Unit 5
Financing Alternatives

What you will learn:
(1) How to measure the expected dollar cost of a foreign bank loan
(2) How the currency denomination of a loan affects its value
(3) How lending between a company’s divisions affects the cost of a loan
(4) How to exploit differences in tax rates across countries
(5) How to measure the exchange risk involved in international borrowing

The MNC has a variety of available financing alternatives
Each of these has its own distinct expected cost and associated risk
The job of the financial officer is to obtain the cheapest expected after tax dollar cost financing given a certain level of risk

Structure of our MNC

<table>
<thead>
<tr>
<th>Parent Corporation</th>
<th>Subsidiary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Located in US</td>
<td>Located Overseas</td>
</tr>
<tr>
<td>Operates in $</td>
<td>Operates in €</td>
</tr>
<tr>
<td>Under US tax authority</td>
<td>Under Foreign tax authority</td>
</tr>
<tr>
<td>Follows US tax rates and rules</td>
<td>Follows Foreign tax rates and rules</td>
</tr>
<tr>
<td>Owns 100% of subsidiary</td>
<td></td>
</tr>
</tbody>
</table>

(8) types of short term financing
(1) € Loan for Subsidiary
(2) $ Loan for the Subsidiary
(3) € Loan for the Parent Corporation
(4) $ Loan for the Parent Corporation
(5) Intracorporate loan - Parent Loans the subsidiary $
(6) Intracorporate loan - Parent Loans the subsidiary €
(7) Intracorporate loan - Subsidiary Loans the parent €
(8) Intracorporate loan - Subsidiary Loans the parent $

Data for the Unit
(We will use these for the loan types)

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>The subsidiary (located in Germany) needs the current equivalent of $1,000,000</td>
<td></td>
</tr>
<tr>
<td>The current spot exchange rate, denoted $e_0 = 1.4100$/€</td>
<td></td>
</tr>
<tr>
<td>The future spot exchange rate, denoted $e_1</td>
<td></td>
</tr>
<tr>
<td>The US tax rate applicable to the US MNC, denoted $t_{US} = 0.30</td>
<td></td>
</tr>
<tr>
<td>The Foreign tax rate applicable to the US MNC’s overseas subsidiary, denoted $t_f = 0.40</td>
<td></td>
</tr>
<tr>
<td>The cost of $ funds for the US parent corporation, denoted $i_{us} = 8% $</td>
<td></td>
</tr>
<tr>
<td>The cost of foreign funds for the US MNC’s overseas subsidiary, denoted $i_f = 9%</td>
<td></td>
</tr>
<tr>
<td>The internal interest rate for intracorporate loans, denoted $i_T = 8% \leq i_T \leq 9% $</td>
<td></td>
</tr>
</tbody>
</table>
Example 1
Euro Loan to Sub
(with unit data)

After Tax Dollar Value = $1,000,000 - 747,518 €

Example 2
Sub Borrows $
(with unit data)

Pay-off Diagram
Example 1 Euro Loan to Sub

Column Format from Tutorial
Euro Loan to Sub

(2) $ Loan for the Subsidiary
(General Notation)

(1) Beginning $ value of loan principal
(2) Ending $ value of loan principal
(3) $ Value of interest paid
(4) Tax deduction on interest paid
(5) Tax owed (or credit received) on capital gain (loss) on loan principal
Column Format From Tutorial

$ loan to Sub

| $ loan to Sub | $ balance | €  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Sub gets initial loan balance $1,000,000:

(2) Sub pays back principal balance -$1,000,000 ( -$1,000,000 ) / €1

(3) Sub pays US interest -$80,000 ( -$80,000 ) / €1

(4) Sub gets tax reduction for interest paid $32,000 ( $32,000 ) / €1

(5) Sub has tax adjustment exchange gain/loss on loan principal $40,000 - 283,688

