

Capital and Banks

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What went wrong?

A rather detailed and prescriptive set of rules governing bank capital – the Basel II – allowed banks to operate with a tiny sliver of equity capital, and a mountain of debt, to finance portfolios of assets which were both risky and often rather hard to value.

That means that it was entirely rational for providers of debt (particularly of uninsured wholesale debt) to run once it was thought at all likely that bank assets might be worth just a few percentage points less.

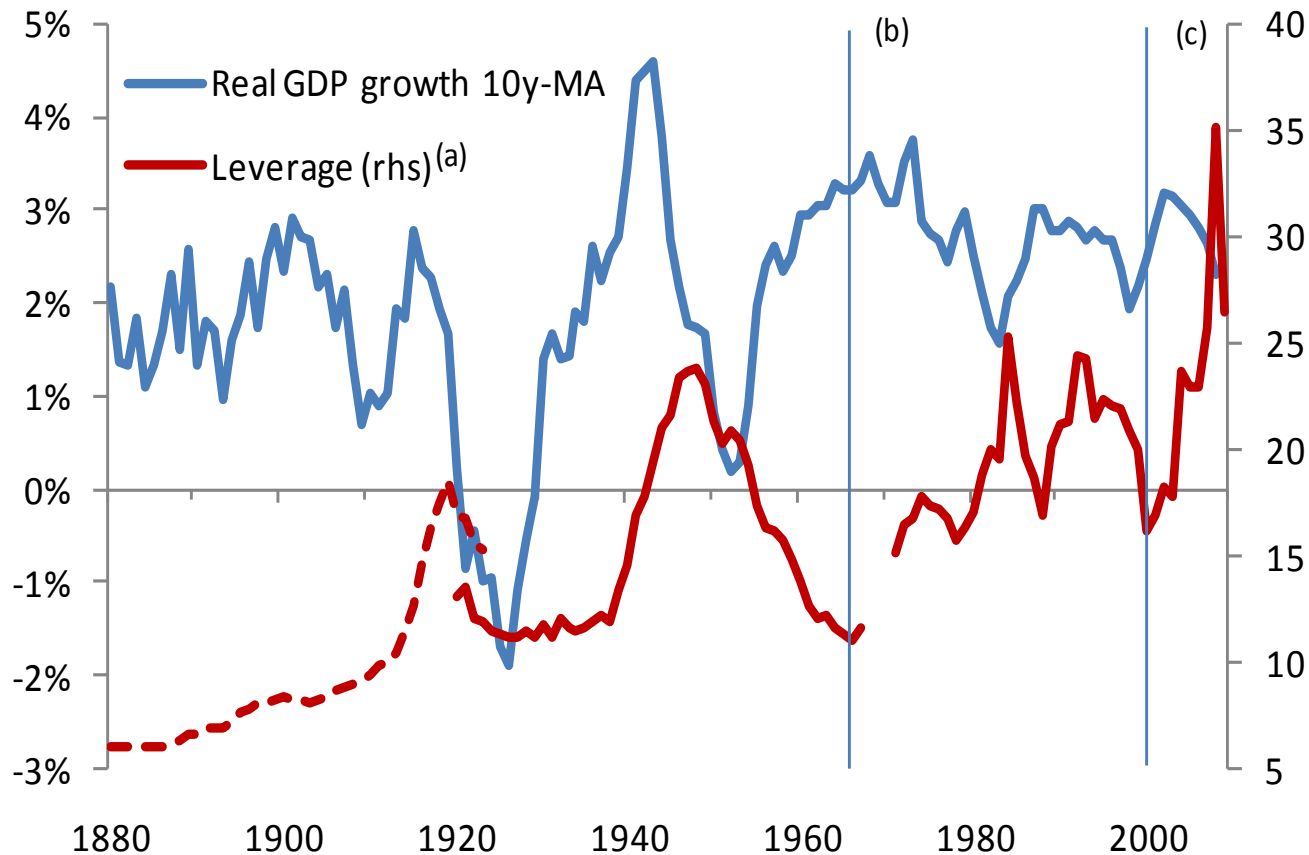
What went wrong?

The big mistake was that regulators acted as if they believed that it was appropriate for banks to have very little truly loss absorbing capital (that is equity) because equity is exceptionally costly and that having banks use more of it to finance their assets would substantially increase their cost of funding.

This belief is not supported by theory or evidence.

