Uncalled Liability and Risk in British Equities, 1870-1914

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Background and Objectives

The goal of my project was to examine the consequences of uncalled liability upon the risk characteristics of equities traded in Britain in the late nineteenth and early twentieth centuries. Equities at this time were issued with both a **"nominal"** and a **"paid"** amount. For example, the nominal amount of a share might have been 10 with a paid up amount of only 6. Because "Nominal" often exceeded "paid" each share also had a designated amount of **"uncalled liability"** which the firm's managers could call in at their discretion. In our example, the amount per share that a shareholder could have been held liable for equaled 4. Focusing on this financial trend my project had two related objectives:

One: To determine which firm characteristics were associated with higher or lower levels of uncalled liability.

Two: To look at the consequences of uncalled liability on share price returns.

Thesis

■ We expected greater uncalled liability to be associated with more risk-averse bank behavior. In general, "risk-averse" banks would have less volatile stock prices after controlling for systemic market fluctuations.

Why did we expect this? Because * If * bankers knew they would be on the hook for a lot of money if their companies failed then they would tend to manage their firms much more cautiously. Cautious (risk-averse) management would, on average, decrease the price volatility of the bank's stock. The reason this is a big *If * is because of the "principle-agent problem." That is, the people making the decisions about how to run the firm are the managers, not necessarily the shareholders. If bank managers were not large shareholders we would not expect to detect any relationship between uncalled liability and price volatility.

Data

☐ Data on British equities came from an NSF-sponsored research project Professor Grossman undertook several years ago. The unbalanced panel data included monthly observations for 192 banks between January 1870 and August 1914.

☐ Key variables included the London and Cambridge Economic Service index of stock prices (LCES), each bank's nominal (Nom) and paid-up (Paid) amount per share, and each bank's stock price (Price) and total number of shares (Shares).

☐ The following variables were also generated and included as necessary:

ΔLCES = The one month percent change in LCES
ΔP = The 1 month percent change in the price of the bank's stock
Total Market Cap = (Price) x (Shares)
ΔMC = The 1 month percent change in Market Cap
Aggregate Uncalled Liability = (Nom – Paid) x (Shares)
Uncalled Liability = Nom – Paid
Uncalled Liability #2 = (Uncalled Liability) / Paid
Uncalled Liability #3 = (Uncalled Liability) / Price
D1 through D191 = Dummy variables for each bank
London = Dummy variable for bank location

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Part I: Method and Model

■ In order to determine which firm characteristics were associated with higher or lower levels of uncalled liability I ran a regression of the following form:

$$\frac{(Nom-Paid)}{Paid}=\beta_1+\beta_2(Dep_{(-1)})+\beta_3(Time)+\beta_4(\Delta MC)+\beta_5(Year)+\beta_6(London)$$

Uncalled Liability #2, which measures uncalled liability as the proportion of "unpaid" to "paid" per share, was chosen because banks had direct control over both "Nom" and "Paid" and hence the ratio is a good measure of bank policy. "$Dep_{(-1)}$" is the one month lag of the dependent variable, "Time" is the time since the dependent variable last changed, "ΔMC" is the one month percent change in Total Market Cap, "Year" ranges from 1870 to 1914, and "London" is the dummy variable for bank location.

I also created a data set consisting of yearly averages of Uncalled Liability #2, Aggregate Uncalled Liability, and Total Market Cap in order to explore broader time-variant trends in the marketplace.

Results I (A)

The regression presented above had an adjusted R-squared equal to .949. It produced the following output:

Variable	Coefficient	P>t
Dep(-1)	.9543057	0.000
Time	-.0000943	0.005
Δ MC	-.0048134	0.000
Year	.0019021	0.000
London	-.0320302	0.000
Constant β	-3.43588	0.000

■ All coefficients were statistically significant at the 1% error level.

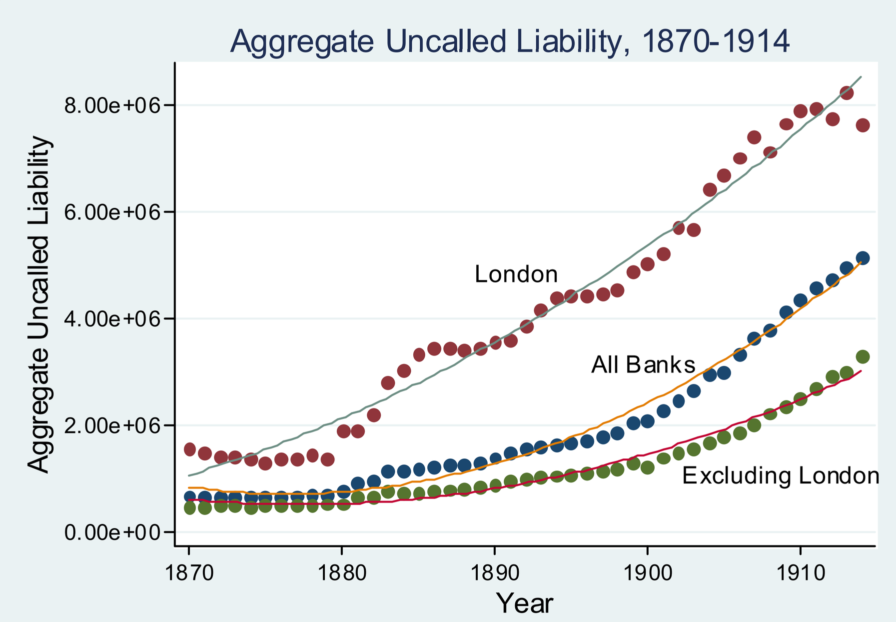
■ The only variable besides "Dep(-1)" with a positive coefficient was "Year." As time went on, banks issued a larger proportion of uncalled liability per share.

