May 16, 2013

Data and computations underlying “Maintaining Adequate Bank Capital” by Mark Flannery

This file supports the excel file data\_for\_Maintaining\_Adequate\_Bank\_Capital.xlsx. It has two sections, the first one lists all variables and the second one describes the process for calculating variables V and Sv.

**Variable names**

PERMNO & PERMCO – unique identification numbers

DATE – date of the end of quarters

mcap – market capital at the time of DATE

name – Bank holding company’s name

quarterindex –Quarters were numbered, with 1986 Q2 being the first one, since only fourth quarters were looked at, populated quarterindex starts with 3 and is in increments of 4.

bhck2170 – book value of assets

bhck3210 – book value of equity

Liabilities – book value of liabilities

stdevRET\_Q\_CAPPED – annualized standard deviation of equity returns capped at . When capping, 5.1% of observations were affected.

rank – each quarter all bank holding companies were assigned rank based on their book value of assets. Bank holding companies with rank of 25 or lower were selected for this paper

V – estimated market value of assets

Sv – estimated market value of the volatility of asset returns

rho – a parameter “rho” that is used when estimating V and Sv

stdevRET\_Q\_pre\_cap – annualized standard deviation of equity return before it was capped. This variable is not used anywhere after stdevRET\_Q\_CAPPED is created

def\_prob\_z – Estimated probability of default during one year

**Calculating estimated market value of assets and standard deviations of returns on assets**

Data that will be needed on individual BHC level:

* Quarters
* mcap, Market Capitalization (shares out \* price)
* BV of TA (bhck2170)
* BV of Equity (bhck3210)
* St Dev of returns on equity (annualized but entire last quarter is used)

Add the data in excel.

Create the following columns:

* B, face value of liabilities
* V, market value of TA
* Sv, annualized st devs of returns on assets
* , representing ratio of MV of TA/BV of Liabilities below which bank is liquidated (either 1 or 0.97 is usually used)
* T, length of maturity on liabilities. We assume it to be 1 (year), so can plug in 1 for T
* X =
* E1\_calc = where N( ) is Normdist(0,1, cumulative)
* E1\_calc-mcap
* F3\_calc =
* F3\_calc-Sv
* Eq\_calc-mcap + F3\_calc-Sv

To manually calculate V and Sv (which is the main point of what we’re doing), run the Solver

* Set Objective : Eq\_calc – mcap + F3\_calc – Sv To: Value Of: 0
* By Changing Variable Cells: V, Sv
* Subject to the Constraints F3\_calc – Sv = 0
* Check Make Unconstrained Variables Non-Negative
* Select a Solving Method: GRG Nonlinear
* Options:
  + Constraint Precision: 0.000001
  + Do not check anything (although Automatic Scaling might help, but I didn’t use it)
  + Under GRG Nonlinear tab
    - Convergence: 0.0001
    - Derivatives: Central
    - Population Size 100
    - Everything else is unchecked

To calculate multiple observations, a macro is created that runs the solver as described for each observation.