

180.266: Financial markets and institutions
Review Material for the Midterm
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This review packet begins with some comments and then goes chapter-by-chapter through the assigned chapters. I provide some comments and then indicate which of the items in the Summary, Key Terms, Questions, and Quantitative Problems are most relevant.

General comment: This is an introductory class and as such one goal is simply to get you familiar with some terms, concepts and basic magnitudes. A large portion of the exam will just require you to know magnitudes and definitions. There will be some basic interest rate computations, but none will involve heavy computation or typing on a lot of numbers. The course last year was a bit different, but last year's midterm should give you a general idea of how the midterm will be.

Formulas: I will provide formulae for the following: duration, variance, standard deviation, covariance, correlation. These will follow the standard notation from the lecture. You need to know how to apply these formulas.

You need to know other formulas we have used, for example: for basic yield calculations, yield to maturity, mean or expected value of a return.

Other readings: In addition to the assigned chapters and lecture notes, I have provided two additional sets of note that are on the website: The probability and statistics review, and the basic portfolio review. This material is fair game and summarized below.

Chapter 1

Faust notes Chapters 1 and 2 are background to help get you oriented. They lightly cover much of what we will cover all term. Basically you need to know those things we have subsequently covered in class. For example: I won't ask about foreign exchange markets or monetary policy on this exam.

Summary: --

Key terms: asset, banks bond, common stock, financial intermediaries, financial markets, interest rate, security.

Questions: 1, 2, 4, 11

Quantitative problems: --

Chapter 2:

Summary: 4, 5, 6

Key terms: adverse selection, asymmetric information, capital, diversification, dividends, equities, financial intermediation, liabilities, liquid, liquidity services, maturity, moral hazard, portfolio,

risk, transactions costs.

Questions: 1, 6, 7, 8, 9, 10, 12

Chapter 3:

Faust Notes: Chapters 3, 5, and 5 are basic intro to finance. Chapter 3 is the basics of financial math. We have spent a good deal of time on this and you need to know this material.

Summary: 1, 2, 3, 4.

Key terms: cash flows, coupon bond, coupon rate, current yield (of bond), (pure) discount or zero coupon bond, duration, face value, par value, interest rate risk, nominal interest rate, perpetuity, present value, rate of capital gain, real interest rate, reinvestment risk, yield to maturity. From class I add: holding period yield.

Questions: 1, 2

Quantitative problems: 1, 2, 3, 4, 8, 9, 10, 11. Note: you should know how to do these quantitative problems. The exam will NOT have any complicated or involved computation requiring you to punch in a lot of numbers. The exam will have simpler versions of problems like these.

Chapter 4:

Faust summary: This chapter shows how the conventional supply and demand diagram that is the basis of much economic analysis works when the market in question is for a financial security. Whenever you see a diagram like this you should ask:

1. What is the label on each axis?
2. Which curve is which and why? That, is why do the S and D curves slope the way they do?
3. What would shift each curve and in what direction?
4. Interpreting the picture: How do you depict equilibrium, excess supply, excess demand, and what is the basic story about how market forces push us from the situations of excess into equilibrium?

Note on Risk: One main area where we are taking a more sophisticated perspective than the book is in discussing risk. The book takes a basic "Econ. 1" perspective: risk is simply variability: an return with a higher standard deviation is riskier than one with lower standard deviation.

In any more advanced course, we have to recognize that there is good and bad variability. Whether something has good or bad risk is a matter of how the variability in an asset return is associated with the returns on your overall portfolio. If the variability is positively associated with your overall portfolio return, then this is "bad risk" that you will have to be compensated to take on. If the variability is negatively associated with your overall portfolio return, then the asset provides insurance value and you will be willing to pay a premium for this kind of variability. Of course, the statistical concepts we have used to describe the association are covariance and correlation (these two always have the same sign).

How to read the book: Chapter 4 talks about volatility of returns as if it is all “bad risk.” In your mind (or scribbled in your text) simply add “more volatile *and the volatility is positively associated with your overall portfolio return.*” That is, when Chapter 4 talks of volatility or variability or standard deviation, it is tacitly presuming that this is “bad volatility.”

Summary: 1, 2, 3

Key terms: asset, demand curve, excess demand, excess supply, expected return, Fisher effect, liquidity, market equilibrium, risk (see the note above), standard deviation, supply curve, wealth.