The after tax dollar value of the loan is equal to $352,000 - 283,688

Pay off Diagram

$ loan to Sub

<table>
<thead>
<tr>
<th>After Tax Dollar Value</th>
<th>Break Even Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>$352,000</td>
<td>$1.2408 $/€</td>
</tr>
</tbody>
</table>

Comparing the Two Financing Alternatives

<table>
<thead>
<tr>
<th>After Tax Dollar Value</th>
<th>Break Even Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0</td>
<td>$1,000,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Break Even Point</th>
<th>$1.3378 $/€</th>
</tr>
</thead>
</table>

Recall CIP

- By Covered Interest Parity, the forward rate would be
  
\[
\left( \frac{1.08}{1.09} \right) \times 1,4100 \text{ $/€} = 1,3971 \frac{ $}{€}
\]

- This is the same exchange rate that equates the after tax dollar values of the two loan alternatives
- The implication is that if the loans are hedged with a forward contract and made riskless, then the after tax dollar value would be the same.

Note both loans are risky

- The riskiness of the loan is reflected in the slope of the line in the payoff diagram; steeper slope = riskier loan.
- Even the dollar loan has exchange risk
  - This results from the fact that the subsidiary calculates its books in euros for tax purposes
  - Changes in the euro value have euro tax consequences which changes dollar values

Self Check

- The subsidiary (located in Germany) needs the current equivalent of $500,000
- The current spot exchange rate, denoted $e_0 = 1.4800 $/€
- The future spot exchange rate, denoted $e_1$
- The US tax rate applicable to the US MNC, denoted $t_{us} = 0.35$
- The Foreign tax rate applicable to the US MNC's overseas subsidiary, denoted $t_f = 0.20$
- The cost of $ funds for the US parent corporation, denoted $i_{us} = 6\%$
- The cost of foreign funds for the US MNC's overseas subsidiary, denoted $i_f = 5\%$
• $500,000 -351,351€ = $76,649 -67,568€
  \[ e1=1.4941 $/€ \]

Break Even Point

- $500,000
- $700,000
- $0

$ Loan to subsidiary

\[ e1=1.4941 $/€ \]

(3) Local Currency Loan for the Parent Corporation

(1) Initial $ value of the LC loan principal
(2) Ending $ value of the loan at repayment
(3) $ Value of the interest
(4) $ Value of the tax “credit” on interest paid
(5) Taxes owed (or credit received) on capital gain (loss) on principal

Example 3
Euro Loan to Parent

\( 0.09 \times 709,220€ \)
\( 0.30 \times 63,830€ \)

Parent

$1,000,000

709,220€

19,149€

(1)

(2)

(3)

(4)

(5)

Column Format from Tutorials
Euro Loan to Parent

Parent gets initial loan balance $1,000,000 709,220€
Parent pays back principal balance -709,220€
Parent pays German interest -63,830€
Parent gets tax reduction for interest paid + 19,149€
Parent gets tax adjustment for exchange gain/loss -$300,000 + 212,766€

The After tax $ value of the loan is equal to $700,000 -541,135€

Payoff Diagram
Euro Loan to Parent

After Tax Dollar Value

$700,000

Break Even Point

1.2936 $/€

Example 4
$ Loan for the Parent Corporation

-\( ($balance)(i_us)(1-t_us) \)

-\( -$1,000,000(0.08)(1-0.30) = -$56,000 \)
Payoff Diagram
$ Loan for Parent

Comparing the Two Financing Alternatives

Self Check 2
- The parent needs the current equivalent of $700,000
- The current spot exchange rate, denoted e_0 = 1.4800$/€
- The future spot exchange rate, denoted e_1
- The US tax rate applicable to the US MNC, denoted t_{us} = 0.35
- The Foreign tax rate applicable to the US MNC’s overseas subsidiary, denoted t_f = 0.20
- The cost of $ funds for the US parent corporation, denoted i_{us} = 6%
- The cost of foreign funds for the US MNC’s overseas subsidiary, denoted i_f = 5%

