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HOW TO PASS THE CFA EXAM

THE ULTIMATE LEVEL I CHEAT SHEET

WILEY

INTRODUCTION

- Success will take a lot of hard work (250–300 hours, or about 15 hours a week).

- Know that all this material can be learned and students will learn it if they follow the system and do their part of the work. It's the "meet me halfway" approach.

THE SYSTEM

- The class/lecture notes provide the basis for the lectures. Students should underline, highlight, circle, as well as annotate in the margins any examples, insights, tips and so forth given by the instructor. The act of writing will greatly enhance retention, so it is an integral part of the approach.

- The importance of practice to retain the material until exam day cannot be overstated. Questions that examine concepts that have given students heartburn over the years as well as concepts that are not examined in Multiple Choice Question (MCQ) format in the CFA Institute readings are essential.

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THE WINNING STRATEGY

- It is imperative to set up a plan and revisit it periodically. The dreaded duo of personal and professional responsibilities often conspire together to disrupt study plans. At some point, intelligent compromises may have to be made (e.g., reduce trips to the gym from 5 to 3 days per week, stop farting around on the Internet, etc.).

CFA TOPIC WEIGHTS

- There are 240 multiple-choice questions (in six hours) on the Level I CFA Exam. That's 90 seconds per question, so pace and stamina are important.

- The following table outlines the most important topics in terms of the Weight to Study Session (SS) Ratio; it helps candidates determine where they'll get the "best bang for the buck."

Topic	Weight	Number of Study Sessions	Weight to Study Session Ratio
Ethics	15%	1	0.15
Corporate Finance	7%	1	0.07
Portfolio Management	7%	1	0.07
Quantitative Methods	12%	2	0.06
Fixed Income	10%	2	0.05
Financial Reporting & Analysis	20%	4	0.05
Equity	10%	2	0.05
Derivatives	5%	1	0.05
Alternative Investments	4%	1	0.04
Economics	10%	3	0.03

- Candidates who score > 70% in the top seven topics tend to pass the exam despite their performance in the other areas.

- Be aware of Economics for the following reasons:
  - Check out the Weight to Study Session Ratio (above). Focusing on this topic (which comes at the expense of others) is not an efficient approach.
  - Even students with an advanced degree in economics tend to do poorly in this section. One reason that is often cited is the way the Institute asks questions on this topic. The way the Institute asks questions on Econ might be different than how you learned it in a university (e.g., elasticity).

- Ethics deserves special attention for the following three main reasons (in no particular order):
  - Historically, it is the first topic examined (both in the morning and afternoon sessions)—so you can expect the first 18 MCQs for both the AM and PM paper to be on Ethics. Give yourself some confidence by nailing these questions out of the gate.
  - The core concepts (namely The Code & Standards) are examined at all three exam levels of the CFA Program.
  - Borderline candidates (those within the CFA Institute's parameters above and below the Minimum Passing Score) can either expect a boost to a pass if they score well in this area or vice versa.

THE TARGET

- No one has ever failed the CFA exam with a score below 70%, which means you can miss 72 questions (at a minimum)—and still pass.

TIPS

STUDY SESSION 1 (ETHICAL AND PROFESSIONAL STANDARDS)

- The Code & Standards (C&S) apply whether you knew (intent) or should have known (negligent).

- Pay particular attention to hot topics, for example, insider trading.

- The C&S apply to members, charterholders, and candidates equally. Candidates are bound even during the exam. Every year we hear of stories of candidates being barred for cheating. When the invigilators tell you to put you pencils down be sure to do just that.

- Be aware of the most extreme answer (e.g., although you must immediately disassociate from unethical behavior, you are not required to report violators unless required by applicable law).

- Note that members are required to know the laws in the jurisdictions where they do business. If the applicable law is in conflict with the C&S, the stricter standard applies. If the applicable law is silent, the C&S apply.

- Unlike the questions in the C&S section, which are largely if not entirely case-based, the Global Investment Performance Standard (GIPS) questions tend to be more of the "memory dump" variety. Accordingly, the best practice to prepare for GIPS questions is to simply memorize these rules well enough to score well on any interim progress tests or sample exams in the final month of review to feel good about oneself, and then do a thorough review a day or two right before the big day. Rules have little "sticking power," so once again be sure to do a good review of the GIPS rules D-Day minus one or two days.

STUDY SESSIONS 2–3 (QUANTITATIVE METHODS)

GENERAL COMMENT

- Quantitative Methods may seem intimidating. Practice will help master this topic! Candidates should not fixate too much on calculations; the CFA Institute tends to put more emphasis on concepts. Be prepared to perform the calculations but, most importantly, understand what is being calculated and the relationships between the concepts.

HYPOTHESIS TESTING

- A question that appears with great regularity is a typical hypothesis test to draw conclusions about a sample. Because we can never prove something to be true, the next best thing is to try and prove that something is not true, then by default, we can conclude that the opposite is true … given a specified level of confidence. Be sure to practice the procedures for performing hypothesis tests:

  1. State the hypothesis.
  2. Identify the test statistic for the hypothesis test.
  3. Specify the level of significance for the hypothesis test.
  4. State the decision rule.
  5. Collect the data and perform all necessary calculations.
  6. Make the statistical decision.

- With practice, candidates hypothesis testing can be tackled easily. Key things to notice from these problems are:
  - One-tailed test or two-tailed test: For a level of significance (alpha) of 5%, we use $p = 0.05$ for a one-tailed test and 0.025 for a two-tailed test.
  - We use the t-statistic instead of the Z-score when:
  - The sample size is small (< 30), and
  - The population standard deviation is unknown.
  - When practicing these types of questions, be sure to understand what the interpretation of the results are. These questions can ask for an interpretation rather than whether the null can be rejected.

- Regarding conceptual hypothesis testing questions on Type I and Type II errors, note the following:
  - Because hypothesis acceptance depends on probabilities, Type I and Type II errors may very well result.
  - The probability of a Type I error is equal to the level of significance (alpha). FYI, the probability of a Type II error is *not* 1—the probability of a Type I error.
  - When doing a test of a hypothesis, there are four possible outcomes:

Not reject a true null	No error, good
Reject a true null	Type I error
Reject a false null	No error, good
Not reject a false null	Type II error

  - The only way to reduce the risk of Type I and Type II errors is to increase the sample size.
  - The power of the hypothesis test is the probability of rejecting a false null hypothesis.
  - There is typically at least one question directly or indirectly on Type I and Type II errors on the exam. Be sure you understand this concept.

- A diagram often helps answer hypothesis questions, whether conceptual or involving calculating acceptance ranges. By sketching the diagram and the indicated change in level of significance, candidates can easily see the effect of a change. For example, by increasing the level of significance increased from 5% to 10%, the fail-to-reject-null zone becomes narrower and the rejection zone becomes wider. A wider rejection zone will increase the chances of incorrectly rejecting the null hypothesis (increase the chance of a Type I error). However, the risk of a Type II error (failing to reject a false null hypothesis) will decrease.

- Remember that in statistics, one can never really "prove" a null hypothesis is true; we can only infer that an alternative hypothesis is true by proving that the null hypothesis is not true. Therefore, we should be setting up the null and alternative such that the alternative hypothesis is what we are really trying to prove. If our calculations can lead us to reject the null hypothesis, then we can say with a level of confidence that the alternative is true.

CONFIDENCE INTERVALS

- A typical confidence interval question involves a confidence interval of 95%. What often throws candidates off is a confidence interval that is not common (80%). An 80% confidence interval is bound by 10% on either side under the normal curve, so the appropriate Z-score for an 80% interval will actually be found with the area representing 90% cumulative probability (an area of 0.9000). Further, the exact Z-score corresponding to 0.9000 is not in the table. This unusual outcome, combined with the stresses on exam day, can be distracting. The key is to practice these types of questions well and not get caught up in the nuances that the CFA Institute may throw in.

- For questions asking for the confidence interval of a sample, the first thing is to be able to identify what the question is really asking, and then be able to pick out the data that is required for the calculations while ignoring the distracters. For example, if the sample size of 16 is small (< 30), we know that we must use the t-score and can ignore any information given regarding the Z-scores. From there, plug in the relevant inputs into the formula and calculate the confidence interval. Candidates should also be prepared to notice whether one-tailed or two-tailed probability tables are given and use the appropriate figures.

