

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

PALISADE HEALTH RISK ANALYSIS FORUM 2010
SAN DIEGO, CALIFORNIA
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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?

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

$$DSC = \frac{\text{Net Income} + \text{Depreciation} + \text{Interest Expense}}{\text{Annual Principal Payment} + \text{Annual Interest Expense}}$$



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
 - ▶ σ of \$610,015

From Audited Statements

| Change in Net Assets | |
|----------------------|-------------|
| FY2003 | \$339,840 |
| FY2004 | \$224,338 |
| FY2005 | \$(4,055) |
| FY2006 | \$1,432,720 |
| FY2007 | \$322,363 |
| FY2008 | \$596,053 |
| FY2009 | \$(577,250) |



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



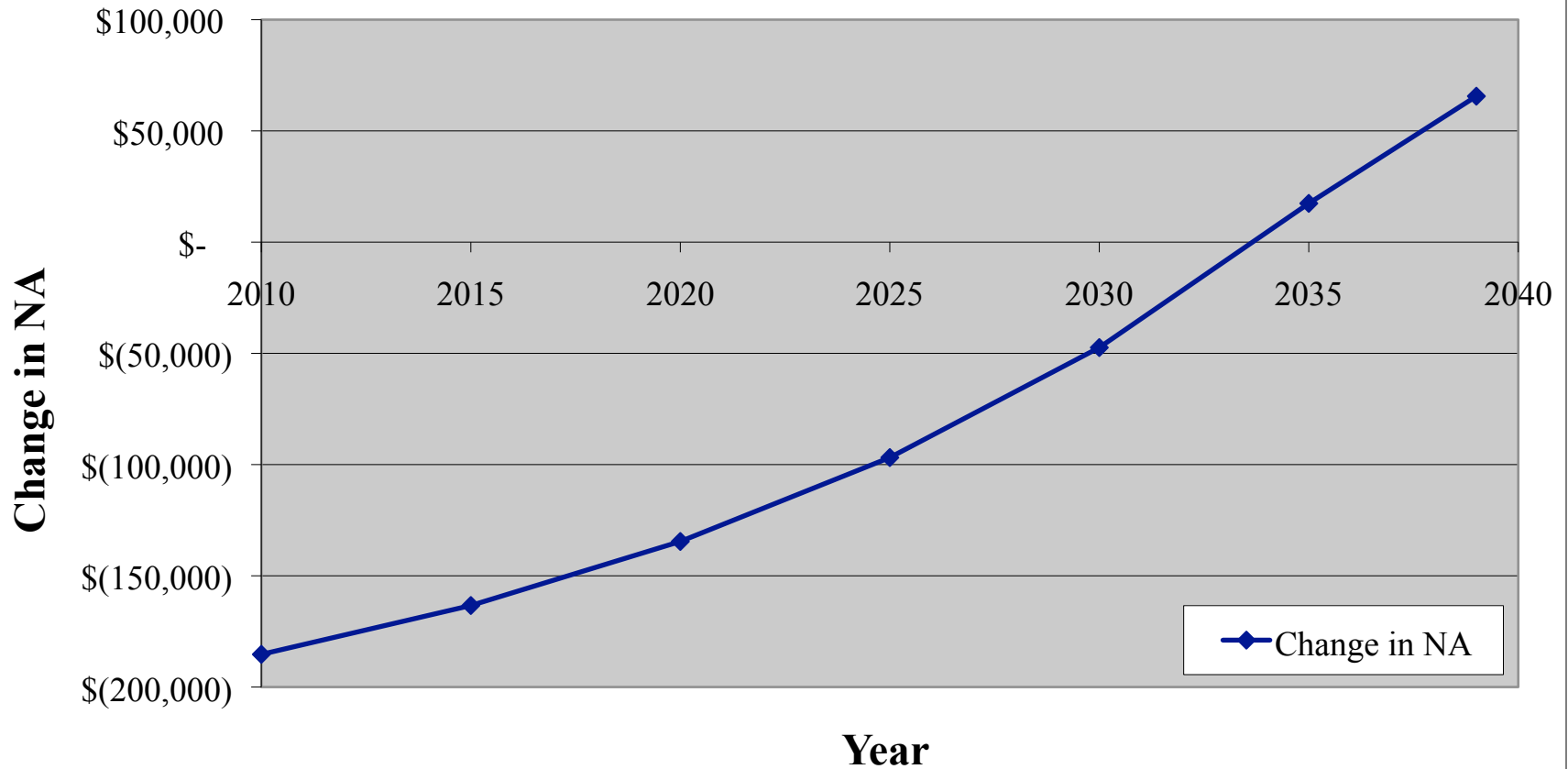
Determining Debt Capacity

| 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 | | | | |
| Change in Net Assets | | | \$ (185,311) | Solution |
| Depreciation | | | \$ 343,375 | Straight Line |
| Interest Expense | | | \$ 278,847 | From Amortization Table |