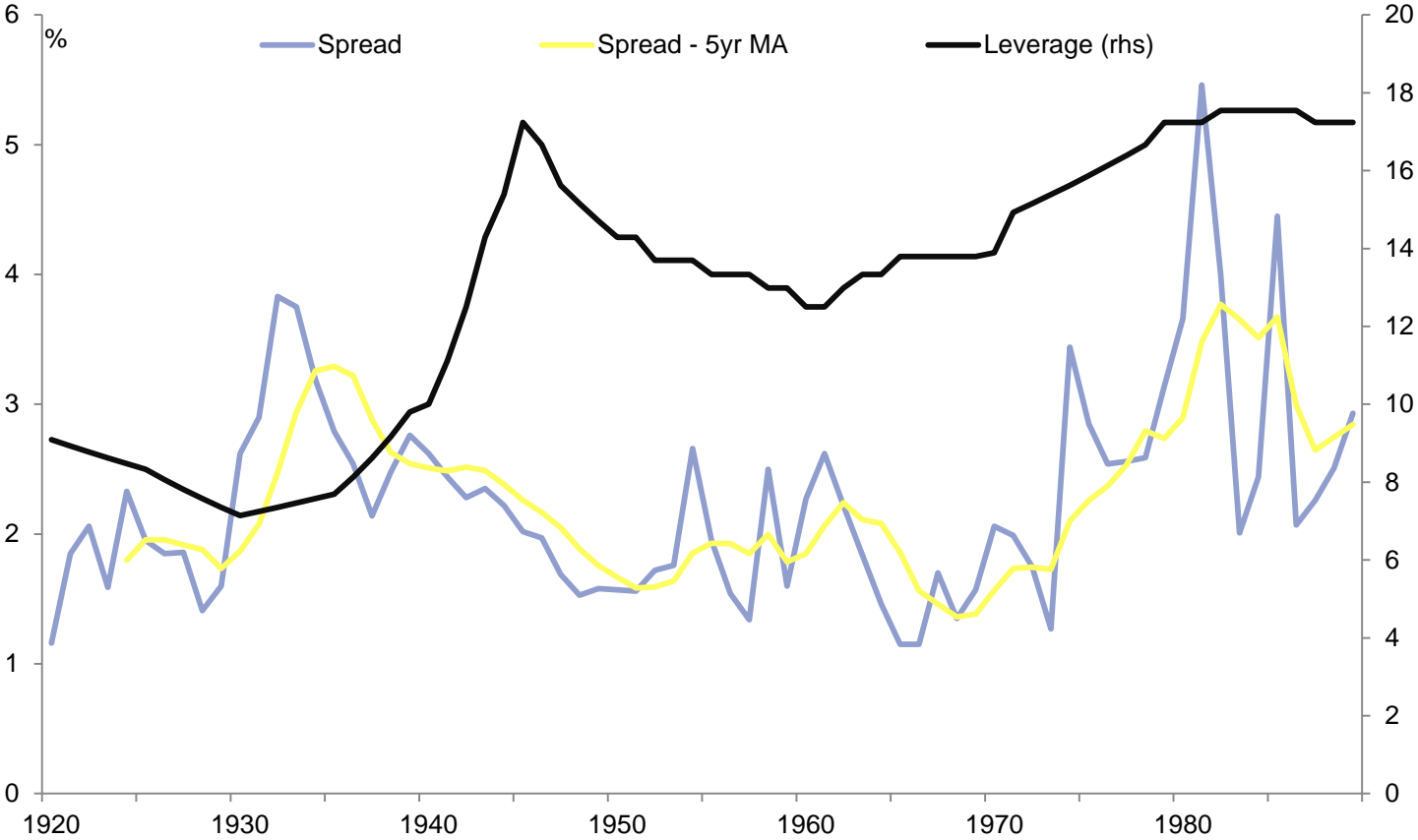
What the evidence does show is that an under-capitalised banking sector that becomes subject to widespread runs as people see how fragile it is can cause enormous damage. Have we now done enough to correct this?

UK Banks' leverage and real GDP growth (10-year moving average)



Source: United Kingdom: Sheppard, D (1971), *The growth and role of UK financial institutions 1880-1962*, Methuen, London; Billings, M and Capie, F (2007), 'Capital in British banking', 1920-1970, *Business History*, Vol 49(2), pages 139-162; BBA, ONS published accounts and Bank calculations. (a) UK data on leverage use total assets over equity and reserves on a time-varying sample of banks, representing the majority of the UK banking system, in terms of assets. Prior to 1970 published accounts understated the true level of banks' capital because they did not include hidden reserves. The solid line adjusts for this. 2009 observation is from H1. (b) Change in UK accounting standards. (c) International Financial Reporting Standards (IFRS) were adopted for the end-2005 accounts. The end-2004 accounts were also restated on an IFRS basis. The switch from UK GAAP to IFRS reduced the capital ratio of the UK banks in the sample by approximately 1 percentage point in 2004.