TIME VALUE OF MONEY

- When tackling time-value-of-money questions, it helps to draw a timeline, as it helps map out what the question is asking and will likely reduce errors. These questions may seem complicated; however, after sketching out the situation and breaking the problem down into smaller pieces, the solution becomes a straightforward time-value-of-money calculation. Often, questions are straightforward. However, due to the stresses involved in taking the exam, candidates make unnecessary mistakes. Trying to rush on question likes these can lead to such mistakes.

- When solving comparison (APR vs. EAR) questions, converting to the same units of measure (EAR) will allow an apples-to-apples comparison. Once the measurement units are the same, the correct answer can be easily identified; for example, select the investment with the highest EAR (all else being equal). Watch the number of compounding periods. Normally, the investment with the highest APR is not the correct choice.

STUDY SESSIONS 4–6 (ECONOMICS)

GENERAL POINTERS

- Economics is 10% of the exam, or 24 questions. The amount of assigned reading is disproportionate for its weight. There are a total of three study sessions on economics.

- Candidates should review the readings and work sample exam questions to prepare for this topic. The author of the assigned material uses different formulas for some topics (elasticity) than what many of you may have learned in pursuing your degree. Also, working questions will better prepare you for how the CFA Institute will test this topic.

- Economics questions are easy to overthink. If asked for the effect of a government stimulus action, give the most likely immediate/short-run effect. The long-run effect may be totally different, but answer with the long-run effect only if that is what the CFA Institute specifically asks for in the question.

- You have to remember that the exam is testing on the assigned material. Even if you believe otherwise, you must answer in accordance with what the text says if you want to answer the question correctly. Some correct choices go against popular wisdom. For example:
  - The press and many politicians espouse the belief that physical capital (based on new technologies) will replace existing workers and that there is no benefit to labor.
  - But, as the assigned readings point out, there are more new jobs created from capital accumulation than there are jobs lost. And these new jobs pay higher.

ELASTICITY

- The assigned reading from the CFA Institute calculates elasticity in a manner different than what you may have learned. Many economics textbooks calculate elasticity using the change over the beginning. The assigned material uses the change over the average (beginning and ending).

- Another issue is to know that the calculated price elasticity of demand will actually be a negative number, but it is always quoted as a positive number. Hence, the absolute value is used.

- The assigned readings spend more time discussing the interpretation of the calculated results for elasticity. The interpretation of a price elasticity result is:
  - When eP > 1, demand is elastic. A 1% decrease in the item's price produces more than a 1% increase in the quantity demanded. Thus, expenditures on the product and the revenues to its producers move in the opposite direction to the price change (raise price, less total revenues received). Buyers have high sensitivity to a price change.
  - When eP < 1, demand is inelastic. A 1% change in the item's price produces less than a 1% change in the quantity demanded. Thus, expenditures on the product and the revenues to its producers move in the same direction as the price change (raise price, more total revenues received). Buyers have low sensitivity to a price change.
  - When eP = 1, demand is unit elastic. A 1% change in price is matched by a 1% change in the quantity demanded. Thus, a change in the product's price will affect neither the amount of spending on the product nor the producers' revenue from it.

- A discussion of elasticity in the context of total revenue depends on which type of demand curve you face as a supplier:
  - Increase prices to increase total revenue if you face an inelastic demand curve.
  - Decrease prices to increase total revenue if you face an elastic demand curve.
  - Price changes cannot be used to increase total revenue if you face a unit elastic demand curve.
  - Interestingly, different portions of most demand curves (excluding the unit demand curve) exhibit different degrees of elasticity. At high price levels, a price reduction can result in large sales gains and higher total revenue. At low price levels, the same price reduction can result in very small sales gains and lower total revenue. This results because the changes in quantity sold are compared to percentage changes in price that are larger at low prices than at high prices.

DEMAND CURVES

- It is important here to first differentiate between changes in demand for money versus changes in the quantity of money demanded.
  - Changes in demand for money create a shift in the money demand curve. Shifts to the right increase the interest rate at a given quantity of money; shifts to the left decrease the interest rate at a given quantity of money.
  - Contrast that with changes in the quantity of money demanded that result in movement along an existing money demand curve. An interest rate increase provides incentives for more people to lend rather than hold their money.
  - This concept is similar to the price for goods and services. Changes in anything that would affect the ability or willingness of consumers to want an item, except for the price of the item itself, can cause the demand for it to change (demand curve shift). In contrast, a change in the quantity demanded (movement along the demand curve) is only caused by a change in an item's price. Factors that can produce a demand curve shift for an item include changes in:
    - Consumer preferences, as shown in the question above
    - Population
    - Income
    - Expected future income
    - Expected future prices of the item
    - The price(s) of other items

  Often, a quick drawing can show the outcome.

MARKET STRUCTURE

- It is typical for the CFA Institute to require you to not only identify the market structure but go further and ask for you to know where prices are normally set (equal marginal cost or above it) and/or whether economic profit is earned, and if they are earned are they in the short run and long run, or short run only. Candidates should remember that:
  - Monopolies, if unregulated, can make short- and long-run economic profits.
  - This is not true for monopolistic competition or pure competition.
  - A lot of factors can determine whether economic profit is earned in an oligopoly structure.
  - You need to know that a firm's profits are maximized when MC = MR and that this is true for any market structure. However, a firm operating in pure competition will face only one price and will

maximize profits when MC = MR = P. In comparison, monopoly, oligopoly, and monopolistic competition structures result in MC = MR < P.

- Be sure to know the formulas for marginal revenue, marginal revenue, etc. These are straightforward calculations.

- A firm in an oligopoly market ends up better off by cheating than by conforming to a collusive (price-fixing) agreement. If it conforms to the agreement, it runs the risk of market share loss to its competitors and failing to sell enough to cover expenses. If it, too, cheats on the agreement and lowers its prices, the worst likely scenario is that no firm in the industry makes an economic profit. However, no firm will suffer a loss. This is an example of a "game" characterized by "Nash equilibrium." Nash equilibrium identifies a stable state (cheating) in which no participant can improve its position by changing strategy.

STUDY SESSIONS 7–10
(FINANCIAL REPORTING AND ANALYSIS)

GENERAL POINTERS

- The CFA Institute has indicated that the score a candidate makes on Financial Reporting and Analysis (FRA) is the best predictor as to whether the candidate will pass or fail the CFA exam. A candidate who scores well on FRA generally scores well on the remainder of the exam and passes.

- Hence, understanding and being able to answer FRA questions is critical to a candidate's success. While it is not necessary to become an expert or even to understand every topic (taxes are extremely difficult), you must gain a fairly strong understanding of many of this section's topics.

- The FRA material is not the basic accounting taught in many university classes. There is no emphasis on debits and credits. The material focuses on how accounting method choices and differences between IFRS and U.S. GAAP affect the reported results for companies. The material stresses understanding these differences and how to adjust for them.

- Candidates should be aware that the material at Level II builds on what is learned at Level I. So the knowledge gained at Level I will help you at Level II.

- At times the assigned readings will be out of date and not reflect new accounting standards. If an exam question covers an area where a new standard applies and one answer matches the new standard and another answer is in accordance with the assigned readings, then the CFA Institute will grade either answer as being correct.

RATIOS

- Given the movement toward converging to a global accounting standard, it is important that candidates are familiar with the nuances between U.S. generally accepted accounting principles (GAAP) and International Financial Reporting Standards (IFRS), and what the impacts are on financial ratios. A good analyst will be able to make appropriate adjustments in order to get the "real" picture of a subject company's well-being relative to a comparable. While not a complete list, here are the major differences between U.S. GAAP and IFRS:

  - IFRS allows revaluation of property, plant and equipment and intangible assets, while U.S. GAAP does not.

  - IFRS allows flexibility on the cash flow statement as to where to classify interest paid (CFF or CFO), interest received (CFI or CFO), dividends received (CFI or CFO), and dividends paid (CFF or CFO). In contrast, U.S. GAAP requires that interest paid, interest received, and dividends received be classified as CFO and that dividends paid be classified as CFF.

  - IFRS does not permit any items to be treated as extraordinary, while U.S. GAAP does allow this classification.

  - IFRS uses voting control to determine the need for consolidating investments, while U.S. GAAP uses both voting and economic control.

