Using @RISK to Forecast Feasibility of a Strategic Expansion: A Case

PALISADE RISK CONFERENCE 201
LAS VEGAS, NEV
10 NOVEMBER 201

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The Case

- **Retail operation in California**
  - two locations – main store and downtown
  - annual sales of $1.2 million in FY2010
- **Opportunity**
  - expand into property next door at downtown location
  - expansion to allow sales of more specialty items
- **Reconstruction of space would cost $150,000**
  - paid entirely out of equity
  - equity would be rebuilt through revenues
The Steps

- Create set of historic financials
  - using percent of sales method
- Organize data on growth rates, cash flow parameters
- Create pro-forma forecast of base financials
  - following percent of sales method
- Forecast revenues and costs associated with project
- Combine base forecast with project forecast
- Perform NPV analysis
- Create @Risk overlay for key inputs and outputs
- Describe results, interpret information, recommend action
The Feasibility Study

- Management needs study
  - forecast of revenues under uncertain economic conditions
  - test management assumptions (growth, impact of expansion)
- Expansion must pay for itself
  - sufficient revenue to recover equity investment?
  - any surprises or unexpected results?
- Management very confident in assumptions
  - does not want a full-blown strategic analysis
- Goal: persuade board to approve investment
Some Problems

- Store is a division of non-profit corporation
- Management reports to board of parent
  - conservative and not focused on profitability
  - not sophisticated in terms of finance, forecasting, or investment
- Use internal data only
- Study cannot resemble a black box
  - how to employ monte carlo analysis?
A Simple (but Effective) Solution

- Focus on pro-forma income statements (simple model)
  - no balance sheets or statements of cash flow
- To justify investment
  - recapture initial investment through net income
  - identify appropriate growth rate and specialty sales levels
  - find conditions for minimum NPV
- Use simple distributions throughout; minimize inputs
- For assumptions:
  - growth – use current and historic data
  - forecast – use percent of sales method
Internal Data Available

- Five years’ historic income statements (audited)
  - FY 2006 through Q3 2011
  - 75 different revenue and expense items
- Known revenues and costs:
  - annual sales and annual specialty sales per square foot
  - existing costs, additional rent, capital expenditures, depreciation, COGS as percent of sales
- Cost of Capital: 4.75% (UST$_{30}$ rate, March 25, 201
- Construction Timing: September 2011 to October 201
Building the Base Forecast Model

- Start with existing line items
- Percent of sales method used
  - calculated each line item with historic average proportion
- Choose conservative growth rate
  - management FY 2011 estimate of 10.1%
  - historic average of 7.6%
- Determine specialty sales levels
Add in New Revenue and Costs

- All additional revenue from one source
  - Specialty merchandise sales in new space
- Three sources for additional costs
  - COGS for new merchandise
  - new lease
  - new depreciation
- Capital Expenditures
Defining the Inputs – Base Growth Rate

- **Growth Rate for Base Forecast**
  - management expects 10.1%
  - used RiskTriang(−7.6%, 3.8%, 10.1%)
    - historic low, half historic average, management rate

- **Resulting expected growth rate of 2.1%**
  - applies to revenues and costs
  - inflation at 2.7% in March 2011 (US DoL CPI)
Simulation of Base Growth Rate

Annual Growth
Triang(-0.0757,0.0378,0.10...)

28....
66....
7.77...
5....

Growth / 2012
Minimum -7.41%
Maximum 10.1%
Mean 2.12%
Std Dev 3.66%
Values 5000

Triang(-
0.07573625679,0.0378
0905863,0.1014)

Minimum -7.57%
Maximum 10.1%
Mean 2.12%
Std Dev 3.66%
Defining the Inputs – Specialty Sales

- **Annual specialty sales per Ft²**
  - management expects $162 per year
  - average annual total sales of $400 per ft²
  - used RiskTriang($2.62, $81, $196)
    - historic low, 50% expected
    - used Goal Seek to set upper bound
  - Resulting expected sales of $93 per Ft²
Simulation of Specialty Sales per Square Foot

Specialty Sales / 20...
Comparison with Triang(2.618653629,81,196.4294404)

