

FUNDING INVESTMENTS
FINANCE 238/738, D. Musto
FIRST TEST, 2/28/05
80 MINUTES / 80 POINTS

Your Name: _____

1. Allied Waste is currently trying to restructure its debt. On 2/22/05 it announced a tender offer and consent solicitation for its bond that matures 1/1/06 and which pays a coupon of 7 5/8. If you tender by the deadline, *and* you vote to remove all the covenants, *and* the vote passes, then you get \$1031.89, plus accrued interest, per \$1000 face value of the bond.
- a. (5 pts) Here are the prices of two Treasury securities maturing 12/31/05: a 1 7/8 coupon note, and a STRIP:

Coupon	Bid	Ask
1 7/8	98:31	99:00
0	97:13	97:14

Assuming everyone tenders, how does the cost to Allied Waste of retiring the bond this way compare to the cost of defeasing the bond? (*don't worry about accrued interest, since that would just wash out of the comparison anyway*).

Answer: To defease a Bond, a company assembles a portfolio of treasury bonds, the payments from these treasury bonds will pay off the existing Bond. On each coupon or principal date of the Bond, the portfolio pays the scheduled payment. Must construct a portfolio using the two STRIPS such that

$$XC_1 + (1-X)C_2 = C_3.$$

Where:

$$C_1 = 1.875$$

$$C_2 = 0$$

$$C_3 = 7.625$$

$$X = (C_3 - C_2) / (C_1 - C_2)$$

$$X = (7.625 - 0) / (1.875 - 0) = 4.06667$$

$$1 - X = -3.066667$$

Buy 4.06667 of the 1 7/8% Note at 99:00 (Ask)

Sell 3.06667 of the Strip at 97:13 (Bid) [Note: 97:13 = 97.40625]

Cost of buying 1 7/8% Note = \$4,026

Proceeds from Selling Strip = \$2,987.125

Difference = \$1,038.875

[Note: The question asks for solution in terms of \$1,000 of face value so the prices should be in terms of \$1,000 face value]

Cost to Defeas the bond (\$1,038.875) > Cost to retire bond in tender (\$1,031.89)

Down branch at time 1 (Stock price \$16)

Denote the replicating portfolio by $n_{1,d}$ and B respectively.

Matching the desired payoff structure yields:

$$20n_{1,d} + B*1.05 = 0$$

$$12n_{1,d} + B*1.05 = 4$$

Solving the pair of equations yields

$$n_{1,d} = -0.5$$

$$B = 9.524$$

The price of the put option is given by

$$P_{1,d} = -0.5*16 + 9.524 = 1.524$$

Initial price at time 0 (Stock price \$20)

Denote the replicating portfolio by $n_{0,d}$ and B respectively.

Matching the payoffs of the assets

$$24n_{0,d} + B*1.05 = 0$$

$$16n_{0,d} + B*1.05 = 1.524$$

Solving the pair of equations yields

$$n_{0,d} = -1.524/8 = -.1905$$

$$B = 4.354$$

The price of the put option is given by

$$P_{1,d} = -0.1905*20 + 4.354 = \$0.544$$

- b. (5 pts) If you replicate the payoff of this option by trading the stock and the bond, how many shares will you buy or sell, net of what you already hold, in one year if the stock goes to 16?

Your replicating portfolio at time 0 has -.1905 stocks in it. If the stock price declines to \$16, the new replicating portfolio requires you to hold -0.5 stocks. Therefore, you would sell -.3095 stocks at time 1 in the down branch

Scoring Rules:

a) Correct solution using the replication of the put - 5 points

Correctly pricing a call, and accurately applying put call parity to price the put, -5 points

Pricing a similar call option only -3 points

Logical errors in either the computation of the option prices or the application of put – call parity lead to lower scores.

b) Computation of change in position using the replicating strategy for a put option, -5 points

Computation of change in position using the replicating strategy of a similar call option (This also happens to yield the correct answer) - 4 points.

Other solutions were allocated less points.

3. (10 pts) A car maker is issuing bonds to finance its future production, which will cost 100. After it sells the bonds, it will choose between two models to develop: a sport-utility vehicle (SUV), and a minivan. The repayment of the bond will come from the car maker's revenues from the model it chooses, which depend on whether gas prices turn out to be high (H), medium (M) or low (L), which each have probability 1/3:

<i>Gas Price:</i>	H	M	L
SUV	40	90	160
Minivan	120	110	90

Everybody is risk-neutral, and the discount rate is 0. The car maker is considering issuing a bond with face value 100; if this bond sells for less than 100, the car maker pays in the difference. Would this be profitable for the car maker? If not, what is a face value that *would* be profitable?