| Fiscal Year | | | | 2010 |
| Cash Flow Available for Debt Service | | | | \$ 436,912 |
| Cash Flow Available for Debt Service with Debt Service Coverage of: | | 1.25 | | \$ 349,530 |
| Debt Supported by Adjusted Cash Flow | | | | |
| Interest Rate: | | 5.42% | | |
| Term in years | | 30 | | |
| Balance at Beginning of Year | | | | \$ 5,173,765 |



Debt Capacity Results

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



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

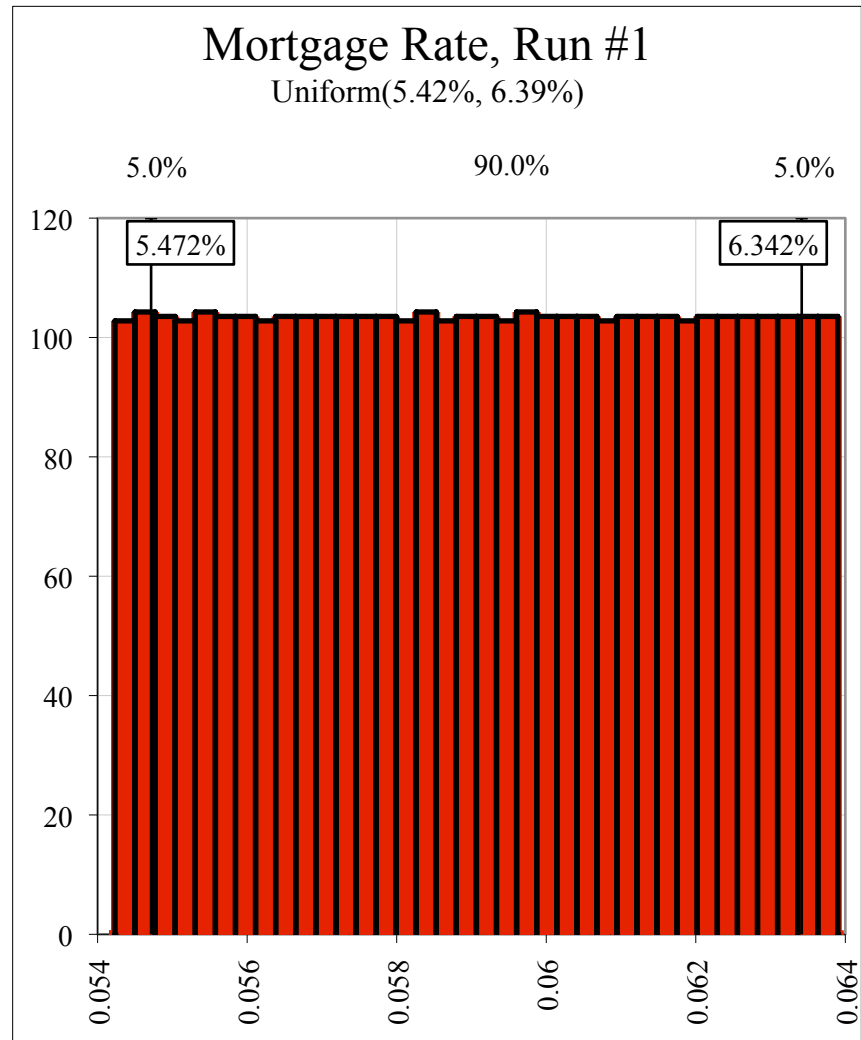
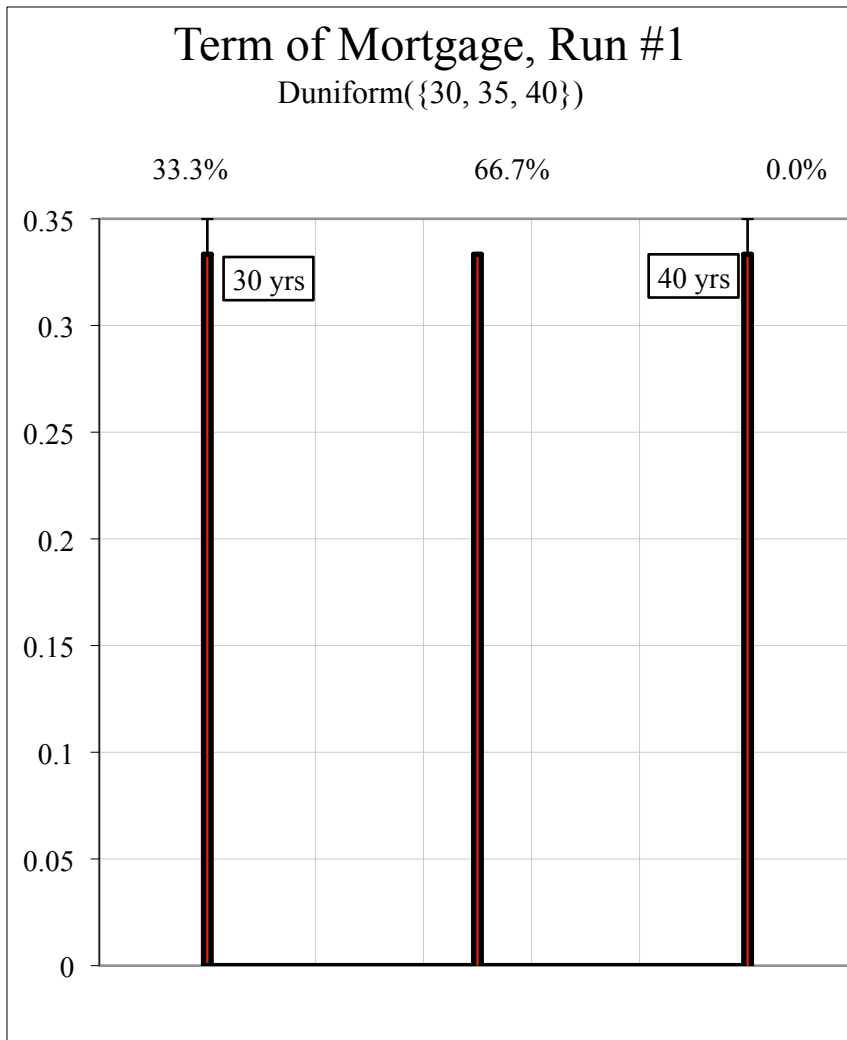