■ Although the coefficient for "Time" is statistically significant, it is too small to be economically significant.

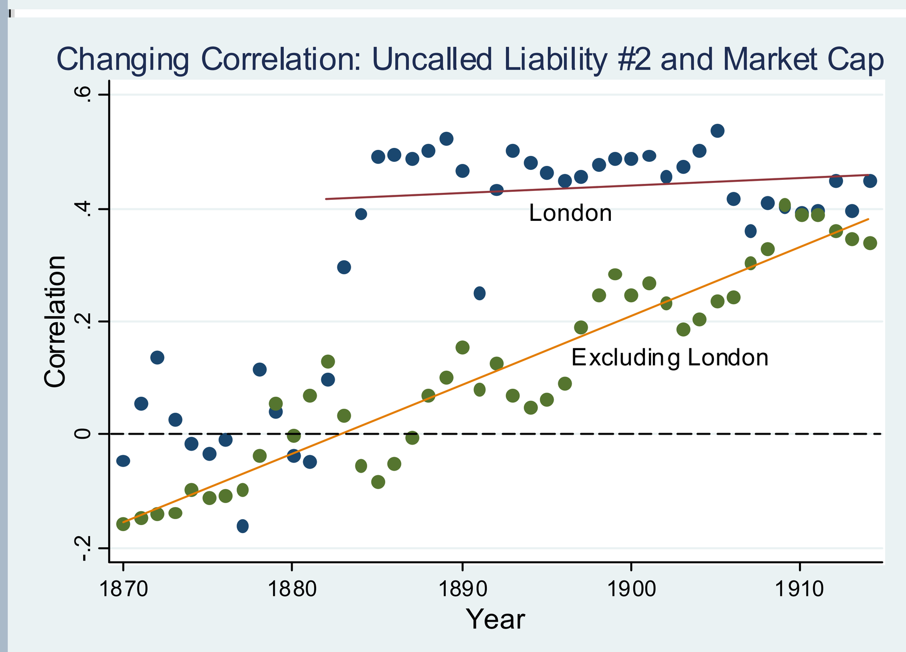
■ A short term increase in Market Cap tended to cause banks to decrease their proportion of uncalled liability per share.

■ London banks tended to have less uncalled liability per share.

Results I (B)



■ Although London banks had less uncalled liability per share they averaged more aggregate uncalled liability because they had increasingly large market caps.



■ Prior to the 1878 Scottish Banking Crisis large banks often issued less uncalled liability per share. Afterward, big London banks reversed this trend. Outside of London the shift seemed to have happened more gradually.

Part II Method and Model

■ In order to test my thesis and examine the consequences of uncalled liability on share price returns I first ran 192 Capital Asset Pricing Models (CAPM) of the following form:

$$\Delta P = \beta_{1i} + \beta_{2i}\Delta LCES + e_i$$

The CAPM models allowed me to find the idiosyncratic risk for each share over time by controlling for systemic market fluctuations captured by changes in LCES. Because LCES is an index of all British stocks at the time it is an indicator of how the market was doing generally. Using "looping" techniques in STATA I recorded the residuals from each of these 192 regressions as a single variable called **"Risk."** In running these regressions I omitted any observations in which the bank's nominal or paid amount changed since I did not want to examine the impact of bank restructuring on share price return.

■ After combining all of the CAPM residuals into my **"Risk"** variable I ran one big regression with 191 dummy variables to test my thesis and see if **Uncalled Liability #3** actually affects idiosyncratic risk across all banks. Uncalled Liability #3 was used because it captures a given bank's overall commitment to uncalled liability by measuring the ratio of aggregate uncalled liability to total market cap.

$$Risk = \beta_1 + \beta_2(U.L.\ \#3) + \beta_3 D_1 + \ldots + \beta_{193} D_{191}$$

If our *a priori* expectations hold true the coefficient preceding Uncalled Liability #3 will be a statistically significant negative number. After controlling for systemic market fluctuations using the LCES index in the first round of regressions, we expect to detect an inverse relationship between uncalled liability and idiosyncratic risk in the second regression shown directly above.

Final Results and Conclusions

■ As expected, the coefficient for uncalled liability equaled -.274 and was statistically significant at the 1% error level. The greater the amount of uncalled liability (that is, the greater the amount that shareholders could be forced to cough up if the firm got in trouble), the more risk-averse banks behaved. Moreover, prior to the banking crisis in 1878 the coefficient was 4 times more negative than it was when I ran the regression on the whole period from 1870 to 1914. Before the 1879 Companies Act bank shareholders carried unlimited liability for the debts of their banking companies. Once this liability was limited through legislation, the incentives that drove shareholding bank managers to behave in a risk-adverse manner were not as strong. In terms of a policy implication, the above analysis suggests that there are benefits to *limiting* limited liability because limited liability encourages companies to take greater risks.

Problems

☐ As mentioned earlier, my analysis could still be slighted by the "principle-agent" problem.

☐ It is also problematic that the choice of the level of uncalled capital for each bank may be endogenous. While we think we are testing the consequences of uncalled liability, we may be catching the process that leads some banks to choose higher or lower levels of uncalled capital, rather than the consequences of those choices.