  - Under U.S. GAAP, the proceeds from the issuance of convertible debt are recorded as a liability on the balance sheet and as cash inflow from financing activities. Under IFRS, the debt portion is recorded as a liability at fair value while the residual option portion of the issue is recorded as equity.

- It is common practice on the exam for the candidate to have to address how a transaction has affected the results and the firm's ratios. Always remember that the following formula must be in balance on any transaction involving the balance sheet: Assets = Liabilities + Equity. If assets rise, then liabilities or equity rise. For example, when a firm sells inventory for cash, its assets rise (inventory falls but cash rises more if the selling price exceeds the inventory cost) and sales rise. The increase in sales will cause the firm's net income to rise and it will owe more in taxes. Thus, the offset to the rise in assets (from accounts payable or cash) is a rise in equity (resulting from net income) and liabilities (resulting from the increase in taxes payable).

- Another testing technique is to change an accounting method and ask how it will affect a ratio or a measure, such as the cash conversion cycle. For example, what is the effect on the cash conversion cycle if the firm reduces its average inventory without affecting sales? The inventory turnover rises, which causes the days on hand (DOH) to fall. The decline in the DOH helps reduce the cash conversion cycle.

- The CFA Institute may test candidates by not providing all the variables needed to plug into a formula. Candidates need to know how to use the given inputs to derive figures that can then be used as input into another formula, for example, the basic DuPont formula, which consists of three components: net profit margin, asset turnover, and leverage. A typical exam question could require solving for a missing part of a formula to test that the candidate understands how the formula works. In addition, candidates should be familiar with the extended DuPont formula. Candidates must know the relationships well in order to do this timely. These types of questions are not difficult but do require practice. Well-prepared candidates should be able to identify what inputs are needed by second nature.

- Candidates need to know the material well enough to answer a question that requires using indirect inputs and intermediate calculations in order to derive the final answer.

- Candidates can minimize the amount of calculations necessary and still derive the correct answer by using elimination. For example, in determining the depreciation method management should select in order to maximize profit margin in the early years, the first inclination would be to calculate all methods provided and then choose the one that has the lowest depreciation. Candidates could save some time if they first think about what the question is asking. Since we are looking for the method that has the highest profit margin (or lowest depreciation), we can eliminate the double-declining method

immediately, as it must have higher depreciation than the straight-line method in the first year since it is an accelerated depreciation method. Thus, candidates really only need to compare the straight-line method versus the units-of-production method. Candidates can end up saving a lot of time if they prepare themselves well enough to correctly eliminate answer choices rather than having to be bogged down by going through long computations.

- Note that as a general rule, often management may try to "manipulate" earnings such that the performance on the company's income statement appears to be very strong. For example, better performance in the early years is typically preferred by management, for job security and bonus.

- Candidates are required to know the differences between methods but more importantly to know how using one method over the other affects a company.

  - Candidates should understand the effect of interest capitalization on subsequent years, once the capitalization has stopped. Assuming the interest was capitalized on a building/improvement, the firm's depreciation expense will be higher in future years. Thus, the benefit to net income in the year of capitalization is offset in subsequent years.

  - Another related issue is capitalization versus expensing costs. If a firm reduces its capitalization, it will immediately reduce its expenses. But the capitalized items, like computers, have to be depreciated, and thus future depreciation expenses will be higher.

- Candidates should understand how the accounts are related. Know the relationship between cost of goods sold, inventory, and profits, and how misstating any of the components affects profits. Always remember that the following formula: Cost of Goods Sold (COGS) = Goods Available for Sale (GAS)—Ending Inventory. For example, if ending inventory is overstated, then COGS is understated. Accordingly, if COGS is understated, then gross profit (Sales – Cost of Goods Sold) must be overstated.

- Some questions are simple but may catch candidates off guard if rushed on an exam. Case in point: the current ratio. Candidates should know immediately that in order to increase the current ratio, either current assets would have to increase or current liabilities decrease. The trick is to notice whether the current ratio is currently less than 1.0x or greater than 1.0x.

  - If the current ratio is currently less than 1.0x, an equal increase in the numerator and denominator would have a bigger percentage affect on the numerator than the denominator. Consequently, the entire current ratio would increase.

  - If the current ratio were currently greater than 1x, the opposite would be true.

- Candidates often confuse accounting principles with analyst adjustments in ratio analysis. Accounting rules must be followed when preparing financial statements. However, when performing analysis (e.g., ratio analysis), a good analyst will adjust the numbers such that they represent the most current price environment. This way, the analyst can make a judgment on the performance of the company or better compare one company relative to another. A rule of thumb is that last in, first out (LIFO) is used for income statement items, while first in, first out (FIFO) is used for balance sheet items.

CASH FLOWS

- Many candidates are confused by the impact of premiums/discounts on cash flows and some of this has to do with the amount actually raised from the issuance. In the case of bonds issued at a discount

to par value, there is less money raised when the bonds are issued at a discount, as compared to the money raised if issued at par. The discount bonds pay a rate below market, while the par bonds pay a higher rate. Thus, interest paid is lower under the discount and the CFO is higher compared to what it would be for a par bond.

- Note that CFF at maturity will be the stated par value. Thus, over the entire life of the bonds, the net CFF for the discount bonds will be negative, while it is zero for par-issued bonds. Effectively, the discount bonds shift some of the interest cost into CFF, which helps reduce the outflow for CFO.

- Candidates should also be familiar with premium bonds and how they result in CFF being higher and CFO being lower than with par bonds.

- Finally, candidates should know the possible treatment of interest paid under IFRS and U.S. GAAP. IFRS allows firms to treat interest paid as being either CFO outflow or CFF outflow. In contrast, U.S. GAAP requires interest paid be treated as a CFO outflow. There are later questions emphasizing this issue and other differences between U.S. GAAP and IFRS.

- Regarding cash flows, here are some general concepts that the candidate should know:

  1. Depreciation and the loss on a sale are not cash flows and are added back in calculating cash flow from operations.

  2. The cash inflow from selling equipment can be found using the book value of the equipment and the gain or loss. The proceeds less the book value determine the gain or loss. CFA Institute wants candidates to understand these types of interactions.

  3. The property and equipment account can be used to find the book value of assets sold, capital expenditures for the year, or annual depreciation.

  4. Given the data, cash flow from investing and cash flow from financing should be easily calculated by candidates and each could be tested on its own.

LEASES

- The candidate has to have an understanding of the impact of operating versus finance lease accounting on the financial statements and resulting ratios.

  - Only a portion of the financing lease payment buys down the recorded lease liability. In contrast, all of the operating lease payment is a CFO outflow.

  - Another impact worthy of note is that a capital lease increases the firm's debt and assets, which negatively affects the debt/equity ratio and can cause the ROA to be lower. In contrast, an operating lease has no effect on the balance sheet when it is entered into by a lessee. Effectively, an operating lease is a form of off-balance-sheet financing.

  - In the early years, the combination of depreciation and interest expense under a capital lease will be higher than the lease expense under an operating lease (but, while that is the case, note that both methods will result in the same total expenses over the life of the lease).

- Candidates should know the decision rules for leases and then the specific choices that a lessor has for a finance lease.

  - Know the four criteria under U.S. GAAP for whether a lease is operating or financing. A lease is treated as a finance lease rather than an operating lease if *any* of the following criteria are met:

    1. The lease transfers ownership of the asset to the lessee at the end of the lease term.

2. The lessee may purchase the asset at below fair market value during or at the end of the lease (bargain purchase option).
3. The present value of the minimum lease payment is 90% or more of the asset's fair market value.
4. The lease term is 75% or more of the economic life of the leased asset.

- For a lessor, a finance lease is then classified as being direct financing (lessor treated as financing company) or sales type (lessor treated like a manufacturer who then leases the product made).

DEFERRED TAXES

- Many candidates dread questions on deferred taxes. These are good questions to master because there will likely be at least one question on the exam.
  - With deferred tax liabilities:
    - There are two key points to remember: (1) future taxable income will exceed pretax income, and (2) this is due to a temporary difference. Combined, this means that current taxable income is below pretax income. This is a common outcome when accelerated depreciation is used for tax reporting and straight-line depreciation is used for book reporting. The result is a deferred tax liability.
    - Also worth mentioning is that if the difference was permanent, then no deferred taxes are recorded.
  - The two most common examples of items that give rise to deferred tax assets are warranty expense and the loss on the write-down of an asset.
- The key to correctly answering questions regarding the calculation of income tax expense given information on a temporary difference is to:
  - Know the difference between permanent and temporary (timing) differences, as well as
  - The relationship between income tax expense and income tax payable. The best way to arrive at the answer is to recall the formula: Income Tax Expense = Income Taxes Payable + Increase in DTL − Increase in DTA. Once that is laid out, it is easy to derive income tax expense.

