FORESTALLING FORECLOSURE
THE STRATEGIC USE OF @RISK TO
A HEALTH CENTER IN FINANCIAL DISTRESS

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The Problem

- Medical center in California
- Secures 30-year $5.1 million mortgage from private banks
- Two loans with average rate of 5.4%
- Loans guaranteed by U.S. Government
- Unexpected decrease in the center’s net income
  - government reimbursements down; numbers of uninsured up
- Monthly P&I too burdensome
  - borrower suspends mortgage payments
  - lenders begin default process
- No one wants foreclosure; how to proceed?
The Project

- Analyze debt situation
- Goals:
  - can borrower avoid default?
  - should the center refinance?
  - how likely is it borrower can resume mortgage payments within the next 12 months?
- Focus on debt capacity from 2010 through 2040
Defining the Situation

- Debt Capacity – Total amount of debt borrower can carry; function of annual income
- Debt Service Coverage – Ratio of Debt Capacity to Annual Principal and Interest Payment
  - bank’s target DSC = 1.25
- What is annual net income necessary to satisfy DSC?

\[
\text{CF for Debt} = \text{Net Income} + \text{Depreciation} + \text{Interest Expense}
\]

\[
\text{DSC} = \frac{\text{Net Income} + \text{Depreciation} + \text{Interest Expense}}{\text{Annual Principal Payment} + \text{Annual Interest Expense}}
\]
## Defining the Inputs

### Known Inputs

- **Depreciation Expense**
  - from Income Statement
  - Straight Line method
  - $343,375 per year

- **Interest Expense**
  - from Amortization Table
  - varies year to year

- **P&I Payments**
  - from Amortization Table
  - $349,530 per year

- **Annual Loan Balance**
  - from Amortization Table
  - Declines year to year

### Unknown Inputs to Test

- **Interest Rate**
  - current rate: 5.423%
  - 6.39% (maximum non-rated muni bond yield, per Delphis-Hanover, February 2010)

- **Term of Debt**
  - current term: 30 years
  - 35 years and 40 years

- **Net Income (aka Change in Net Assets)**
Defining Change in Net Assets

Change in Net Assets

- Seven Years of Audits
  - two years of losses
  - five years of gains
  - low of ($577,250)
  - high of $1,432,720
  - average of $333,430
  - $\sigma$ of $610,015

From Audited Statements

<table>
<thead>
<tr>
<th>Year</th>
<th>Change in Net Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2003</td>
<td>$339,840</td>
</tr>
<tr>
<td>FY2004</td>
<td>$224,338</td>
</tr>
<tr>
<td>FY2005</td>
<td>$(4,055)</td>
</tr>
<tr>
<td>FY2006</td>
<td>$1,432,720</td>
</tr>
<tr>
<td>FY2007</td>
<td>$322,363</td>
</tr>
<tr>
<td>FY2008</td>
<td>$596,053</td>
</tr>
<tr>
<td>FY2009</td>
<td>$(577,250)</td>
</tr>
</tbody>
</table>
The Debt Capacity Model

- Use Evolver to solve for net income in equation:

\[ CF \text{ for Debt} = Net\ Income + Depreciation + Interest\ Expense \]

- Subject to the condition:

\[ 1.25 = \frac{Net\ Income + Depreciation + Interest\ Expense}{Annual\ Principal\ Payment + Annual\ Interest\ Expense} \]

- Repeat calculation for each year of interest
- Calculating the minimum net income needed to service mortgage with DSC of 1.25 for each year
### Determining Debt Capacity

**FINANCIALLY STRUGGLING HEALTH CENTER**  
**DEBT CAPACITY ANALYSIS**

**Using Financial Data for 1 January 2003 through 31 December 2009**

**Debt Capacity**

Provides rough measure of total debt cash flows could support, assuming Debt Service Coverage Ratio of 1.25 times and various amortization periods at current commercial mortgage rates.

**Defined As:** Change in Net Assets Plus Depreciation Expense Plus Interest Expense

#### INPUTS for FY2010

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in Net Assets</td>
<td>$ (185,311)</td>
</tr>
<tr>
<td>Depreciation</td>
<td>$ 343,375</td>
</tr>
<tr>
<td>Interest Expense</td>
<td>$ 278,847</td>
</tr>
</tbody>
</table>

#### Fiscal Year 2010

<table>
<thead>
<tr>
<th>Description</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Flow Available for Debt Service</td>
<td>$ 436,912</td>
</tr>
<tr>
<td>Cash Flow Available for Debt Service with Debt Service Coverage of:</td>
<td>1.25</td>
</tr>
<tr>
<td>Interest Rate:</td>
<td>5.42%</td>
</tr>
<tr>
<td>Term in years</td>
<td>30</td>
</tr>
<tr>
<td>Balance at Beginning of Year</td>
<td>$ 5,173,765</td>
</tr>
</tbody>
</table>
Debt Capacity Results