Part 1 (5 points)- Will the project be profitable if the Equity holders have to finance the portion of debt not financed by debtholders

Calculate payoff to Debt and Equity holders (2 points to calculate value for debt and equity holders for SUV, 2 for minivan)

SUV

	High	Medium	Low	E(v)
Debt holder payoff	40	60	100	76.6
Equity payoff	0	0	60	20

Minivan

	High	Medium	Low	E(v)
Debt holder payoff	100	100	90	96.6
Equity payoff	20	10	0	10

With $FV = 100$, car maker will chose SUV, but debt holders know this and they will pay 76.6 for the debt so the equity holders have to pay 23.3. Now $23.3 > 20$ so cost > Expected payoff so nothing will happen (1 point for conclusion)

Part 2 (5 points) – What face value makes debt profitable?

Calculate the value of debt to make the equity holder indifferent to payoff on minivan and SUV (3 points)

Value of debt = 70

Conclusion for value of debt below 70 the venture will be profitable. (2 points)

4. The supermarket chain Winn Dixie filed bankruptcy on 2/21/05.
- a. (5 pts) The *Wall Street Journal* reports that, at the same time it filed, Winn Dixie announced a new \$800MM credit line from Wachovia. Also, Winn Dixie now plans to terminate the leases on two warehouses and 150 stores it previously closed, thereby shaving \$60MM from annual expenses. Furthermore, it will sell its manufacturing businesses. Winn Dixie should have done these things before, when they would have helped *avoid* a bankruptcy filing. Discuss.

Answer: A successful answer to this question will focus on the fact that Winn Dixie could not have effectively achieved any of these events if the Company had NOT filed for bankruptcy. Major issues to consider include:

- *DIP Financing is only available after a company files for bankruptcy because the court allows new financings to have super-priority status. As a result, banks that would not lend to a company on the verge of entering bankruptcy will be more likely to fund a DIP loan because the bank is more confident it will be repaid in full.*
 - *Asset sales can be effected free of hidden liabilities in bankruptcy so buyers may be more willing to buy those assets than they would be outside of the bankruptcy process. Also, the sale of assets in bankruptcy tends to be a more orderly process than selling the assets in a rush to avoid bankruptcy. Additionally, if the assets are sold prior to filing for bankruptcy at a price below market value, those sales could be deemed as “fraudulent conveyances”*
 - *Termination of leases can be achieved more effectively in bankruptcy than out of bankruptcy. The filing Company can choose to reject the lease in which case the company stops making payments, and the owner repossesses the property. Although the owner can sue for damages, those damages are capped at the maximum of a) one year’s rent, and b) 15% of the remaining rent for a maximum of three years. In the K-Mart example, the ability to “cancel unfavorable leases” was a major consideration in that company’s bankruptcy filing.*
- b. (5 pts) The *Journal* further reports that Winn Dixie had recently been downgraded by rating agencies, and vendors subsequently tightened credit. What concerns would the vendors have had?

Answer: Creditors will be increasingly concerned about the ability of the Company to repay its obligations in the event of a liquidation. However, in addition to the increased likelihood of default, when Winn Dixie files for bankruptcy the court may choose to look back at recent payments made and if those payments are classified as preference

payments the court may choose to have those payments reversed. “Creditors (with some exceptions) that received value from the debtor in the 90 days before the filing date must pay the value back into the bankrupt estate. The idea is that these payments are preferences – the company gave some creditors preference over others by paying them off before filing, and thereby letting those creditors avoid taking a haircut like all the other creditors. One of the exceptions to the preference-reversal rule is payments made on a Cash on Delivery, or COD basis”

5. You are a market maker for a biotech stock, and you know the issuer will announce tomorrow whether the trial for their latest drug was successful or not. If it was successful then the stock will be worth 55, and if it isn't, it will be worth 40. According to public information, which is all you have, the probability of each outcome is $\frac{1}{2}$. You have to post a bid and an ask for the stock, and you know that the next trade will come from one of nine traders, with equal probability (i.e. the probability that the trade came from any given trader is $\frac{1}{9}$). Among these nine traders are four hedge-fund managers, who already know whether the trial was successful, and five dentists, who don't know any more than you know.

- a. (5 pts) What bid and ask do you post?

$$(47.5 - A) * \frac{5}{9} + (55 - A) * \frac{4}{9} = 0$$

$$(B - 47.5) * \frac{5}{9} + (B - 40) * \frac{4}{9} = 0$$

Solving the above pair of equations yields

$$A = 50.833$$

$$B = 41.167$$

- b. (5 pts) The finance minister of New Zealand recently said,

“When coupled with research showing an enforceable insider-trading regime can increase market liquidity, the need to beef up our insider trading legislation becomes very apparent.”