(5) Intracorporate loan - Parent Loans the subsidiary $

Example 5
Parent Loans Sub $
(6) Intracorporate loan - Parent Loans the subsidiary €

1. Parent "borrows" dollars
2. Parent converts to LC and loans subsidiary LC
3. Subsidiary pays back LC
4. Parent pays back LC
5. Subsidiary pays parent interest at a rate IT
6. Parent pays US bank interest
7. Parent receives tax "credit" for interest paid
8. Parent pays tax on interest earned
9. Subsidiary receives a tax "credit" on interest paid
10. Tax owed (or credit received) on capital gain (loss) on loan principal

The After tax $ value of the loan is equal to $244,000 - 206,383€

Example 6

€ Loan : Parent to Sub

Column Format from Tutorials

€ loan : Parent to Sub

Payoff Diagram

€ Loan : Parent to Sub

After Tax Dollar Value

Break Even Point

= 1.1823 $/€

After tax dollar value = $244,000 – 206,383€

Column Format from Tutorials

$ loan : Parent to Sub

Payoff Diagram

$ Loan : Parent to Sub

After Tax Dollar Value

Break Even Point

= 1.2443 $/€

After tax dollar value = $353,000 - 283,688€
Comparing the Two Financing Alternatives

Choosing the Intracorporate Loan Terms

- How to set the transfer interest rate?
  - Driven by the relative taxes in the two countries
  - Tax arbitrage:
    - shift costs to high tax country, shift profits to low tax country
- Examine tax effect of parent charging $1 of interest
  - Parent has additional taxes due for interest earned - $0.30
  - Sub has tax break for interest expense + $0.40
  - Net effect for the company is $0.10
- Company as a whole gains $0.10 for every dollar of interest charged → charge as much interest as possible

• What is the ultimate source of the $0.10 to our company?
  - The Foreign government loses $0.40 in taxes, while the US government gains $0.30 in additional taxes
  - The $0.10 comes at the expense of the foreign tax payers.
    • The foreign government will regulate how high we can set the transfer interest rate.
      - Typically we would have to justify our rate based on the riskiness of the loan

How to choose the Currency Denomination?

• Changing the currency denomination of the loan determines who gets the capital gain/loss adjustment.
  - If the parent charges €, the parent has the adjustment
  - If the parent charges $, the subsidiary has the adjustment

• The denomination we pick depends on
  - Our expectation of the exchange rate move
  - The relative tax rates
• Let’s apply the logic to the last example
  • Assume we expect € to strengthen
    - If parent loans sub €
      • Parent gets back strong €
      • Parent has capital gain
      • Parent taxed at 30%
    - If parent loans sub $
      • Sub pays back with weak $
      • Sub has capital gain
      • Sub taxed at 40%
    - Given our expectations, € loan would be cheaper because the expected gain lands in the low tax country
• Assume we expect € to weaken
  – If parent loans sub €
    • Parent gets back weak €
    • Parent has capital loss
    • Parent gets tax break at 30%
  – If parent loans sub $
    • Sub pays back with strong $
    • Sub has capital loss
    • Sub tax break at 40%
  – Given our expectations, $ loan would be cheaper because the expected loss lands in the high tax country.

Compare the Two Financing Alternatives

<table>
<thead>
<tr>
<th>After Tax Dollar Value</th>
<th>$353,000</th>
<th>$346,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Break Even Point</td>
<td>= 1.1823 $/€</td>
<td>= 1.2443 $/€</td>
</tr>
</tbody>
</table>