EARNINGS PER SHARE

- Basic and diluted earnings per share (EPS) are likely to appear on the exam. Candidates should always remember that to be dilutive, diluted EPS has to be less than or equal to basic EPS. Otherwise, it is antidilutive. Potentially dilutive securities to be familiar with are convertible preferred stock, convertible debt, and stock options.
  - Note that for convertible debt, the numerator of the EPS calculation is adjusted for after-tax interest. The denominator is adjusted for the shares that would have been issued upon conversion.
  - Also worth noting is that options are dilutive only when the average stock price for the year exceeds the exercise price for the options. When calculating diluted EPS for options, the numerator is unchanged. The denominator is adjusted upward for the net shares that would be issued. By net shares, we mean the total shares issued for the options, less the number of shares that can be repurchased at the average stock price for the year.
  - Finally, basic EPS is the amount available to common shareholders, so it is the net income less the preferred dividends. Candidates should know that the weighted average number of common shares outstanding is the average common shares outstanding and does not include any preferred shares.

STUDY SESSION 11 (CORPORATE FINANCE)

GENERAL POINTERS

- Corporate Finance is 7% of the exam. The entire weight is in one study session. Referring back to the "best bang for the buck" in the intro, you'll be hard-pressed to find a better value than this bad boy. In fact, only Ethics appears higher than Corporate Finance on the list.

- The material learned in this study session—more specifically in the first two readings—is used in Equity and is required underlying knowledge at Level II.

- Candidates may try to memorize the breakeven formulas (breakeven or operating breakeven quantity of sales) and leverage formulas (degree of operating leverage, degree of financial leverage, and degree of total leverage). However, while they should be comfortable calculating them, if they can understand the concept (meaning candidates understand what these quantities mean), the mathematics behind it and therefore remembering the formula is straightforward and intuitive. Recall the interpretation of breakeven quantity of sales: it is simply the level of production where the firm's operating profit is zero. Accordingly, total profitability of the firm would be negative.

DISCOUNTED CASH FLOW AND COST OF CAPITAL

- Candidates should be able to use their CFA exam-approved calculator to:
  - Solve for each project's NPV in basic NPV problems.
  - Note that you can also find the IRR for each project by using the same inputs and then having the calculator compute the IRR.
- Candidates need to know the following reasons regarding why we need to be concerned about employing the IRR method for ranking capital budgeting projects:
  - Mutually exclusive means that only one project can be undertaken. If the projects are mutually exclusive, then the firm could undertake only one of the two (even if both had positive NPVs). For mutually exclusive projects, always use NPV to make the selection. Why?
    - Because the IRR method can produce a selection decision that conflicts with the NPV method. This results because IRR method assumes reinvestment at the internal rate of return while NPV method assumes reinvestment at the company's weighted average cost of capital (WACC). The results from NPV analysis provide a more theoretically sound decision; a company can use cash flows from the project for internal funding for other projects at their WACC rather than trying to find new projects that return the subject project's IRR.
  - Multiple IRRs can result from nonconventional cash flows. A conventional cash flow has an initial outlay followed by cash inflows. A nonconventional cash flow has more than one outflow.
  - Most importantly, regardless of the preceding cases, NPV is always preferable to IRR when deciding on which project(s) to undertake. The NPV method is most closely related to stock prices because adding a positive NPV project should by definition increase the wealth of the company and thus the shareholders. Note, however, that current stock prices may already reflect the market's perception that the company will undertake positive NPV projects.
  - Project-specific financing should not determine the discount rate. The firm's WACC should be used for projects that have risk equal (similar) to the firm's overall risk because the firm could have used internally generated funds for the project and financed other projects externally.

- With regard to the marginal cost of capital (MCC), candidates should be aware of the following:
  - The marginal cost of capital (MCC) is the cost of the next dollar of new capital raised by the firm. As the firm raises capital in excess of its retained earnings breakpoint (retained earnings divided by the weight of common equity), costs of external funding may rise and result in MCC greater than WACC.
  - A related item is how the MCC interacts with a company's investment opportunity schedule (IOS) to generate the optimal capital budget. The IOS shows the returns of successive projects. The highest-return projects are funded first and then lower- and lower-return projects are funded. Thus, the IOS is downward sloping. Drawing a diagram on exam day might help you visualize this and lead you to the promised land.
  - Another somewhat related item for you to know is that the firm will maximize its value when it minimizes its WACC. This is because the lowest discount rate (WACC) applied to the firm's pre-financing cash flows will result in the highest value. Thus, a firm should strive to minimize its WACC.
  - Finally, the firm's EPS is not necessarily maximized when WACC is minimized. Hence, maximizing EPS will not necessarily maximize the value of the firm. Maximum EPS could occur when debt is extremely high. Investors will note the higher risk and require a higher return on equity, thus discounting the maximized EPS at a higher required return.

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STUDY SESSION 12 (PORTFOLIO MANAGEMENT AND WEALTH PLANNING)

GENERAL COMMENTS

- Portfolio Management is now 7% of the exam (up from 5% last year). Like Corporate Finance, Portfolio Management has its entire weight is in a single study session, and is accordingly tied with Corporate Finance at number 2 on the "best bang for the buck" list.

- Many candidates will already be familiar with approximately half of the material (Markowitz efficient frontier, capital asset pricing model, etc.) if they took an undergraduate or graduate finance class. The material on asset allocation decisions may be unfamiliar.

- While introductory, this material will repeat at Level II and be a critical starting point at Level III.

CML, SML, EFFICIENT FRONTIER

- Candidates should know the CML and SML and be able to picture each on exam day.
  - CML:
    - The combination of the risk-free asset with the market portfolio results in a straight line (the CML) that dominates the efficient frontier at every point except the market portfolio.
    - The x-axis indicates that the relevant risk measure for a portfolio or the market is its standard deviation. In the assigned readings, variance is also considered to be a relevant risk measure (since standard deviation is the square root of variance).

- It is the excess return of the market over the risk-free rate (rather than the market return alone) that determines the numerator of the slope for the CML.
  - SML:
    - The security market line shows the relationship between risk and the expected or required rate of return on an asset.
    - If the market is efficient, all securities and portfolios will lie on the SML because all will be properly priced relative to risk.
    - The relevant risk measure for an individual risky asset is its covariance with the market portfolio (Covi, M).
    - Note that the x-axis changes to beta and the market variance term will equal 1 on many graphs that choose to view beta as the standardized measure of systematic risk. This results because the market's covariance with itself equals 1.
  - If a question makes reference to unleveraged portfolios containing only risky assets, then you need to immediately realize that you are dealing with the efficient frontier. Appropriately, no option to borrow or invest at the risk-free rate should be assumed (as in the CML). This indicates the true emphasis is on the efficient frontier.

COVARIANCE AND CORRELATION

- While it may be more likely to be tested on concepts (most questions ask for an interpretation, e.g., its role in diversification) rather than straight calculations, you should know the formula for calculating covariance.
  - Note that the data required to solve for covariance can also be used for several other calculations (variance, standard deviation, coefficient of variation, correlation, and coefficient of determination). Case in point: remember that correlation is a standardized measure of the relationship between two assets. It is dependent on the covariance between two assets. So with that in mind, be ready for a "2 × 3" format question like this one on exam day:

	Covariance	Correlation
a.	2.5	−0.3
b.	2.5	0.60
c.	11.6	0.60

  - We interpret that there is a high likelihood of these concepts (covariance, correlation, etc.) appearing on the exam for the following reasons:
    - There is overlap here with the material in Quantitative Methods.
    - These concepts underlie much of what is done by portfolio managers. In addition, it is critical at Level III and is included in the Level II curriculum as well. We also interpret that as meaning there is a greater likelihood of this concept appearing on the exam.
    - These concepts can be indirectly embedded in other questions.

  Accordingly, understanding these concepts is by far more valuable than memorizing them).