Minimum Annual Change in Net Asset Needed to Support Remaining Balance on Mortgage Debt

<table>
<thead>
<tr>
<th>Year</th>
<th>Change in NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>$(200,000)</td>
</tr>
<tr>
<td>2015</td>
<td>$(150,000)</td>
</tr>
<tr>
<td>2020</td>
<td>$(100,000)</td>
</tr>
<tr>
<td>2025</td>
<td>$(50,000)</td>
</tr>
<tr>
<td>2030</td>
<td>$50,000</td>
</tr>
<tr>
<td>2035</td>
<td>$100,000</td>
</tr>
<tr>
<td>2040</td>
<td>$150,000</td>
</tr>
</tbody>
</table>
Debt Capacity Results

- Analysis results in unexpected conclusion
  - results raise their own issues
- Negative net income not sustainable economically
  - depreciation is as large as cash flow available for debt service
- Occasional losses should pose minimal threat
- Break even strategy needed
- Question: What is likelihood of minimum net income?
- What is likelihood of satisfying DSC in any given year?
Debt Service Coverage Simulation Using @Risk

- Three variables determine DSC:
  - change in net assets
  - term of debt
  - interest rate

- Would refinancing reduce debt burden?
  - would reducing payments make a difference?

- Refinancing changes
  - mortgage rate
  - annual P&I
  - years on mortgage
Debt Service Coverage Simulation Using @Risk

- Think of problem in Time Value of Money terms
  - PV = principal balance remaining on mortgage debt
  - FV = $0 (fully amortized mortgage)
  - PMT = annual P&I
  - i = mortgage rate
  - n = term remaining on mortgage

- Refinancing affects only PMT, i, and n
- Change in net assets, depreciation, and interest expense determine mortgage debt capacity
  - discounted cash flow approach solving for PV
Debt Service Coverage Simulation Using @Risk

- @Risk simulation inputs:
  - change in net assets
  - term of debt
  - interest rate

- @Risk simulation outputs:
  - change in net assets
  - debt capacity

- Technical Details
  - MacBook Pro, OS X v 10.6.2
  - Parallels Desktop v 5.0.9310
  - Microsoft Windows XP HE 2002 SP3
  - @Risk 5.0
Simulation for 2010 only

Make two runs to refine model
  - small data sample for net income with large $\sigma$ value

Start with uniform distributions for two variables
  - net income ($-577,250$ to $1,432,720$)
  - interest rate (5.42% to 6.39%)

Term variable uses discrete uniform distribution
  - values (30, 35, 40)

Run 1000 iterations to start first simulation
Simulation Results, First Run

Term of Mortgage, Run #1
Duniform((30, 35, 40))

Mortgage Rate, Run #1
Uniform(5.42%, 6.39%)
Simulation Results, First Run

Change in Net Assets, 2010
Uniform(-577250, 1432720)

Debt Capacity, 2010
Simulation Results, First Run

- Term and rate results as expected
- Net Income results exceed −$185,000 roughly 80% of trials
- Debt Capacity results exceed $5.17 million roughly 80% of trials
- Regression shows net income drives results
- Refinancing not useful
- Service existing debt
Debt Service Coverage Simulation Using @Risk

- Fix rate and term at existing values (5.42% and 30 years)
- Use triangular distribution for simulating net income
  - values (−$577,250; $333,429; and $1,432,720)
  - fixes minimum and maximum values
- Run 5000 iterations
Simulation Results, Second Run

Change in Net Assets, 2010
Triang (-577250, 333429, 1432720)

-0.185
1.100

Debt Capacity, 2010

5.17
20.41
Simulation Results, Second Run

Findings

- Net Income results exceed –$185,000 roughly 92% of trials
- Debt Capacity results exceed $5.17 million roughly 92% of trials
- Good (not great) likelihood of that occurring in FY2010
  - situation dire but not hopeless
  - better than foreclosure?
- Refinancing not a practical solution
- Best strategy to service existing debt
Analysis Leads to Strategic Conclusions

- Best solution to continue servicing existing debt
- Negotiate timetable to restart debt service payments with lenders and US government
- Create benchmarks for measuring progress
- Develop comprehensive strategic business plan to:
  - Deliver minimum (breakeven) net income in FY2010 and subsequent years
  - Identify new sources of growth and minimal revenue targets
  - Identify areas for budget cuts and maximum expense targets
  - Create and fund debt service reserve account
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