Debt Service Coverage Simulation Using @Risk

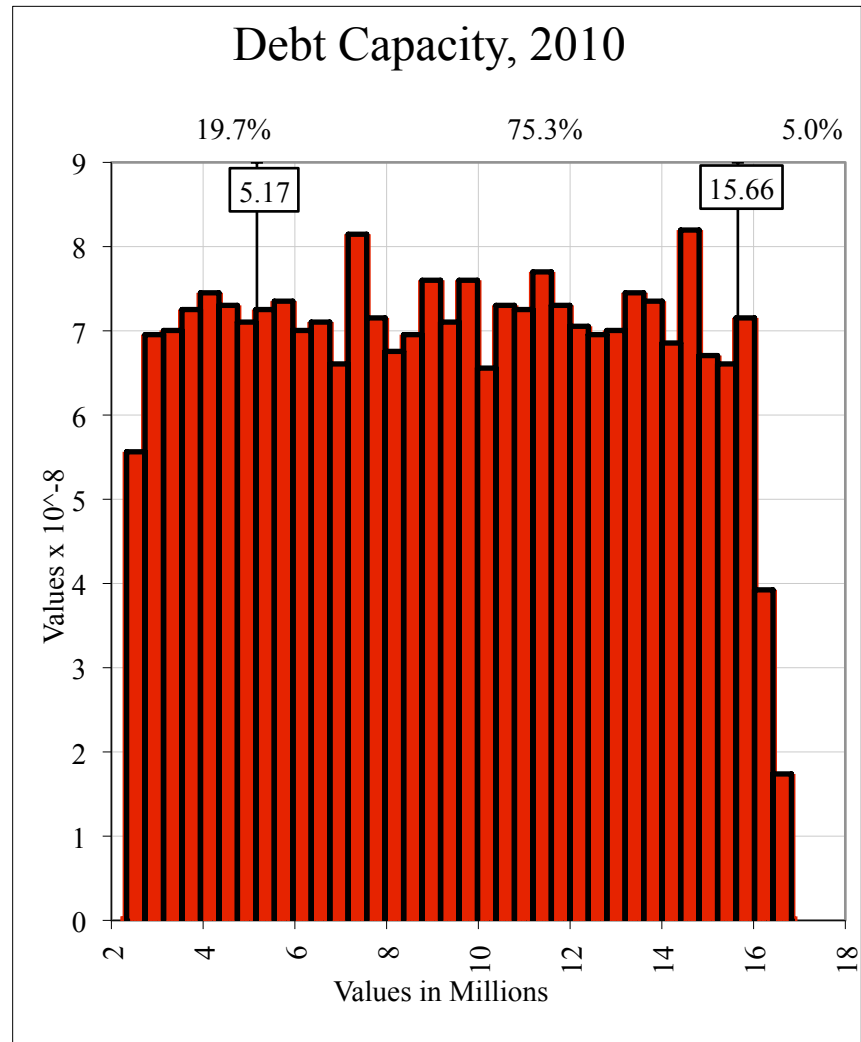
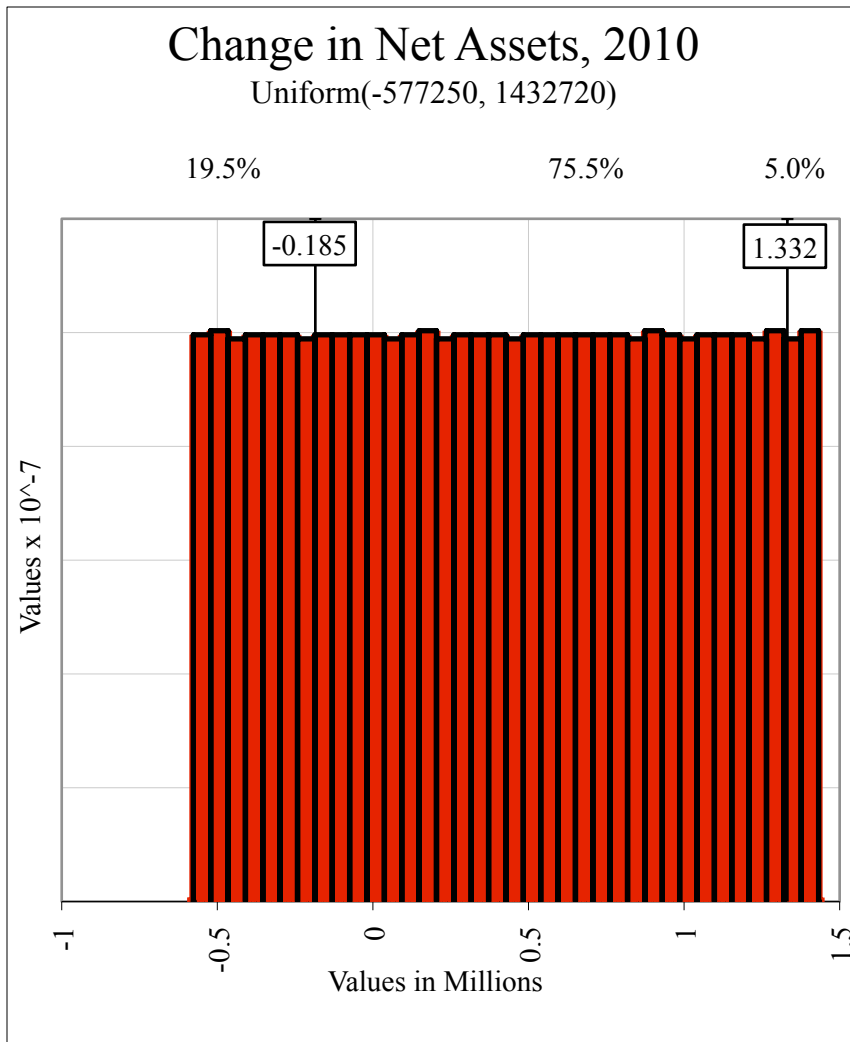
- ▶ Simulation for 2010 only
- ▶ Make three runs to refine model
 - ▶ small data sample for net income with large σ value
- ▶ Start with uniform distributions for two variables
 - ▶ net income ($-\$577,250$ to $\$1,432,720$)
 - ▶ interest rate (5.42% to 6.39%)
- ▶ Term variable uses discrete uniform distribution
 - ▶ values (30, 35, 40)
- ▶ Run 1000 iterations to start first simulation