RISK

- Candidates should understand the assumption that an investor will require more return to assume more risk. This concept underlies the portfolio management theories.
  - A utility curve is a series of points representing various expected return/risk combinations that give an investor equal amounts of utility (satisfaction).

- The steeper the utility curve, the greater is the investor's aversion to risk. That is, an investor with a steeply sloped utility curve will require more return per unit of additional risk than will an investor with a flatter, sloped utility curve.
- The intersection of an investor's utility curve with a portfolio on the efficient frontier shows the portfolio that provides the investor with the greatest utility.
- You may wish to graph this in the margin of the question booklet on exam day to assist you in solving questions of this variety.

- Some questions are relatively simple, but can be easily missed. If candidates rush or don't read carefully, they can easily select the incorrect choice. One tip is to be careful of answer choices that are stated in absolutes, such as: "Low-risk assets will *always* be …"

- The assigned material emphasizes the benefit of diversification and how it can reduce risks significantly. While the term *diversification* may not be mentioned in the question or even in any of the answer choices, you should always be thinking about how diversification can affect a portfolio's risk.

STUDY SESSIONS 13–14 (EQUITY INVESTMENTS)

GENERAL COMMENTS

- Equity is 10% of the exam. This topic is covered in two study sessions and is a relatively easy read.

- A large portion of Level I learning will carry over to Level II.

RATIOS (P/E, P/B, P/S) VIS-À-VIS FINANCIAL REPORTING AND ANALYSIS

- Some questions require an understanding of the material from Financial Reporting and Analysis. For example, in determining the price-to-book (P/B) ratio, candidates may have to remember the basic accounting identity (Assets – Liabilities = Equity) and adjust for preferred stock (if any) in the determination of book value per share—if equity is not given but the other inputs are.

- The assigned readings emphasize the rationales for and against using various price ratios. Many of the rationales are easily understood and build on concepts discussed in the Financial Reporting and Analysis readings.

  - Regarding price-to-sales (P/S):
    - Arguments for use of the P/S ratio are:
      - Sales are less vulnerable to being "managed" than earnings or book value.
      - Sales figures are always positive. P/S can be used when P/E cannot (when EPS is negative).
      - P/S may be more meaningful because sales aren't as volatile as earnings.
      - It may be more appropriate for valuing mature, zero-income, or cyclical businesses.
      - Research indicates that long-run average stock returns are related to differences in P/S values.
    - The arguments against using P/S ratios are:
      - A firm may be unprofitable despite significant sales growth. Since a business must eventually be able to generate cash flow and positive net income if it is to continue as a viable entity, a multiple based on sales may not be valid.

      - Cost structure differences among firms are not captured by P/S ratios.
      - Revenue recognition accounting practices may bias sales numbers.
  - Regarding price-to-earnings (P/E):
    - There are a number of reasons analysts favor the use of P/E ratios:
      - Earnings power (as reflected in EPS) is a primary determinant of investment value.
      - P/E ratios are easily understood, widely recognized, and commonly employed.
      - Differences in long-run average stock returns may be related to differences in P/Es.
    - Criticisms of P/E as a valuation measure stem from the fact that distortions of EPS will affect the comparability of the ratio across firms:
      - A negative EPS causes the multiple to be useless.
      - Some components of earnings may be volatile or transient, making it hard for analysts to determine the ongoing or recurring EPS necessary for determining intrinsic value.
      - The ability to manage EPS by varying a firm's account

- Candidates should exclude nonrecurring items when valuing a company using EPS when determining normalized P/E. Thus, any nonrecurring losses should be added back and any nonrecurring gain subtracted. The only exception is if the analyst believes that the items are not truly nonrecurring, such as in a case of a company that constantly writes down its property, plant and equipment (PP&E). For example, assume a firm takes a writedown charge every four years and this pattern has repeated several times. The analyst might assume that the writedown is not nonrecurring and will probably spread the charge (by way of increased depreciation) over the previous four years. The CFA Institute will most likely state this type of assumption.

RATIOS (P/E, P/B, P/S)

- Sometimes P/E needs to be normalized for reasons other than accounting shenanigans. For example, the P/E for a cyclical company will tend to be unreliable at any point in the cycle. This is because cyclical companies may have volatile earnings and the P/E for each year will reflect this volatility. Generating a normalized EPS using the method of historical average EPS or the method of average return on equity can solve this cyclicality problem. You should be able to use either approach.

- The exam is just as likely to test you on what will cause the earnings multiplier (the P/E) to rise or fall.

  - The P/E will rise if:
    - The payout percentage increases,
    - Growth rises, or
    - The cost of equity falls.
  - The ratio will fall when:
    - The payout percentage falls,
    - Growth falls, or
    - The cost of equity rises.

EFFICIENT MARKET HYPOTHESIS

- The three forms of the efficient market hypothesis are likely to be tested somewhere on the exam. A common approach used is to require candidates to assess the situation and make a judgment as to which form of the efficient market hypothesis is violated. The three forms and studies on each are:
  - Weak form of the EMH:
    - Security prices reflect all historical information about prices and trading in the market. If the weak form is true, technical analysis does not work.
    - In general, studies have supported the weak form hypothesis.
  - Semistrong form of the EMH:
    - Market prices react quickly to new public information, whether it relates to trading of securities (weak form) or "fundamental" information such as earnings, financial ratios, news announcements, and so forth. Thus, analysis of historical data provides no information to make superior forecasts of a security's future performance. Hence, if the semistrong form is true, fundamental analysis fails.
    - Anomalies that may disprove the semistrong form include:
      - Stocks with high dividend yields outperform stocks with low dividend yields.
      - Earnings surprise is not immediately reflected in the stock price, and it is possible to profit from buying positive surprise companies and selling negative surprise companies.
      - The January effect and weekend effect (stocks fall between Friday close and Monday open) seem to disprove it.
      - Low P/E stocks outperform high P/E stocks.
      - Stocks with low price/earnings to growth (PEG) ratios outperform stocks with high PEGs. But not all studies agree on this one.
      - Small-sized firms outperform large-sized firms. Some argue that the risk is not measured correctly and that transaction costs will erode most of the outperformance.
      - Neglected stocks (low volume, little analyst coverage) outperform other stocks. Some studies have contradicted this finding.
      - Stocks selling at high book value to market value (equity) have higher returns.
      - Buying shares of a company when a stock is first announced as being listed on an exchange has resulted in abnormal returns.
- Strong form of the EMH:
  - All information (private and public) and projections from this data are already reflected in the price. New information affects prices, but since it enters the market randomly, price movements are random. If true, insiders cannot make abnormal returns.
  - Studies show that corporate insiders make abnormal returns, but investors who trade on the announcement do not earn abnormal returns. In addition, stock exchange specialists make abnormal returns. Both of these contradict the strong form. Analysts and professional money managers are in a position to understand and act on information better than the average investor. But studies show that investors following analysts' recommendations do not earn abnormal returns, and mutual funds (proxy for professional money managers) do not earn abnormal returns.

FUNDAMENTAL VARIABLES (ROE, RM, RF, G)

- Candidates may encounter questions requiring a return on equity (ROE) solution in Corporate Finance, Equity Investments, or Financial Reporting and Analysis on the exam. To answer this correctly, candidates have to remember the basic income statement and how it flows. This will allow them to know that the net profit margin is needed as an input to the final calculation. Then the three-stage DuPont model must be used to determine ROE. After determining ROE using the three-stage DuPont model, the variables (ROE and growth rate) can be used to solve for dividend payout ratio.
- Candidates must thoroughly understand calculations relating to cost of equity and pricing. It is common for the question to provide the risk premium on the market as opposed to the required return on the market. The market's risk premium is equal to the required return on the market minus the risk-free rate: Market risk premium = rM – rF. This has been repeatedly tested at Level I in the past and is critical knowledge at Level II of the CFA exam.
- Common mistakes are made on basic questions. For example, candidates are required to know how to use the projected dividend in calculating the value of a stock or the expected return on a stock (using the Gordon Growth Model). A common mistake that candidates make is to use the current dividend and not the projected dividend in doing the calculation. The term *current dividend* means the dividend that was most recently paid (expressed in annual terms). If it was already paid, the buyer of the stock today does not get that dividend. Accordingly, share price should be based on forward (next period) earnings because the shareholder will never receive the last earnings. Assuming the dividend is paid during the period that the investor owns the shares (which you will on the exam), the buyer will receive the projected dividend.