Considering your answer to part (a), do you agree or disagree with the minister's connection between insider trading and liquidity? Explain.

I agree with the minister's connection between insider trading and liquidity. When there is high levels of insider trading, market makers protect themselves from potential losses incurred from trading with insiders by setting a big bid-ask spread. The high bid-ask spreads impose a high cost of trading, and deter would be investors, leading to fewer transactions and lower liquidity. Reducing the level of insider trading will help lower bid ask spreads, and increase liquidity in the marketplace

6. On 2/24/05, Bloomberg News reported that the general repo rate was 2.54%, but the repo rate for the current 2-year note, which matures 1/31/07, was 0.40%.
- a. (5 pts) On 2/24/05 you wish to finance your purchase of \$10MM face value of the 2-year using the repo market. You wish to buy on 2/24/05 and sell four days later. The invoice price is \$9,958,218 at the bid and \$9,961,343 at the ask, and the repo market requires 2% margin: security value = 102% of loan amount. How, in dollars, does the specialness of the note affect your financing cost?

Solution

$(\text{Invoice bid} / \text{security value}) * (\# \text{ of days} / 360) * (\text{general repo rate} - \text{special repo rate})$

$$(9,958,218 / 1.02) * (4 / 360) * (2.54\% - .4\%) = \$2,321.41$$

Therefore, you save \$2,321.41 in financing costs due to the specialness of the note by paying less interest to your repo counterparty.

- b. (5 pts) On 2/24/05, the 2-year note was near the end of being the current 2-year, because the Treasury issues a new 2-year at the end of each month. How might this relate to the repo rate we observe?

Answer: Treasuries become increasingly scarce for repos during the time they are on the run, because the initial buyers (e.g. investment banks) at the auction sell to longer-term investors (e.g. pension funds) that are not major participants in repo. There is still demand to short the Treasury, and thus demand to borrow treasuries outstanding. However, the lending supply (i.e. the number of treasuries available to be lent) goes down as the scarcity increases and therefore lending prices go up. Therefore, it becomes expensive to short the security and the cost of this scarcity is borne by the shorter through lower interest earned on the loan it makes to the security lender. This security was at the end of being on the run, so its specialness was high. The specialness would disappear after this Treasury is no longer on the run.

7. Last week, Lions Gate Entertainment raised \$150MM by selling a convertible bond. It matures 3/15/25, pays a 3 5/8% coupon, becomes callable at par as of 3/15/12, and \$1000 face value is convertible into 70.0133 shares of Lions Gate. At the time the convertible was issued, the shares were trading for \$10.35 each.
- a. (3 pts) What is the conversion premium?
- b. (4 pts) This issuance is wise because it allows Lions Gate to pay a below-market coupon for seven years, and then sell equity above today's price. Agree or disagree? Explain.
- c. (3 pts) In its press releases, Lions Gate admits that its brand name is synonymous with original, daring, quality entertainment in markets around

the globe. Does their decision to make this bond convertible increase or decrease their incentive to be daring in the future? Explain.

Solution

a (3 points) *Premium calculation*

$$1000/(70/3) = \$14.283$$

$$\text{Premium} = (14.283 - 10.35)/10.35 = 1.38 \text{ (38\% premium)}$$

b (4 points) *Disagree (2 points). Explanation (2 points). It is a variant of the 50% fire insurance*

story. The key is that they observe that the statement in 7b ignores the downside possibility. Your shares go down, and you will wish you had sold equity at the earlier higher price, rather than have this bond on your balance sheet.

c (3 points) *Convertible bonds decrease firms desire to be daring (volatile). So by issuing such a bond it has decreased their incentive to be daring in the future.*

8. (10 pts) Tower Semiconductor announced recently that its bank lenders had waived its non-compliance with financial ratios and covenants, rather than declare its \$497MM loan in default and demand immediate repayment. Tower Semiconductor's public debt is a \$27MM bond, and the current market value of its equity is \$60MM. Does this capital structure make the banks' decision more or less surprising? Explain.

**** *For full credit on this question (at a minimum), there needed to be a clear reference to the actual capital structure (ie: a rough percentage breakdown of the capital structure), a statement saying that the bank's decision is LESS surprising given the firm's capital structure, and an explanation of WHY a high proportion of bank debt makes the bank more likely to grant concessions. *****