Simulation Results, First Run

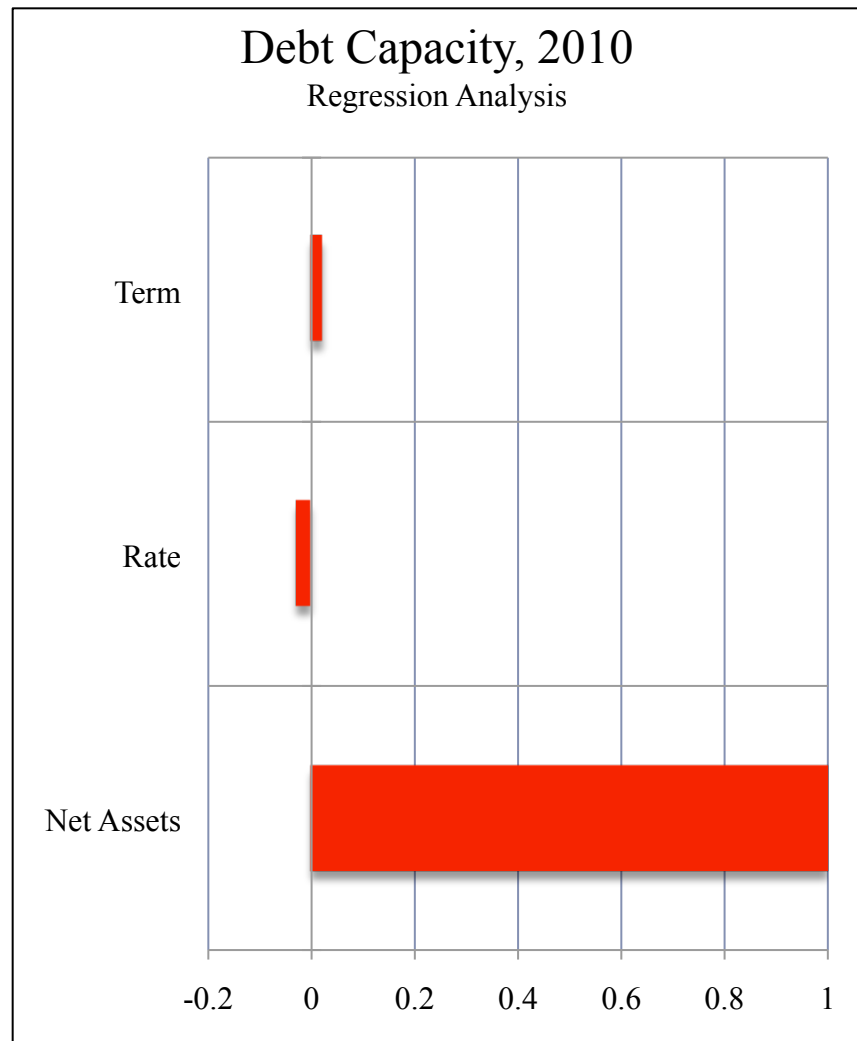


Simulation Results, First Run



