

The Johns Hopkins University
The Paul H. Nitze School of Advanced International
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TA Session

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DURATION

1. A one-year, \$100,000 loan carries a market interest rate of 12 percent. The loan requires payment of accrued interest and one-half of the principal at the end of six months. The remaining principal and accrued interest are due at the end of the year.
 - a. What will be the cash flows at the end of 6 months and at the end of the year?
 - b. What is the present value of each cash flow discounted at the market rate? What is the total present value?
 - c. What proportion of the total present value of cash flows occurs at the end of 6 months? What proportion occurs at the end of the year?
 - d. What is the duration of this loan?

HEDGING INTEREST RATES: FUTURES

2. Consider the following balance sheet (in millions) for an FI:

<u>Assets</u>		<u>Liabilities</u>	
Duration = 10 years	\$950	Duration = 2 years	\$860
		Equity	\$90

- a. What is the FI's duration gap?
- b. What is the FI's interest rate risk exposure?

- c. How can the FI use futures and forward contracts to put on a macrohedge?
- d. What is the impact on the FI's equity value if the relative change in interest rates is an increase of 1 percent? That is, $\Delta R/(1+R) = 0.01$.
- e. Suppose that the FI in part (c) macrohedges using Treasury bond futures that are currently priced at 96. What is the impact on the FI's futures position if the relative change in all interest rates is an increase of 1 percent? That is, $\Delta R/(1+R) = 0.01$. Assume that the deliverable Treasury bond has a duration of nine years.

MATURITY

- 3. Consumer Bank has \$20 million in cash and a \$180 million loan portfolio. The assets are funded with demand deposits of \$18 million, a \$162 million CD and \$20 million in equity. The loan portfolio has a maturity of 2 years, earns interest at the annual rate of 7 percent, and is amortized monthly. The bank pays 7 percent annual interest on the CD, but the interest will not be paid until the CD matures at the end of 2 years. The average maturity of deposits is zero years.
 - a. What is the maturity gap for Consumer Bank?
 - b. Is Consumer Bank protected against changes in interest rates? Why or why not?