Leverage and spreads of average business loan rates charged by US commercial banks over 3-month Treasury bills



Source: Homer and Sylla (1991).

Corporate Finance 101

Simple finance theory suggests why, starting from very low levels of equity (high debt leverage), the impact of large proportionate changes in the use of equity on the overall cost of funds is likely to be small.

Double equity from 2.5% to 5% assets – debt costs 5%; equity return 15%.

Initial cost	Cost with Zero MM	Cost with 25% MM	Cost with 50% MM	Cost with 75% MM	Cost with 100% MM
5.25%	5.5%	5.44%	5.375%	5.31%	5.25%
Change in cost	+25bp	+19bp	+12.5bp	+6.25bp	0bp

The link between equity beta and the leverage ratio: theory

$$\beta_{assets} = \beta_{equity} \frac{E}{D + E} + \beta_{debt} \frac{D}{D + E}$$

Assuming that debt is riskless,

$$\beta_{equity} = \frac{D + E}{E} \beta_{assets}$$

The link between equity beta and the leverage ratio: estimation

$$\hat{\beta}_{i,t} = \alpha_i + X'_{i,t}b + \varepsilon_{i,t}$$

i indexes banks and t time periods

X includes leverage, year dummies

Estimation techniques: OLS, fixed effects, and random effects.

The link between the required return on equity and leverage

The CAPM states that the required return on equity can be expressed as

$$R_{equity} = R_f + \beta_{equity} \cdot Riskpremium$$

Inserting our estimate of the link between beta and the leverage ratio yields

$$R_{equity} = R_f + \left(\hat{a} + \hat{b} \cdot \frac{D + E}{E} \right) \cdot Riskpremium$$

The link between the required return on equity and leverage: Results

At a leverage ratio of $(D+E)/E = 30$,

$$\begin{aligned}R_{equity} &= R_f + (\hat{a} + \hat{b} \cdot leverage) \cdot Riskpremium \\ &= 5\% + (1.07 + 0.03 \cdot 30) \cdot 5\% \\ &= 14.85\%\end{aligned}$$

$$\begin{aligned}WACC &= R_{equity} \frac{E}{D+E} + R_f \frac{D}{D+E} \\ &= 14.85\% \cdot (1/30) + 5\% \cdot (29/30) \\ &= 5.3\%\end{aligned}$$

The link between the required return on equity and leverage: Results

At a leverage ratio of $(D+E)/E = 15$,

$$\begin{aligned}R_{equity} &= R_f + (\hat{a} + \hat{b} \cdot leverage) \cdot Riskpremium \\ &= 5\% + (1.07 + 0.03 \cdot 15) \cdot 5\% \\ &= 12.60\%\end{aligned}$$

$$\begin{aligned}WACC &= R_{equity} \frac{E}{D+E} + R_f \frac{D}{D+E} \\ &= 12.6\% \cdot (2/30) + 5\% \cdot (28/30) \\ &= 5.51\%\end{aligned}$$

Doubling equity means the WACC would rise to 5.5% - a rise of about 20bp.

The cost of a widespread bank crisis

The cost of having banks use more equity is quite small. What about benefits? That is the benefit of reducing the chances of a widespread crisis in banking.

The expected cost of a crisis is equal to the product of the probability of a crisis and the loss given a crisis.

Assume that if a banking crisis occurs, GDP falls initially by 10%.

Three quarters of this reduction lasts for just five years whilst one quarter is permanent.

Based on that, and a discount rate of 2.5%, the present value gain of permanently reducing the likelihood of a systematic crisis in any one year by one percentage point is around 55% of current annual GDP.

Optimal capital ratios ignoring the most extreme bad events

	Crises have some permanent effects on GDP growth	Crises have no permanent effects on GDP growth
Base cost of capital	19%	17%
Lower cost capital	20%	18%
Higher cost capital	18%	16%

Are banks special?

Is there something about banks that makes equity unusually costly?

Bankers often say so.

Are they right or is this special pleading to take advantage of private benefits of high leverage?

They seem to have done a good job of convincing people who came up with Basel III. Required equity capital as a percentage of RWA for a large bank is around 10%.

The calculations here suggest the correct answer is near 20%. Admati and Hellwig think it is higher....John Kay higher again.

Are banks special?

What about TLAC (Total Loss Absorbing Capital)?

This goes far beyond equity.

That is more about bailing people in at failure and not preventing failure. If failure itself is something that is too costly to contemplate this does not help much!

That is still helpful of course. But reliance on non-equity to boost resilience when things have gone wrong is only the optimal strategy if equity itself is very costly to use.

Where on earth is the evidence for that?