Questions: 1, 2, 3, 7, 11, 12, 13, 14

Quantitative problems: 1, 2

Chapter 5:

Faust Notes: We went through the expectations theory of the term structure in some detail in class. You need to know:

1. What is the expectations theory of the term structure?
2. How can you use it to derive measure of what the market expects interest rates to be in the future.
3. In practice, the expectations theory is relied upon by market participants and others?
4. There is no good economic reason why the expectations theory should hold: essentially the theory implies that agents don't care much about risk.
5. Evidence does not broadly support the expectations theory.
6. In particular, over many horizons, when the expectations theory says the markets expect a rise in short rates, short rates are likely to fall. Short-term rates often move in the opposite direction from that which the expectations theory predicts.
7. Reconciling why people use the theory so heavily despite the evidence is a bit of a puzzle.

We did not touch on the other theories much in class. You need to know the basic idea behind the market segmentation theory and liquidity premium theory.

Note: The Chapter and questions after also deal with the effects of tax exempt status of municipal bonds on yields. We have not emphasized this, and will return to it later. You may skip this at this point.

Summary: 1

Key terms: default, default-free bonds, expectations theory, forward rate, inverted yield curve, liquidity premium theory, market segmentation theory, risk premium, spot rate, term structure of interest

rates, yield curve.

Questions: 1, 2, 3, 4, 6, 7 (For 6 and 7, the question asks you to deduce the market's expectation. In both cases, interpret these as asking, *Under the expectations theory* what is the market expecting or predicting?)

Quantitative problems: 1, 5, 6, 7, 9, 14

Chapter 6.

Faust Summary: Understand the reasoning behind view that 'you can't beat the market.' This says that "hot tips" are unlikely to be valuable: if this is public information, then folks will already have traded on it and driven prices up (and returns down) on the item in question so that the expected return is no longer special.

We replaced this with the view that you can't beat the market with the view that you can beat the market a few ways:

1. Cheat.
2. Take on risk. In this case you earn a higher return on average (the risk premium) but your returns will also be more variable.
3. Produce/exploit valuable new information--information that is not yet fully appreciated by the market.
4. Get lucky. If enough people are trying random strategies, one is going to seem to work, even for a substantial period. Ultimately, this must come to grief.

Combining taking risk and exploiting luck: you take on risk, but it is a risk of a very bad, very low probability event. You earn the risk premium for a long time (and thereby look like you are beating the market) and this goes on until the low probability event finally happens. At that point you go broke.

Of these, only creating and exploiting new information is honest and reliable: you create valuable information in this world, you get paid for it.

When you are confronted with a great opportunity to "make a killing" in some investment, you need to ask yourself if it is simply nonsense. Otherwise it is 1 of the 4 things above. If you don't know which, then stay away from the investment. This goes for individuals and firms and investment professionals.

In many financial firms, this is embedded in the idea that any proposed investment must come with an "investment thesis" explaining why there is a special profit opportunity in this case.

One fact has been well established: most actively managed money earns a lower return than simply investing in a broad market portfolio. The assets may have a slightly higher return than the market, but for the customer, this higher return seldom covers the costs charged by the active manager.

Perhaps this is the most important lesson of the class: Don't waste your money on hot tips and active managers that charge you a great deal, but don't cover those costs in higher returns. (If you can invest with someone actually producing valuable information, this is a different story.)

There will be a question on either the mid-term or the final inviting you to waste points by following active management advice. I hope you don't waste these points and more importantly, later in life I hope you don't waste your money either.

Summary: 1, 2, 3, 4

Key terms: arbitrage, efficient market hypothesis, market fundamentals, random walk, theory of efficient capital markets.

Questions: 1, 4,6, 7, 8, 10

Quantitative Problems: 2

Faust Note: This concludes the “intro to finance” portion of the course. We now turn to financial markets and institutions. We start with commercial banking. Ch. 15, 17, 18, 20, 24. We introduce many concepts in the context of commercial banking. We will apply these again and again as we analyze other financial institutions.

Chapter 15.

Faust summary. Before the financial crisis, courses like this might not have emphasized the issues in Chapter 15 (moral hazard, adverse selection, etc.). When financial markets do really big, really crazy stuff we are forced to remind ourselves of and re-emphasize the information problems that are at the heart of financial markets and institutions.

Summary: 1, 2, 3, 4, 5, 6 (Note: I think summary item 7 is a bit misleading here. All the factors listed might contribute to crises, but there are many others that might contribute as well. In the end, we actually are not so clear on why crises occur. If we were, we'd probably do a better job avoiding them.)

Key terms: audits, bank panic, collateral, creditors, equity capital, financial crisis, insolvent, net worth, principal-agent problem, restrictive covenants, secured debt, unsecured debt.