TYPES OF ORDERS AND BUYING ON MARGIN

- You should know the types of orders:
  - *Market:* This is the most common type of order and is an order to buy or sell a stock at the best current price.
  - *Limit:* The order is executed at the price limit or better. If a buy limit, then the executed price is less than or equal to the limit price. If a sell limit, then the executed price is greater than or equal to the limit price.
  - *Stop loss or stop buy:* The order becomes a market order when the stop price is reached. A stop loss on Samsung at $50 would execute when Samsung's price drops to $50 or lower. A stop buy will buy at the stop price or higher.
  - *Short sale:* Candidates will need to know how a short sale works. A short seller sells shares that he or she does not own, with the intention of buying the shares back later at a lower price. Effectively, a short seller expects that the price will fall. If the stock being shorted pays a dividend, then the investor who shorted it has to pay the dividend.
- You need to remember the following with regard to buying on margin:
  - The initial margin is the amount of cash (equity) that the investor is required to put up at the start; however, note that on the exam the investor may put up more than what was required.
  - Maintenance margin is the amount of equity that has to be maintained in the account.
  - A margin call occurs when the investor's equity falls below the maintenance margin level. When this occurs, the investor must contribute enough additional capital (often cash) to return at least to the maintenance margin.

STOCK INDEXES

- Candidates should know the three ways in which a stock index can be calculated. More importantly, candidates should know the biases well:
  - Price-weighted indexes are biased toward the highesttpriced securities.
  - Value-weighted indexes are biased toward the highest market-capitalized securities.
  - Unweighted indexes are equally affected by large- and small-capitalization securities.

STUDY SESSION 15–16 (FIXED INCOME)

GENERAL POINTERS

- Fixed Income is 10% of the exam. This topic is covered in two study sessions.
- The readings at Level I primarily cover basic definitions, how fixed income instruments work, and some of the core risks to these instruments.
- Candidates will need this base knowledge in order to understand the fixed income readings at both Level II and Level III.

SPREADS

- There are three spreads that candidates should know:
  - *Nominal spread:* As correctly stated in the question, the nominal spread is the yield to maturity (YTM) for a bond minus the YTM for a comparable-maturity Treasury bond. There are two problems with the nominal spread: (1) it ignores the term structure of interest rates because it uses a single point on the yield curve, and (2) it ignores the effects of embedded options.
  - *Zero-volatility spread:* This is also called Z-spread or static spread, and it is derived from the Treasury spot yield curve. It is a spread over Treasury spot rates, but it assumes there is only one interest rate path and it still ignores the effects of embedded options.
  - *Option-adjusted spread (OAS):* This spread is a measure of the spread over a variety of possible interest rate paths, including those paths where an issuer could call a bond. The OAS is the appropriate spread measure for callable, putable, and mortgage-backed bonds (which essentially has a borrower put option).

  When selecting among comparable bonds for investment, always choose the bond with the highest OAS if available.

INTEREST RATE SENSITIVITY

- Candidates need to remember that duration is a measure of interest rate sensitivity. For straight bonds, both duration and convexity increase as rates change from high to low. Duration increases (lengthens) because at lower interest rates, the present values of distant cash flows become more significant. For example, when rates are high, say 10%, a 100-basis-point (bp) change is relatively small (1/10 = 10% change in rates). But if rates are at 4%, a 100-bp change is quite large (1/4 = 25% change in rates). Therefore, the bond is more likely to have higher sensitivity when rates are low. Visual learners may wish to graph this out. If rates are low, the slope (duration) of the curved line is quite steep. If rates are high, the slope is small. Note that this phenomenon occurs regardless of whether the bond is selling at a premium, at par, or at a discount.

- Similarly, calculations can prove that positive convexity helps offset some of the price decline when rates rise (the upside is greater than the downside): $\Delta PBOND = -DE\ \Delta r + \Delta r + CE\ \Delta 2$. Notice the negative relationship between duration and interest rates by the negative in front of the duration figure in the calculation; conversely, the addition sign in front of the convexity adjustment signals that convexity always gives us a lift. The greater the convexity, the greater the lift. Accordingly, due to this convexity phenomenon, the price increase for a given fall in interest rates is greater than the price decrease for an equal rise in interest rates. Convexity gives us a lift on the downside as well as the upside. Graphing the price-yield relationship for straight, callable, and putable bonds may help illustrate this phenomenon. Note the following as you graph it out:
  - Straight (option-free) bond:
    - The difference between the straight-line and the curved price yield line is reflecting the effect of convexity.
    - Also, note that convexity (as I hinted at in the bullet immediately above) rises as rates fall.
  - Callable bond:
    - The callable bond is stopped out at the call price.
    - Callable bonds will exhibit negative convexity at the point where market rates are low (the negative convexity results in the price not rising despite rates falling).
    - When market rates are high and the probability that the bond will be called is low, a callable bond has positive convexity. In fact, the bond's price-yield relationship at high rates is virtually the same as a straight bond.
  - Putable bond:
    - The convexity becomes quite large when the put option becomes valuable (when rates are rising).
    - The bond price normally would continue dropping, but because the bond is putable, the price decline stops out at the put price.
    - The difference between the two potential prices (with and without the embedded put), is due to large positive convexity.

- Candidates need to remember the basic idea that bond prices rise when rates fall. If you expect a rate decline, given no further information other than you have a few bonds to choose from with their corresponding duration and convexity, you want to own the bond with the highest interest rate sensitivity because its price will increase the most (and therefore provide the most profit under this scenario).
  - The best measure of a bond's interest rate sensitivity is its duration. The longer the duration, the more sensitive the bond is to interest rate changes. For example, if you expect a rate decline, given a few bonds to choose from, you want to own the one with the highest interest rate sensitivity because its price will increase the most and therefore provide the most profit. Normally, this alone will solve the question.
  - However, if you have two bonds with the same duration, then next you'll need to look at the convexities provided (they would have to be under such a scenario). Candidates need to remember that positive convexity will benefit a bond's price change more than will negative convexity. Thus, the next criterion after duration is to use convexity and select the bond with the largest positive convexity.

- Questions with durations and convexities provided can be solved using calculations based on the expected price change formula: ΔPBOND =-DΔr + CΔr2; however, the time involved would be well above the allotted time, and this is why it is better to know and understand the core issues and outcomes.

- If convexity is not given, then duration alone can be used to estimate the effect on a bond's price when rates change. It is better to have both duration and convexity, but candidates should be able to use what is provided. Besides, in most cases, the duration effect is the largest. If the bond was a straight bond, candidates could estimate that the price change will be greater than the estimated price change of the bond using duration alone. Remember, option-free bonds have positive convexity, will cause the price rise to be more than duration predicts when rates fall and will cause the price decline to be less than duration predicts when rates rise.

TYPES OF FIXED INCOME INSTRUMENTS

- However, given information beyond duration (or convexity), candidates should know the various types of fixed income instruments and their respective risks:

  - Homeowners tend to refinance when interest rates fall. This puts the mortgage-backed security (MBS) holder in a position of reinvesting at a lower interest rate. Next, think about which remaining instrument has the best chance of paying the investor a good income while interest rates fall.

  - Candidates will need to remember how floating-rate and inverse floating-rate bonds work. A floating-rate bond will have its interest payments set by a formula such as LIBOR + X. If rates fall, the floating-rate bond will pay lower interest. An inverse floating-rate bond does the opposite. It will pay interest based on a formula, such as 10% – Y × (LIBOR). If rates fall, it pays more interest. Also, a cap on a floater limits the upside rate of interest (benefits the issuer, hurts the buyer), and a floor limits how low the interest payments can fall (benefits the buyer, hurts the issuer).

  - Finally, be sure to know the difference between a nonrefunding provision and a noncallable provision. The nonrefunding provision only protects against the firm issuing new debt at lower rates and paying off the higher-rate old debt. This is easy to circumvent. A noncallable provision means the firm cannot prepay the debt at all. To retire it early, the firm has to buy it in the open market. If rates are falling, the price will be rising and the firm does not gain by buying the old high-rate debt and issuing lower-rate debt.

  For example, if you were provided with the preceding three bonds and you expect that interest rates will fall sharply over the next two years, you would most likely prefer an inverse floating-rate bond with a nonrefundable provision. An inverse floating-rate bond (floater) is one whose coupon resets inversely with a reference rate. If interest rates fall, an inverse floating-rate bond's coupon will rise and your income will rise. The nonrefunding provision prevents the issuer from calling the bond by using the proceeds from issuing new lower-coupon debt.

