Session 10

Capital Leases II: Modeling

Multiple Lease Events
Lease Characteristic Array

Last revised: July 6, 2011

Review of last time: Capital Leases I

- Present and Future Value (`PV`, `FV`)
  - Present value of a stream is the equivalent value as a lump sum now
  - Future value of a stream is the equivalent value as a lump sum in the future
- The present (future) value of a sum of streams is the sum of the present (future) values of the streams
- Present Value and Future Value are the basic concepts underlying leases
- Leases have effects on all three financial statements

Capital leases vs. operating leases

- Two basic kinds of leases
  - Capital leases (often used for equipment)
  - Operating leases (often used for facilities)
- Criteria for capital lease
  If any one of these conditions is met, the lease must be treated as a capital lease:
  - Property transfers to lessee by the end of the term
  - Lessee can purchase the property at a discount below fair market value
  - Lease term is ≥ 75% of useful life of property
  - Present value of minimum lease payments is ≥ 90% of fair market value at t=0.
- Accounting differences
  - Operating lease is treated almost like rent
  - Capital lease is treated almost like purchase

Accounting for a capital lease

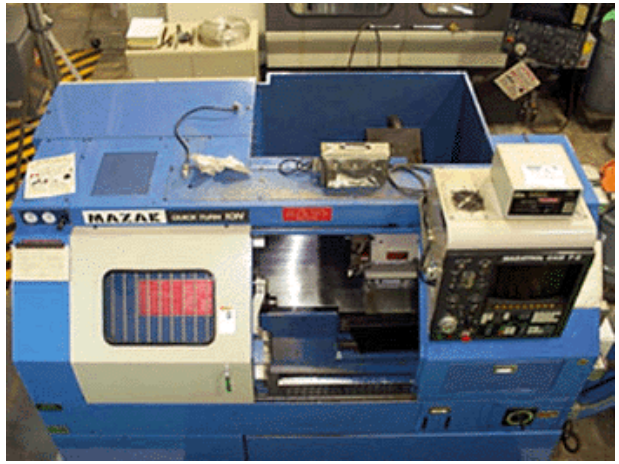
- On effective date of lease contract
  Record a purchase of the asset for the amount of the asset under contract
  - Debit the appropriate asset category
  - Credit a liability of amount of the contract
- On the date of each payment
  - Interest expense = interest amount of the payment
  - Credit liability = principal amount
  - Credit cash = payment amount
- Each accounting period
  - Depreciate the entire asset

Capital lease: one-time event

General Kinematics purchases a coil winder under a capital lease contract. The winder is worth $100,000. The term of the lease is six years, and the interest rate is 9% per year. The useful life of the winder is 6 years, at which time GK is obliged to buy it for $1,500. GK believes that this will be the scrap value of the winder at that time. Lease payments are quarterly.

- Find the lease payment
- Find the quarterly effect on the Income Statement
  - Depreciation expense
  - Interest expense
- Find the quarterly effect on cash flow
- Find the quarterly effect on the balance sheet

◆ Winder



Multiple lease events

- Typical model contains multiple leases
  - Different lease terms (start dates and end dates)
  - Different depreciation schedules
  - Different interest rates
- Often a lease agreement covers a stream of acquisitions over a period of time
- For this case it is most convenient to use a Lease Characteristic Array

Lease characteristic array

- To compute the effects on the three financial statements:
  - Compute the effect of a single lease event
  - Convolve with the stream of lease events

The effects of a single event in the first period are summarized in the Lease Characteristic Array.

- The LCA summarizes the effects on all financial statements of a single lease event
  - Cash outlay
  - Assets
  - Liabilities
  - Depreciation
  - Interest payments
- This approach works for streams of lease events that are subject to identical lease conditions

LCA example

- General Kinematics is expanding
  - You are leasing personal computers for new hires as the company expands.
  - Each PC costs $1200
  - You are given the hiring stream
  - Find the effect on cash flow, capital equipment assets, and depreciation expense
  - Different from previous examples: this time, we lease:
    - Five-year lease term
    - Depreciation five years, straight line
    - Interest rate 9% per year

◆ PC

Using the LCA approach

- Two possible approaches:
  - Combine all equipment of a given lease type before convolving
  - Combine results after convolution
- Convolution is slow
  - Combining after convolution requires multiple convolution computations
  - Combining before convolution is faster because only one convolution is required
- It's better to combine and then convolve

Choose operation order wisely

If two kinds of equipment have the same lease terms, add them first, then convolve.

$$(\text{Equipment Stream 1} \oplus \text{Equipment Stream 2}) \otimes \text{Lease Characteristics} =$$

$$\text{Equipment Stream 1} \otimes \text{Lease Characteristics}$$

$$\oplus\ \text{Equipment Stream 2} \otimes \text{Lease Characteristics}$$

These two approaches yield the same results, but the first is much faster.

Preview of next time: Inventory Modeling

- Inventory modeling is one example of a capacity problem
- Inventory is especially important in businesses that deal in materials, and most especially when interest rates are high
- Cost factors associated with inventory include interest expense, ordering cost, space, shrinkage and other holding costs
- When demand is constant, we can define an Economic Order Quantity (EOQ)