Questions: 2,3, 4, 6, 7, 9, 10, 15

Quantitative problems: 1, 2, 4

Chapter 17.

Faust notes: Chapters 17 and 24 go together, in my view. Chapter 17 is basic management and 24 is risk management in specific. The lectures treat these two together. You need to know the basics of T-accounts and balance sheets as displayed in lecture and in the text.

Summary: 1, 2, 3, 5

Key terms: Asset management, balance sheet, capital adequacy management, credit risk, deposit outflows, equity multiplier, excess reserves, interest rate risk, liability management, loan sale, operating expenses, operating income, reserves: (required reserve ratio, required reserves, reserve requirement), ROA, ROE, secondary reserves, T-Account, vault cash.

Questions: 1, 2, 3, 4, 7, 10, 11, 12, 13, 14, 15.

Quantitative problems: 2, 3, 7, 8, 9

Chapter 18.

Faust Summary: Chapters 18 and 20 go into a great deal of detail on banking laws and regulations and on the effects of regulations on the banking industry. I am not emphasizing many details here. What I want you to take from Chapter 18 (and the associated lectures).

1. The U.S. left the depression with heavy bank regulation that also resulted in the U.S. having a great many small banks.
2. Some government involvement in banking benefits banks, giving them financial advantages over other institutions. For example, deposit insurance allows banks to attract funds more cheaply than they could without the insurance. Reporting requirements that are verified by the government allow banks to be more persuasive in convincing customers that they are sound. This would be more costly to do if there were not laws backing the accuracy of the information.
3. Government regulatory restrictions almost by definition impose costs on banks. For example, capital requirements make banks hold more capital than they would otherwise. Banks would prefer more leverage, lower capital (relative to assets), in order to raise ROE.
4. Banks and other institutions will innovate to avoid costly regulation.
5. Until about 1980, depression era laws and bank practices and structure were largely in place.
6. In part because of technological advances and in part due to the stresses caused by high inflation around 1980, about in 1980, we began a process of rapid innovation (in part to avoid regulation) that decreased dominant role that commercial banks play in credit provision in the economy.
7. Partly in response to the fact that banks were losing so much business, we began a process of deregulation of banks in order to allow them to compete better with the less regulated institutions that were grabbing a larger share of what had traditionally been bank business.
8. One upshot of all the reform was a huge amount of consolidation in the banking system. The U.S. still has a very large number of banks, but a very small number of very large banks now dominate from the standpoint of total deposits, total assets, etc. Thus, any

discussion of behavior of banks has two parts: How do big banks operate? How do the vast majority of banks operate?

9. As of about 2003, many analysts in the private sector and academics were congratulating the the U.S. and, say, the UK for adapting to financial innovation and deregulation in such a clever way. The thought was that credit was being provided in a much more efficient way than in, say, 1980, and that the booming economy was evidence that this was a very good thing.
10. As of the crisis, all this thinking is being revised. Some innovation and deregulation was surely a good thing, or at least an unavoidable thing. We cannot go back to depression-era banking given the nature of the modern economy. We are however, in a state of flux over just what the financial world should look like going forward.

Because of the ongoing turmoil, I have decided to not emphasize particular laws, dates, and activities. Rather, I want you to have a feeling for the broad sweep of events outlined above, and of the economic forces driving those events. See the Faust notes on Chapter 24 for more on this theme.

Read Chapters 18 and 20 to get a sense of the underlying specifics that have been

Summary: 2, 3, 4 (Don't need to know the names/dates of the laws), 5 (should know that “Glass Steagall Act” separated commercial banking from investment banking and has now been repealed.).

Key terms: securitization, large complex banking organizations (LCBOs).

Problems: --

Chapter 20. Regulation

Faust notes: These continue from the notes on Chapter 18. Once again, we are not getting into the details of banking regulatory law.

1. There are many forms of bank regulation: rules about which assets and liabilities a bank can hold, capital requirements, disclosure and reporting requirements, examination by bank examiners, and so forth. These are all motivated by the need to overcome asymmetric information problems.
2. In particular, in an unregulated system, banks are subject to bank runs. Even if a bank is well run and healthy, it would be costly for the depositors to learn this. Thus, the depositors rely on reputation and faith. If they “lose faith” they may all run to the bank, and withdraw deposits. Even a formerly healthy bank cannot liquidate all assets on a moments notice, so a bank facing a run may well fail. Disclosure and reporting requirements can help here, but an element of faith remains. Deposit insurance is a main fix for this problem.