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

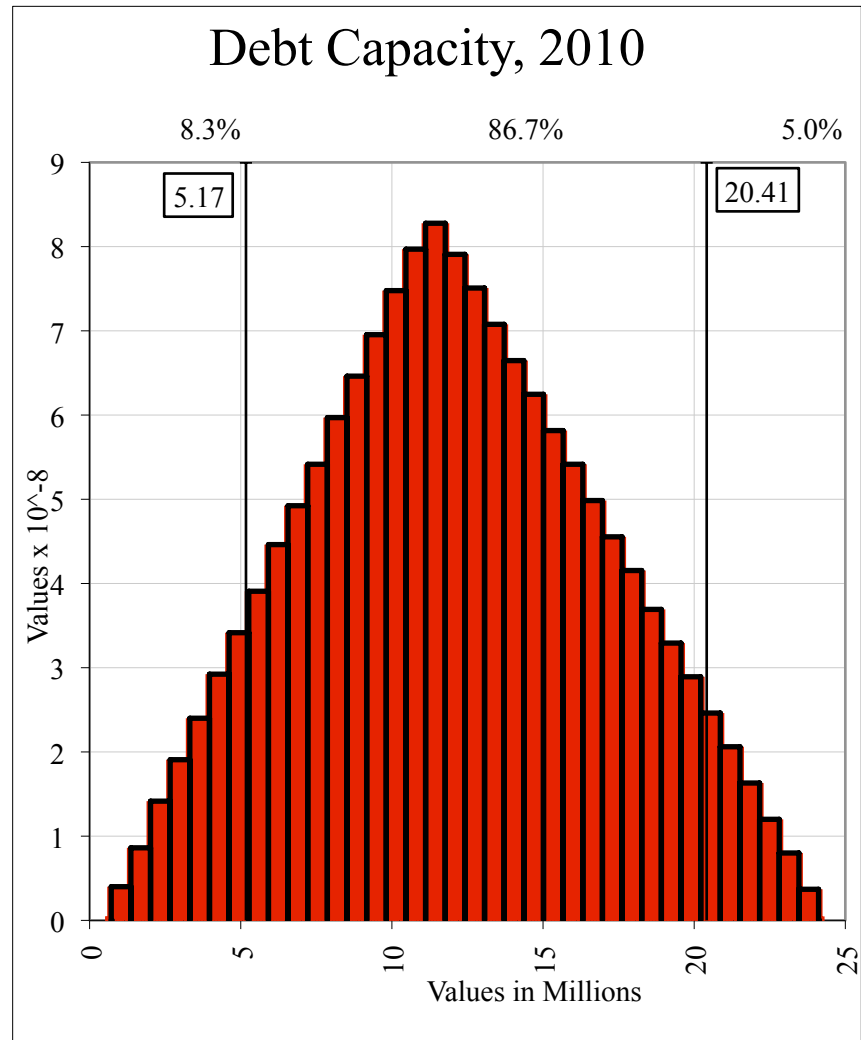
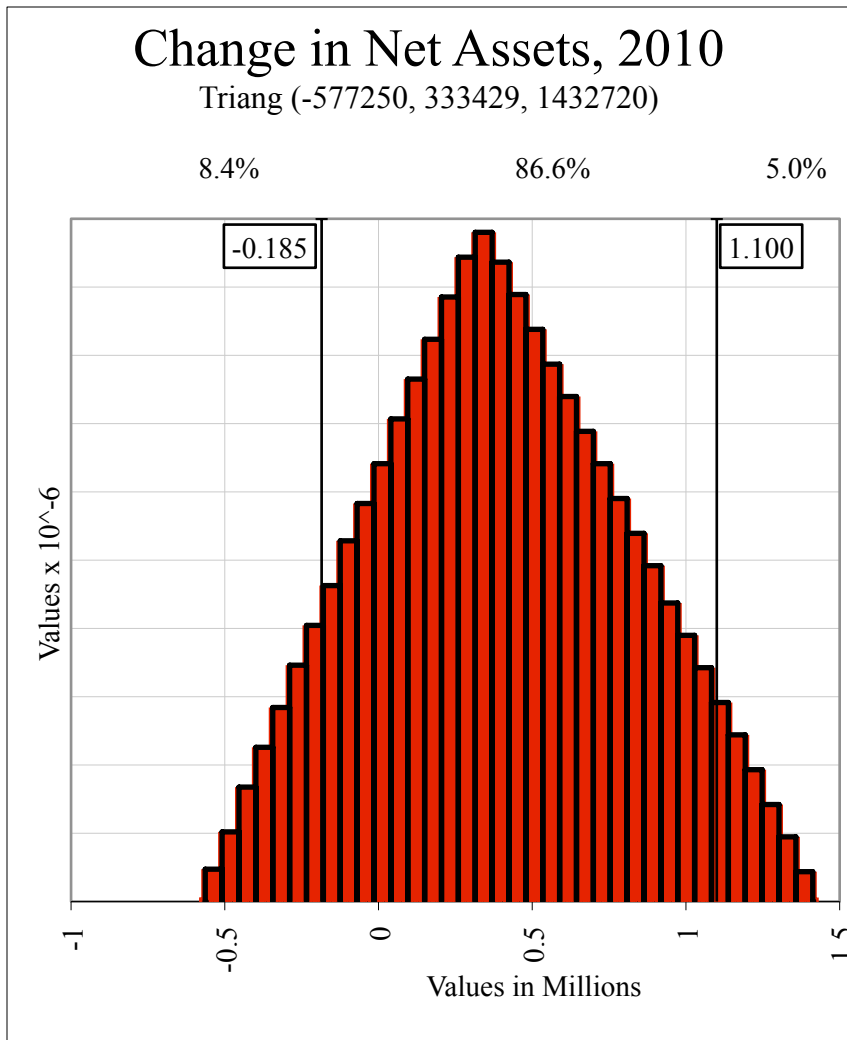


