

### GIVEN INFORMATION

$B(NA) = \$100$	$B(FU) = \$100$	$P(NA) = 0.5$
$P(B NA) = 0.9$	$P(B FU) = 0.7$	$P(FU) = 0.5$
$W(NA) = \$30$	$W(FU) = \$30$	$c = \$11$ *COULD BE GIVEN AS PERCENT LIKE HOMEWORK 7
$P(W NA) = 0.1$	$P(W FU) = 0.3$	$N\pi(s) = 0.01$
		$N\pi(f) = 0.02$
		$FC(F) = \$0.99$

### a) FIND TVs FOR EASIER CALCULATIONS LATER

$$TV(NA) = n(NA)[P(B|NA)B(NA) + P(W|NA)W(NA)] \\ = 1[0.9(100) + 0.1(30)] \\ = \$93$$

$$TV(FU) = n(FU)[P(B|FU)B(FU) + P(W|FU)W(FU)] \\ = 1[0.7(100) + 0.3(30)] \\ = \$79$$

### FIND $MV_{NC}$

$$MV_{NC} = P(NA)TV(NA) + P(FU)TV(FU) \\ = 0.5(93) + 0.5(79) \\ = \$86$$

### FIND $MV_c(NA)$

$$MV_c(NA) = TV(NA) - c \\ = 93 - 11 \\ = \$82$$

### DETERMINE COMMUNICATION PREFERENCE

SINCE  $MV_{NC} > MV_c(NA)$ , NA PREFERS NOT TO COMMUNICATE.

### FIND $\pi(s)$

$$\pi(s) = N\pi(s)MV_{NC} \quad \text{USE PREFERENCE FROM ABOVE} \\ = 0.01(86) \\ = \$0.86$$

### FIND $\pi(f)$

$$\pi(f) = N\pi(f)TV(NA) - FC(F) \\ = 0.02(93) - 0.99 \\ = \$0.87$$

### DETERMINE SECURITIZATION PREFERENCE

SINCE  $\pi(f) > \pi(s)$ , NA PREFERS FUNDING.

### b) GIVEN INFORMATION

$c_1 = \$5$  \*THIS WILL CHANGE  $MV_c(NA)$  AND  $\pi(s)$ .

### FIND NEW $MV_c(NA)$

$$MV_c(NA) = TV(NA) - c_1 \\ = 93 - 5 \\ = \$88$$

### DETERMINE COMMUNICATION PREFERENCE

SINCE  $MV_c(NA) > MV_{NC}$ , NA PREFERS TO COMMUNICATE WITH THE LOWER COST.

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$P(W NA) = 0.1$	$P(W FU) = 0.3$	$N\pi(s) = 0.01$
		$N\pi(f) = 0.02$
		$FC(F) = \$0.99$

### FIND $\pi(s)$

$$\begin{aligned}\pi(s) &= N\pi(s)MV_c(NA) \\ &= 0.01(88) \\ &= \$0.88\end{aligned}$$

### DETERMINE SECURITISATION PREFERENCE

SINCE  $\pi(s) > \pi(f)$ , NA PREFERS TO COMMUNICATE WITH THE LOWER COST.

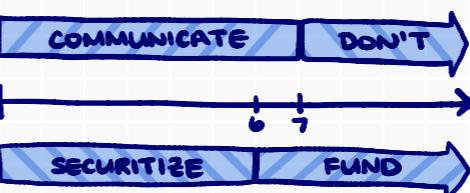
c) BANK IS INDIFFERENT WHEN  $MV_{NC} = MV_c$

$$\begin{aligned}MV_{NC} &= TV(NA) - c^* \\ 86 &= 93 - c^* \\ c^* &= \$7\end{aligned}$$

d) BANK IS INDIFFERENT WHEN  $\pi(f) = \pi(s)$

$$\begin{aligned}\pi(f) &= N\pi(s)MV_c(NA) \\ \pi(f) &= N\pi(s)[TV(NA) - c^{**}] \\ 0.87 &= 0.01(93 - c^{**}) \\ c^{**} &= \$6\end{aligned}$$

e) FROM  $c=0$  TO  $c=7$ , THE BEST OPTION IS TO COMMUNICATE. AND, FROM  $c=0$  TO  $c=6$ , THE BEST OPTION IS TO SECURITIZE.



### Example 11.1

North American Bank has originated a portfolio of loans. North American knows that the aggregate payoff on this portfolio will be \$100 with a probability of 0.9 and \$30 with a probability of 0.1. Suppose investors cannot tell the difference between this portfolio and another portfolio from First United Bank. First United's portfolio has a payoff of \$100 with a probability of 0.7 and \$30 with a probability of 0.3. Investors believe that it could be either portfolio with a probability of 0.5.

Suppose the bank can communicate the true value of its loan portfolio at a cost of \$11 (a signaling cost). North American's net profit from loan origination and servicing is 1% of the true value of the securitized loan portfolio.

If the loans are kept on the books and funded by the bank, the bank's net profit is 2% of the true value of the loan portfolio minus a fixed cost of 99 cents associated with funding.

- (1) Will North American prefer to securitize or fund its loan portfolio?
- (2) Suppose now the communication costs fall to \$5. Will the bank securitize or fund its portfolio?
- (3) Find the communication cost  $c^*$  where the bank is indifferent between communicating and not communicating.
- (4) Find the communication cost  $c^{**}$  where the bank is indifferent between securitizing and funding.
- (5) Beginning at  $c = 0$  to  $c = c^{**}$ , find the values of  $c$  for which choice is best for the bank.