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?

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

\[
DSC = \frac{Net \text{ Income} + Depreciation + Interest \text{ Expense}}{Annual \text{ Principal Payment} + Annual \text{ Interest Expense}}
\]
# 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
  - $σ of $610,015

<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:

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

- Subject to the condition:

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

- 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**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in Net Assets</td>
<td>$ (185,311)</td>
<td>Solution</td>
</tr>
<tr>
<td>Depreciation</td>
<td>$ 343,375</td>
<td>Straight Line</td>
</tr>
<tr>
<td>Interest Expense</td>
<td>$ 278,847</td>
<td>From Amortization Table</td>
</tr>
</tbody>
</table>

**Fiscal Year 2010**

<table>
<thead>
<tr>
<th>Cash Flow Available for Debt Service</th>
<th>$ 436,912</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Flow Available for Debt Service with Debt Service Coverage of: 1.25</td>
<td>$ 349,530</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Debt Supported by Adjusted Cash Flow</th>
<th></th>
</tr>
</thead>
<tbody>
<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

Change in NA

Year

$200,000
$150,000
$100,000
$50,000
$-
$50,000
$100,000
$200,000

2010 2015 2020 2025 2030 2035 2040
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?
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
Debt Service Coverage Simulation Using @Risk

- 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

Values x 10^-7
Values in Millions

Values x 10^-8
Values in Millions
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

8.4% 86.6% 5.0%

Debt Capacity, 2010

8.3% 86.7% 5.0%

5.17 20.41

8.3% 86.7% 5.0%

Values x 10^-6
Values x 10^8
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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