Debt Service Coverage Simulation Using @Risk

- ▶ 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
 - ▶ helps better define σ
- ▶ Run 5000 iterations



Simulation Results, Second Run



Simulation Results, Second Run

Findings

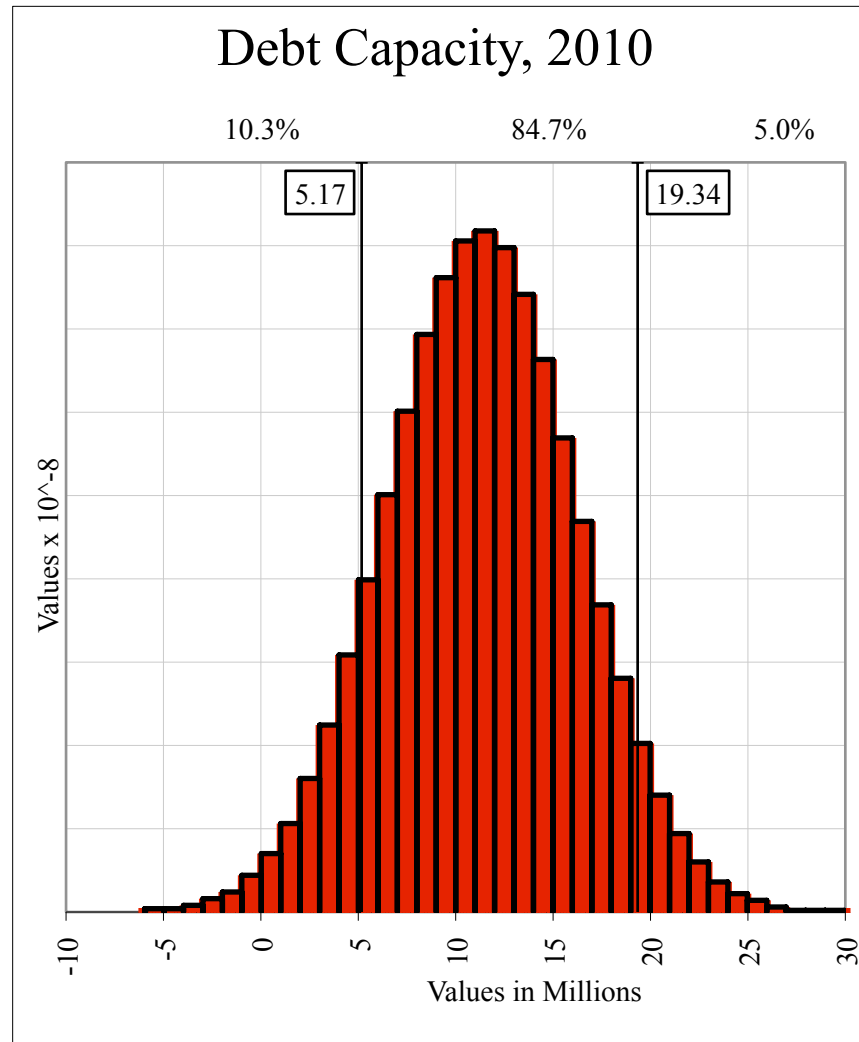
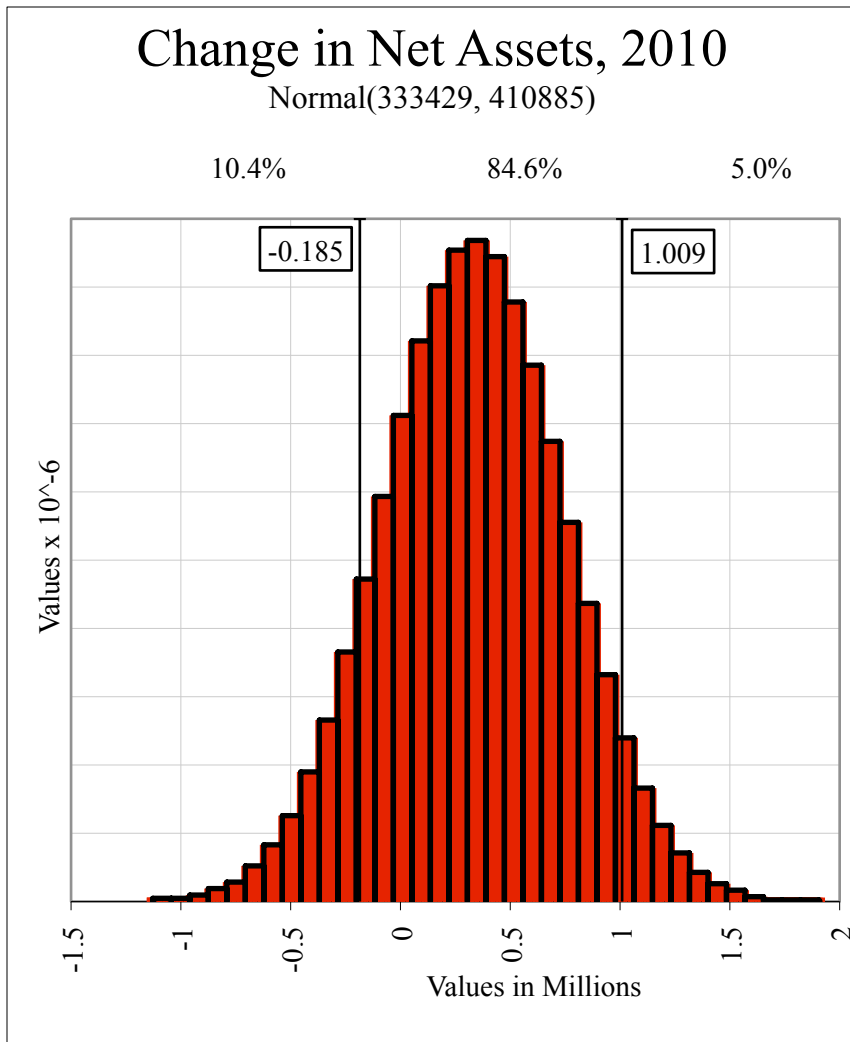
- ▶ Net Income results exceed $-\$185,000$ roughly 92% of trials
- ▶ Debt Capacity results exceed $\$5.17$ million roughly 92% of trials
- ▶ σ for net income = $\$410,885$
 - ▶ $\pm\$1.2$ million v. $\pm\$1.8$ million
 - ▶ more consistent with experience and other forecasts

Changes for Third Run

- ▶ Use normal distribution for net income
 - ▶ $\mu = \$333,429$
 - ▶ $\sigma = \$410,885$



Simulation Results, Third Run



Simulation Results, Third Run

Findings

- ▶ Net Income results exceed $-\$185,000$ roughly 90% of trials
- ▶ Debt Capacity results exceed \$5.17 million roughly 90% 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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