RISKS

- Candidates should know the types of risks for bond investing to solve problems involving various types of bonds (individual bonds, bond portfolios, bonds with embedded options, MBS, ABS) with regard to risk:

- *Interest rate risk:* This is generally the largest risk (and therefore most commonly examined) and it arises from changing rates. When interest rates rise, bond prices decline. The reverse is also true: falling rates result in a rising bond value. Duration is commonly used to measure a bond's interest rate risk.

- *Yield curve risk:* This is the risk that the value of a bond portfolio might deteriorate or improve because of a change in the shape of the yield curve. The yield curve can change in a parallel manner (portfolio's weighted duration can measure the risk) or a nonparallel manner (key rate duration is required).

- *Call and prepayment risk:* This is the risk that a bond will be paid off before its maturity date. This risk applies to bonds with explicit call provisions and securities whose principal can be prepaid early, such as mortgage-backed and asset-backed securities. There are three reasons why the possibility that a bond will be called is disadvantageous to investors:

  1. The investor does not know what the future cash flows of the bond will be because it is unknown when, or if, the bond will be called.
  2. The investor is subjected to reinvestment risk because bonds are usually called when interest rates are low so that the issuer can replace outstanding high-coupon debt with new lower-coupon debt. The bond investor is forced to reinvest the proceeds from the call at lower interest rates.
  3. The appreciation potential of a callable bond is limited because investors will not pay much above a bond's call price, regardless of how much interest rates fall. Thus, declining rates do not benefit a callable bond near as much as they benefit a non-callable bond.

  Note: For a putable bond, the investor can put the bond and will most likely do this when rates rise and bond prices fall. The bond could be paying 6% and rates have risen to 8%. The investor puts the bond, gets the proceeds, and reinvests these funds at 8%. Thus, the investor has little reinvestment risk.

- *Volatility risk:*

  - This is the risk that changes in the expected volatility of interest rates will affect the value of any embedded options in a bond's pricing structure, thereby affecting the value of the bond. Callable and putable bonds can be considered the same as owning the straight bond and either writing (call) or buying (put) the option: PCB = PNCB – c; PPB = PNPB + p.

  - As interest rate volatility rises, the option's value rises (all options rise when the underlying's volatility changes). This means that increased interest rate volatility will lower the price of a callable bond because the c in the formula above is increasing and raise the price of a putable bond because the p is increasing in value.

  - This is another example of how materials from different sections of the exam are merged. From derivatives, candidates should know that rising volatility of the underlying will cause the related option value to rise. Then, candidates should have the ability to merge this knowledge with an understanding that the price of a callable or putable bond is comprised of the value of the straight (noncallable or nonputable) bond and the option.

  - A call option has a negative value to the bond investor because the issuer will call the bond when it is advantageous (when rates are down). A put is a positive value to the bond

investor because the investor can put the bond if rates rise. Thus, increased interest rate volatility hurts the call bond investor and helps the put bond investor.

- *Inflation risk:* This is the risk that the purchasing power of the cash flows received from a bond (interest and principal) will decline over time because of inflation.
- *Exchange rate risk:* This is the risk that the exchange rate between the currency in which a bond is denominated and the investor's home currency might change.
- *Event risk:* This is the risk that some unusual event could cause the price of bonds to decrease. Typical events are natural disasters, regulatory changes that cause a credit rating downgrade, and a takeover, leveraged buyout, or corporate debt restructuring that substantially increases an issuer's debt-to-equity ratio and causes a downgrading of its credit rating.
- *Sovereign risk:* Foreign government bonds have sovereign risk, which is the risk that the sovereign may be unable to service its bonds or it is unwilling to service its bonds even though it has the resources to do so. You should remember that you want both the ability and willingness to pay.

TERM STRUCTURE OF INTEREST RATE THEORIES

- Candidates should know the theories on the slope of the term structure of interest rates:
  - The pure expectations theory says that the yield curve reflects the market's expectation of future interest rates. If the market consensus is that yields will be rising, then a longer maturity bond must have a higher yield than a shorter maturity bond (i.e., the yield curve is upward sloping).
  - The liquidity preference theory (biased expectations theory) says that longer-maturity bonds must offer a higher yield compared to shorter-maturity bonds to compensate investors for reducing their liquidity. According to the theory, this additional yield (called a term premium) increases with maturity. Hence, the yield curve should normally be biased upward.
  - The market segmentation theory hypothesizes that groups of investors and issuers are restricted to specific maturity regions of the yield curve. It argues that the shape of the yield curve will reflect the relative supply and demand in various maturity regions of the yield curve. If there is excess demand for bonds at the shorter maturities and excess supply at the longer maturities, then the yield curve will be upward sloping. The market segmentation theory can potentially explain any shape of the yield curve.
  - The preferred habitat theory is a variant of the market segmentation theory, but is less restrictive. It posits that, while particular groups of investors prefer to invest in specific segments along the yield curve, they can be lured away from their normal market segment, or preferred habitat, by higher yields offered in other maturities. The preferred habitat theory accommodates any shape the yield curve might take.

YIELD CURVES (PAR, SPOT, FORWARD)

- In order to answer more complex problems about the slope or level of the various yield curves, candidates first need to know the basics:
  - *Par yield curve:*
    - The par yield curve is the coupon yield of newly issued, on-the-run securities trading at par (which can be approximated by the yield to maturity).

- Effectively, par yields are the compounded total of the appropriate spot rates for each cash flow on a bond.
- *Spot yield curve:*
  - Spot rates apply to a single future cash flow (and therefore can be used to value a bond).
  - Not all spot rates can be directly observed, but par yields are observable. It is possible to use a sector's par yield curve to determine the sector's spot rate curve through a process called "bootstrapping", which is where we calculate the implied spot rates (rates that apply to a single cash flow) from the par rates. Candidates should be prepared to do the math. The assigned reading spends a lot of time on notation, but notation itself is not important. The only important item is getting the correct answer.
- *Forward yield curve:*
  - Once we have the spot rates, it is possible to use them to find the implied forward rates. A forward rate is a future rate, such as the six-month rate, one year from now. Using the spot rates, find forward rates by determining what the market is implying the future rate will be. For example, the six-month forward rate in one year is found based on an equivalency: An investor should be indifferent between investing in the 1.5-year zero-coupon bond or investing in a 1-year zero-coupon bond and rolling the proceeds in one year into a six-month zero-coupon bond.
  - There is a trick that can save time if a forward rate is requested. With very short compounding periods (five periods or less), the forward rate can be estimated as being the simple average. This allows for a quicker answer and does not require the use of a calculator. For example, if the two-year spot is 7.0% and the one-year forward is 6.0%, then the two-year forward has to be approximately 8.0% [(6.0 + 8.0) / 2 = 7]. The 7.0% is for two periods, so approximately 14.0% is earned.
- With the basics out of the way, we can answer questions more complex questions such as:
  - Whether the spot rate curve will be upward or downward sloping and lower or higher, given an upward-sloping par yield curve. The par yield curve can be viewed as weighted average of spot rates. As a result, the slope of the spot rate curve determines the slope of the par yield curve. The spot rate curve is steeper than the par yield curve.
    - Accordingly, when the par yield curve slopes upward, the spot yield curve will reside above it, and when the par yield curve slopes downward, the spot yield curve resides below it.
  - Whether the implied one-year forward rates will increase at a slower, same, or faster rate than the annualized spot rates are increasing. The two-year spot rate is effectively the average of the one-year spot rate and the one-year forward rate one year from now.
    - Accordingly, if the two-year spot rate is larger than the one-year spot rate, then the one-year forward rate one year from now must be even larger.

PAR, PREMIUM, DISCOUNT

- Candidates should know that given an assumption of constant YTM that discount bonds will increase to par value at maturity, premium bonds will decrease to par value at maturity, and par bonds will remain about the same price until maturity. For example, in the case of a discount bond, the discount amortizes over the life of

the bond such that it will be worth par at maturity. Thus, because it was sold below its par value, it must increase in price to be worth par at maturity.