- Specialty Sales / 2012
  - Minimum: $3.80
  - Maximum: $195.56
  - Mean: $93.35
  - Std Dev: $39.81
  - Values: 5000

- Triang
  - Minimum: $2.62
  - Maximum: $196.43
  - Mean: $93.35
  - Std Dev: $39.80
**Output – Forecast Net Income**

**Forecast Change in Net Assets**

<table>
<thead>
<tr>
<th></th>
<th>FYE 2012</th>
<th>FYE 2013</th>
<th>FYE 2014</th>
<th>FYE 2015</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>$203,784</td>
<td>$212,602</td>
<td>$221,903</td>
<td>$231,402</td>
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</table>

**Historic Change in Net Assets**

<table>
<thead>
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<tbody>
<tr>
<td></td>
<td>$110,376</td>
<td>$174,757</td>
<td>$189,399</td>
<td>$162,976</td>
<td>$206,751</td>
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Using Net Present Value to Determine Feasibility

- Think of problem in Time Value of Money terms
  - PV = project initial investment ($150,000)
  - FV = terminal value ($160,084 = $7604 ÷ 4.75%)
  - PMTs = annual net income levels (project only)
  - i = Weighted Average Cost of Capital (WACC = 4.75%)
  - n = years in forecast
Using Net Present Value to Determine Feasibility

- All variables known except future cash flows
  - minimum acceptance condition is NPV = $0
  - under that condition, WACC = IRR
  - find minimum cash flows necessary to justify project

- Use Goal Seek
  - define upper estimate for specialty sales; set NPV to $0

- Project Cash Flows (Minimum Necessary)

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<tbody>
<tr>
<td>Net Income</td>
<td></td>
<td>$1,881</td>
<td>$4,331</td>
<td>$5,872</td>
<td>$7,446</td>
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<tr>
<td>TV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$160,084</td>
</tr>
<tr>
<td>Cash Flows</td>
<td>($150,000)</td>
<td>$1,881</td>
<td>$4,331</td>
<td>$5,872</td>
<td>$167,530</td>
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Output Results: Project NPV Profile

NPV Profile

<table>
<thead>
<tr>
<th>Net Present Value</th>
<th>WACC</th>
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<tbody>
<tr>
<td>$40,000</td>
<td>10%</td>
</tr>
<tr>
<td>$30,000</td>
<td>8%</td>
</tr>
<tr>
<td>$20,000</td>
<td>6%</td>
</tr>
<tr>
<td>$10,000</td>
<td>4%</td>
</tr>
<tr>
<td>$0</td>
<td>2%</td>
</tr>
<tr>
<td>($10,000)</td>
<td>0%</td>
</tr>
<tr>
<td>($20,000)</td>
<td>0%</td>
</tr>
</tbody>
</table>
Output Results

- Given minimum cash flow estimates
  - Net Present Value = $0 when WACC = 4.75%
- Of 5000 iterations, 47.2% (2360) result in positive NPV
Interpretation of Results

- Specialty sales are the key to making this work
  - broad range of concern; $93 is good target
- Low growth rate (less than inflation) needed
  - plenty of room for more aggressive growth
- Sufficient net income available to recapture capex
- NPV shows project should work
  - provided specialty sales target can be met
  - fewer than half of iterations met target
Analysis Leads to Strategic Conclusions

- Go ahead with investment
  - average sales per ft\(^2\) are $400
- **Create comprehensive strategic business plan to:**
  - improve likelihood of success
  - thoroughly analyze risks; minimize downside and losses
  - develop marketing strategy for specialty items
  - deliver minimum growth (2.1%) in FY12 and subsequent years
  - develop alternate scenarios and plans for extended recession
  - better analyze and understand competitive environment
  - create and fund reserve account for recaptured capex
Some Useful References

- For building pro-forma forecasts
  - *Financial Models Using Simulation and Optimization*
    Wayne Winston, Palisade Corporation, 1998

- For dealing with political issues
  - “Valuing Life Science Investments Using Simulation,
    Robert Ameo, Palisade Health Risk Analysis Forum, 2010

- Tech Specs
  - iMac, OS X Lion v 10.7.2
  - MS Excel 2010, Windows 7, VirtualBox v 4.1.6
  - @Risk v 5.1.7 Industrial Version
Contact Information

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