Euro Getting weaker

Example 7
Sub Loans Parent €

<table>
<thead>
<tr>
<th>Description</th>
<th>$</th>
<th>€</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Subsidiary gets initial loan balance</td>
<td>$1,000,000</td>
<td>709,220</td>
</tr>
<tr>
<td>(2) Subsidiary loans Euro to parent</td>
<td>$1,000,000</td>
<td>709,220</td>
</tr>
<tr>
<td>(3) Parent pays Euro back to the subsidiary</td>
<td>709,220</td>
<td>€</td>
</tr>
<tr>
<td>(4) Subsidiary pays back principal balance</td>
<td>-709,220</td>
<td>€</td>
</tr>
<tr>
<td>(5) Parent pays subsidiary interest</td>
<td>56,738</td>
<td>€</td>
</tr>
<tr>
<td>(6) Subsidiary pays foreign creditors interest</td>
<td>-63,830</td>
<td>€</td>
</tr>
<tr>
<td>(7) Subsidiary gets tax reduction for interest paid</td>
<td>25,532</td>
<td>€</td>
</tr>
<tr>
<td>(8) The subsidiary has additional taxes for interest income earned</td>
<td>-22,695</td>
<td>€</td>
</tr>
<tr>
<td>(9) The parent gets tax reduction for interest paid</td>
<td>17,021</td>
<td>€</td>
</tr>
<tr>
<td>(10) Parent has tax adjustment exchange gain/loss on loan</td>
<td>$300,000 + 212,766</td>
<td>€</td>
</tr>
</tbody>
</table>

Payoff Diagram
€ Loan : Sub to Parent

After Tax Dollar Value
$700,000

Break Even Point
= 1.2953 $/€
Example 8
Sub Loans Parent $

Add Only Highlighted cells

Comparing the Two Financing Alternatives

Comparing the Two Financing Alternatives

Which Loan?
Value vs. Risk

Withholding Taxes

• Sometimes governments will impose withholding taxes on interest paid to foreigners
  – The governments are trying to encourage firms to use home country banks
  – The withholding taxes have the effect of making the foreign loan artificially more expensive

Withholding tax Example 1

• Parent Corp borrows the equivalent of $1,000,000 in € from a German bank
• The current spot exchange rate, denoted \( e_0 = 1.4100 $/€ \)
• The future spot exchange rate, denoted \( e_1 \)
• The US tax rate applicable to the US MNC, denoted \( t_{us} = 0.30 \)
• \( i_{us} = 8\% \)
• \( i_f = 9\% \)
• The US government imposes a 20% (non-income tax deductible) withholding tax on interest paid to foreigners

\[ \text{After Tax Dollar Value} \]

\[ \text{Break Even Point} \]

\[ \text{€ Loan sub to parent} \]

\[ \text{$ Loan sub to parent} \]

\[ \text{€ beats on Value} \]

\[ \text{€ beats on Risk} \]

\[ \text{Depends on risk aversion} \]
Withholding tax Example 1 cont. (Non-Income tax deductible)

1. Parent gets initial loan balance $1,000,000 - 709,220 €
2. Parent pays back principal balance -709,220 €
3. Parent pays German interest -63,830 €
4. Parent gets tax reduction for interest paid + 19,149 €
5. Parent gets tax adjustment for exchange gain/loss -300,000 + 212,766 €
6. Parent pays withholding tax -12,766 €

The After tax $ value of the loan is equal to $700,000 - 553,901 €

Withholding tax Example 1 cont. (Income tax deductible)

<table>
<thead>
<tr>
<th>Description</th>
<th>Value in €</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Parent gets initial loan balance</td>
<td>514,800</td>
</tr>
<tr>
<td>2. Parent pays back principal balance</td>
<td>-799,220</td>
</tr>
<tr>
<td>3. Parent pays German interest</td>
<td>-63,830</td>
</tr>
<tr>
<td>4. Parent gets tax reduction for interest paid</td>
<td>+ 19,149</td>
</tr>
<tr>
<td>5. Parent gets tax adjustment for exchange gain/loss</td>
<td>-300,000</td>
</tr>
<tr>
<td>6. Parent pays withholding tax</td>
<td>-12,766</td>
</tr>
<tr>
<td>7. Parent gets tax reduction for withholding tax</td>
<td>+ 1,318</td>
</tr>
</tbody>
</table>

Effect of Withholding tax

![Effect of Withholding tax diagram]