- Candidates should know that zero-coupon bonds are valued based on their bond-equivalent yield. That requires discounting the one bond cash flow at maturity by the semiannual yield and number of compounding periods. For example, for a five-year zero-coupon bond, the number of discounting periods would be 10 periods in order to compare it to a semiannual-pay five-year bond. The rate would be half the yield-to-maturity.
- Candidates need to understand that the required yield, or YTM, is the discount rate. If a bond pays a higher rate of interest than the discount rate, then it will sell at a premium to its par value. This is really just time value of money.

TERMS AND MEASURES (YTM, YTC, CURRENT YIELD, BEY)

- Candidates should know the terms used and how to calculate each measure:
  - The current yield is the annual coupon interest divided by the current price.
  - The yield to maturity (YTM) and yield to call (YTC) are found using a financial calculator.
  - On the exam, always assume the bond equivalent yield (BEY) is desired unless the question specifies otherwise.

STUDY SESSION 17 (DERIVATIVES)

GENERAL POINTERS

- The topic area of Derivatives is 5% of the exam or 12 questions. At Level I, this topic is covered in a single study session.
- The assigned readings cover the basics of options, futures, forwards, and swaps.
- Many candidates will skip the derivatives material under the belief that it is too hard and that its weight is insufficient. This is a critical mistake for two reasons:
  1. The readings are relatively simple and you may find derivatives to be much easier than other topics.
  2. The emphasis on derivatives is much greater for the Level II and III CFA exams. The basic knowledge gained from the Level I readings is required for Levels II and III.
- Many candidates, because of the bad press that derivatives (notably synthetic collateralized debt obligations [CDOs]) have received, assume that the assigned readings will treat derivatives as being risky. In fact, the opposite is true. Derivatives are shown to be quite helpful in moderating or modifying risk and the material notes that derivatives themselves are not "bad."

FORWARD CONTRACTS

- Candidates need to remember the basics:
  - A forward contract is an agreement to enter into a future transaction at a price specified at the contract's initiation. The basic forward contract terminology is as follows:
    - The party obligated to deliver the underlying is the seller, or short position.
    - The party obligated to make payment and take delivery is the buyer, or long position.

- The quantity of the underlying asset to be delivered is the contract size.
- The date of delivery is the expiration, maturity, or settlement date.
- Advantages/disadvantages for forwards are:
  - Customized to meet specific needs (advantage).
  - No money exchanges until contract expiration (advantage, except for credit risk).
  - Credit risk that the counterparty will default (disadvantage).
  - Early exit requires negotiation with the counterparty (disadvantage).
  - Private transaction that provides little transparency (can be advantage or disadvantage).
- Candidates should be able to understand currency movements and read the exchange rate quotes closely with forward contracts (and swaps, forwards, options).
- With a forward rate agreement (FRA), the buyer pays fixed and receives floating. For example, with a 7 × 10 month FRA, the buyer has agreed to pay the fixed rate. The floating rate it will receive in return is the three-month rate of interest that exists in seven months. The amount to be paid by the insurance company is the difference in the rates times the notional amount. But instead of paying the interest differential three months after the seven months, the amount is paid immediately (at the end of the seven months when the rate has been set).

FUTURES

- Candidates need to be aware of the subtle (but important) difference in the way margin works for stocks/securities through a broker versus margin on futures contracts through a clearinghouse.
  - When a margin call occurs for a futures contract, the investor has to post enough cash or securities to get his or her margin balance back to the initial margin level. For example, assume the initial margin is $3,000 and the maintenance margin level is $1,000. If the investor's margin account drops to $800, then the futures investor must post $2,200 in additional margin ($3,000 initial – $800 current level).
  - For stocks bought on margin, the investor only has to bring the account back to the maintenance margin level.
- Be sure to know the basics on futures:
  - Futures contracts are standardized, which provides less flexibility but more liquidity.
  - They are exchange traded with a clearinghouse acting as the intermediary between the longs and the shorts. The clearinghouse guarantees performance and this minimizes credit risk.
  - The clearinghouse requires each participant to deposit initial margin before entering a trade. This deposit is not a cost of the contract.
  - Futures positions are marked-to-market daily.
  - If the margin balance falls below the maintenance margin, a margin call will be generated. As discussed earlier, the futures investor must bring the margin balance back up to the initial margin level.

OPTIONS

- Covered call strategy:
  - This strategy entails buying the stock (that are likely to remain unchanged or appreciate over the next 30 days) and writing a call option (that are slightly in the money) on the stock.

- The risk of loss exists and it occurs as the stock price falls.
- The investor's breakeven stock price is equal to the cost per share for the stock bought less the premium per share received for writing the calls.
- The maximum loss will occur when the stock falls to $0, and will equal the cost of the stock less the call premium.
- This strategy should only be used if the outlook suggests the stock's price will stay relatively unchanged or fall slightly. It should not be used if the stock could rise or fall by a substantial amount.

- Another common strategy is a protective (covered) put, also known as portfolio insurance.
  - This strategy entails buying the stock and buying a put option on the stock.
  - This allows the investor to retain the upside potential of the portfolio and limit the downside risk.
  - There is the cost of the put, which reduces the investor's profit if the stock rises.
  - The investor's maximum loss is equal to the price paid for the stock and put, less the strike price for the put. The maximum gain is unlimited and the breakeven point is equal to the sum of the per share prices paid for the stock and the put.
  - Portfolio insurance is an attractive strategy if the stock might rise or fall significantly. It performs poorly if the stock price remains relatively flat.

- Under the heading of "Volatility Risk" in the Fixed Income section above, you were told to remember that an option's value increases when the underlying instrument's volatility increases. If the value rises, the writer (seller) of the option will receive a higher option premium. Thus, higher volatility will cause an option to sell at a higher premium.

- For options, candidates should know the difference between American and European options. An American option, which does not mean it is only traded in North America, can be exercised at any time until expiration. In contrast, a European option can be exercised only at expiration. Given the higher flexibility, an American option should sell for a price equal to or greater than a European option with the same terms.

- Also, you should know how other factors affect an option's value. Candidates should also know the following DIVUTS "cheat sheet" by heart; it is simple, quick, and a great reference guide that can be used across all three levels.

Dividends ↑	Call ↓	Put ↑
Volatility ↑	Call ↑	Put ↑
Interest Rate ↑	Call ↑	Put ↓
Underlying Asset Price ↑	Call ↑	Put ↓
Time to Expiration ↑	Call ↑	Put ↑
Strike Price ↑	Call ↓	Put ↑

SWAPS

- Candidates should understand the basics of swaps.
  - A swap agreement is a private over-the-counter contract, where both parties agree to enter into a transaction at some future date and at an agreed upon price at initiation. Often, no money changes hands at the initiation of the contract (true for interest rate swaps; not true for currency swaps). Swaps involve a commitment by both parties and normally involve a series of transactions.
  - Typically, one party to a swap agrees to pay a fixed set of cash flows in return for a variable set of cash flows from another party. For example, in an interest rate swap, the fixed-rate payer agrees to pay a fixed amount each period based on a fixed interest rate and notional amount determined today. In return, the counterparty (the floating-rate payer) agrees to pay a variable amount each period based on a reference rate applied to the same notional amount agreed to today.

- The exam might have candidates estimate the payment on a swap and maybe even one where the return is negative. It is important to review the basics of swaps and not be confused by negative numbers. The trick is to understand that the payer of a negative return in a swap can be interpreted as receiving the return. For example, by agreeing to pay the S&P 500 return, the firm has effectively 'shorted' the market. If the market indeed falls, the firm benefits from the decline because it is short the market. Often, candidates find drawing a swap diagram to see the swap's flows very helpful.

STUDY SESSION 18 (ALTERNATIVE INVESTMENTS)

GENERAL POINTERS

- Alternative Investments make up 4% of the exam (up from 3% last year).

- This topic is covered in a single study session. These should be easy points for you.

- The material is very definitional in its nature (for example, stages in venture capital).

- The math is not very difficult at all.

- There is overlap with topics already covered (for example, generating a weighted return). Moreover, candidates should recognize that a cap rate (NOI/P) could be considered similar to the earnings capitalization rate for an equity security (E/P, or the inverse of the P/E ratio). In a sense, the income approach is just a form of comparables (multiples) valuation.

- The assigned material notes that non-publicly traded companies sell at a discount valuation because they lack marketability. Also, the material notes that a control premium is added to a valuation when control is bought. This is because the investor can control the company's actions/cash flows.

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