3. Deposit insurance raises moral hazard and can lead to excess risk taking by banks. This necessitates further regulation.
4. Views regarding the best way to regulate banks were evolving over the period of rapid innovation since 1980. This process was going on world-wide, and our evolving views of bank regulation are reflected in “Basel Accords” (Basel I, II, III) about bank regulation. The crisis has thrown all this into question.
5. For example, question 10 at the end of Chapter 20 asks “Why has the trend in bank supervision moved away from a focus on capital requirements to a focus on risk management?” Since the crisis, you could get many answers to this question from experts. Some would say, “Because we were foolish. We thought we understood risk management and risk modeling better than we really did understand it. As it turns out, this emphasis on risk management allowed risk to build up leading to the crisis. In the crisis, we learned that bank's didn't have enough capital.” Others completely disagree.
6. If this were a more advanced class, we would explore the many important arguments on both sides about the way to best regulate banks. In light of the state of things today, in this class, I want you to understand that regulation evolved rapidly after 1980. Many people believed that the evolution was going quite well, but in light of the crisis everyone is re-considering how banks should be regulated.

Summary: 2,3,5

Key term: bank supervision, Basel Accort, leverage ratio, prudential supervision.

Questions: 1, 2, 4, 6, 7,

Quantitative problems: --

Chapter 24.

Faust notes: In the lectures chapters 17 and 24 were treated together under the general umbrella of management. You need to know the main categories of risks banks face and how they manage them. I did not mention compensating balances in lecture, but you should understand the role these play (p. 622).

Summary: 1, 2

Key terms: duration gap analysis, compensating balances, income gap analysis, secured loans

Questions: 2, 4, 5,

Quantitative problems: Note: All of the problems in this chapter are good ones. Many of them involve a lot of a calculating, however. Thus, we won't have problems this involved on the exam. You should know *how to complete* problems like these, however, because, there may be simplified

versions on the exam. Particularly look at: 1, 2, 3, 4, 5, 6, 8, 10, 11, 12.

Probability and Statistics notes:

Faust notes: You need to know how to compute the mean or expected value of a return (if I give you the outcomes and probabilities). If needed, I will give you the formulae for the variance, standard deviation, covariance, and/or correlation. You need to know how to interpret and apply these (in the way we have used them in class). You need to be able to compute these if I give you the formulae and the outcomes and associated probabilities.

Portfolio theory and risk notes:

Faust notes: The bottom line here is that you need to know the key equation to the CAPM and how it summarizes a lot of intuitive things we figured out by discussing fire insurance, etc. The key idea is this: if all agents behave rationally, we expect asset prices and expected returns to be driven to a point where assets pay an expected return that is either more or less than the risk free rate based on whether their return has “good” or “bad” variance. Good variance is when the return tends to be high when the your market portfolio return is low (covariance with the market return is negative). Thus, the asset return acts like insurance. You are willing to accept less than the risk free rate to hold an asset like this. The opposite is true for “bad” variance: variance that is positively associated with the market return (positive covariance). An implication that is sometimes viewed as peculiar is that if the return has no association with the market (zero covariance) the asset's expected return will equal the risk free rate--even though the return is uncertain. Why? Because this risk is completely diversifiable. By owning a little bit of a lot of assets like this, you can eliminate the risk entirely. The “beta” of an asset in the CAPM equation, has the same sign as the covariance of the asset return with the market return and thus captures the effect we are discussing.

Key terms: CAPM, beta, diversifiable risk, systematic risk.

Data Facts:

You need to know basic magnitudes for the following:

U.S. Nominal GDP,

What is the level of short-term nominal interest rates in the U.S. presently?

And long-term?

What is the typical slope of the term structure?

What is the slope right now?

At what point in time and at what level did interests rate peak in the U.S. since WWII.

Approximately how many commercial banks are there in the United States?

How many banks have assets over \$1 trillion?

What is the approximate level of total assets of the banking sector?

What is a typical ROA and ROE for commercial banks in the U.S.

What is the appropriate magnitude of debt of nonfinancial sectors in the United States (household, business, government)?

What share of debt is attributable to each sector?

What is the approximate magnitude of U.S. household mortgage debt?

From the problem set: The real return on a market portfolio of stocks has tended to be

about how many percentage points higher than the return on a short-term government bond?

For all these, I just want you to know approximate magnitudes: GDP, about 15 trillion. Maximum level of interest rates 15 to 20 percent around 1980. Short-term government rate today, near zero. Household mortgage debt: Around \$10 trillion. Number of commercial banks, several thousand (around 7,000).