbl ◦ Company buys oil at spot rate of \$45 ◦ Net price = \$50 	<ul style="list-style-type: none"> • Company pays \$1/bbl premium to buy option • If Oil = \$55 <ul style="list-style-type: none"> ◦ Option value = \$5 ◦ Company buys oil at spot rate of \$55 ◦ Net price = \$51 • If Oil = \$45 <ul style="list-style-type: none"> ◦ Option is out of money ◦ Company buys oil at spot rate of \$45 ◦ Net price = \$46



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Comparison of Forwards, Future, and Options

	Forward Contract	Futures Contract	Option Contract
Definition	An agreement between two parties to buy or sell an asset at a fixed point in time for a specified price	A standardized contract to buy or sell an asset at a certain point in the future for a specified price	A contract that gives the buyer the option to buy (call) or sell (put) an asset at some point in the future for a specified price
Contract Size	Customized to the needs of the customer	Standardized size and time periods	Standardized if exchange-traded but customized if individually contracted
Expiration Date	Negotiable	Standardized	Standardized and negotiable are both available.
Market	Negotiated directly between the parties with no initial payment	Traded on an exchange with an initial margin deposit required	Exchange-traded or negotiated directly between two parties; if exchange-traded, typically requires a margin deposit
Regulation	Not regulated	Government-regulated (CFTC in the US)	Exchange-traded options are regulated by the exchange rules.
Settlement	Mandatory	Mandatory	Optional

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Foreign Exchange (FX) Risk Management in Treasury



- Challenges in International/Global Treasury Management
 - Foreign Exchange (FX) Risk
 - Cash Flow Complexity
 - Tax Issues
- 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

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Sample Foreign Currency Quotation Formats



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

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

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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?

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



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Foreign Exchange (FX) Rates

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

$$\$2,000,000 \times 100.25 = \text{JPY}200,500,000$$


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

$$\frac{\text{CAD}2,000,000}{1.2914} = \text{USD}1,548,707$$


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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


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Foreign Exchange (FX) Markets

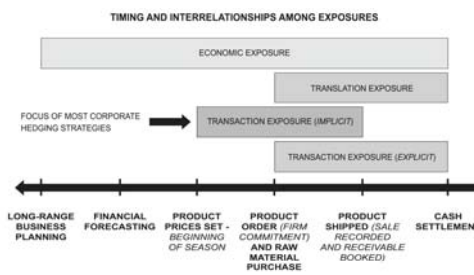
- Spot Market (spot rate)
- Forward Market (forward rate)
 - Par
 - Discount
 - Premium
 - Points
- Interest Rate Parity



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FX Rate Exposure

TIMING AND INTERRELATIONSHIPS AMONG EXPOSURES




LONG-RANGE BUSINESS PLANNING FINANCIAL FORECASTING PRODUCT PRICES SET - BEGINNING OF SEASON PRODUCT ORDER (FIRM COMMITMENT) AND RAW MATERIAL PURCHASE PRODUCT SHIPPED (SALE) AND RECEIVABLE (BOOKED) CASH SETTLEMENT

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

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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)

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Forward Rate Agreement



- Two parties agree that a certain interest rate will apply to a certain principal during a specified, future period of time
- Notional principal amounts are agreed-upon, but never exchanged
- If the actual rate is different at settlement, then one party pays the other a cash amount equal to the difference
- Majority of FRAs are based on Eurodollar rates – typically LIBOR
- Very popular with short-term borrowers

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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



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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



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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



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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



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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




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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



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Session Wrap-up
Session 10: Risk Management

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



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Carolinas Cash Adventure – 2018: CTP Track
Risk Management

End of This Session

We will reconvene at 12:45 pm Today.

The topic will be:

More Key Concepts
Advanced CTP Math

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