Bank Risk and Bank Rents: The Franchise Value Hypothesis Reconsidered

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Synopsis

1. In a large sample of publicly quoted banks in the US, Europe, and Asia during 1985-2017, higher values of Q predict *higher* bank risk of insolvency when Q exceeds 1 and franchise value is priced.
2. The franchise value hypothesis (FVH) (higher franchise value due to rents, higher bank risk) is rejected in our sample.
3. A decomposition of rents into bank efficiency rents, loan and deposit pricing power rents, and rents due to government guarantees shows that an increase of any of these rents predicts higher franchise values.
4. We offer two complementary explanations of the rejection of the FVH based on a calibration of two standard financial models of the banking firm, and a simple industry model with endogenous entry

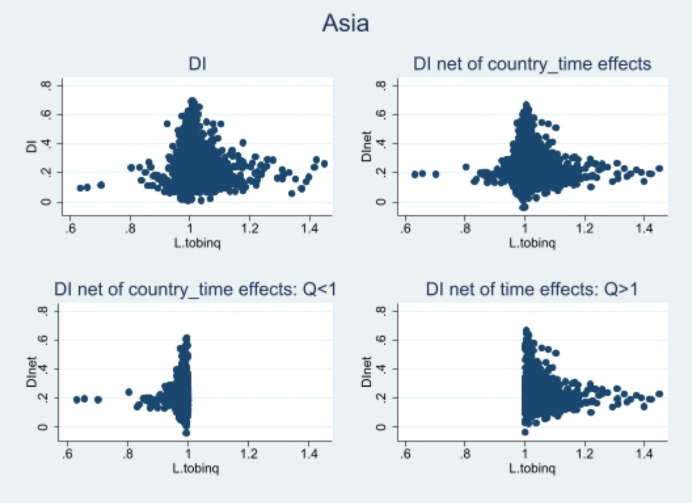
Evidence

- Our data: Panel of publicly traded banks in 25 advanced economies for the period 1985-2017. The sample is composed of 1,136 publicly quoted banks, including 629 U.S. Bank Holding Companies (BHCs), 310 European banks and 197 Asian banks.
- Franchise value measured by Tobin Q
- Measure of bank risk of insolvency: Distance to Insolvency (DI) derived by Atkeson, Eisfeldt, and Weill (2018) based on Lelands (1994) structural model of credit risk.
- Evidence of non-linearity of the predictive relationship between Tobin Q and DI.

US banks. DI vs. lagged Tobin Q (1985-2017)

European banks: DI vs. lagged Tobin Q (1985-2017)

Asian banks. DI vs. lagged Tobin Q (1985-2017)



Franchise value as a predictor of bank risk

- To capture non-linearity, we estimate a log-linear version of the regression kink model with an unknown threshold introduced by Hansen (2017):

$$\ln DI_{it} = a_0 + \alpha_1(\ln Q_{i,t-1} - \ln Q^*)_- + \alpha_2(\ln Q_{i,t-1} - \ln Q^*)_+ + X_{i,t-1}\beta + \gamma_{ct} + \epsilon_{it} \quad (1)$$

- $(\ln Q_{i,t-1} - \ln Q^*)_-$ and $(\ln Q_{i,t-1} - \ln Q^*)_+$ are the negative and positive parts of the difference $\ln Q_{i,t-1} - \ln Q^*$ respectively, and $\ln Q^*$ is the estimated threshold of $\ln Q$.
- The vector $X_{i,t-1}$ includes standard bank controls

Results: $Q^* \approx 1$. For all $Q > Q^*$, higher Qs predict *higher* bank risk.

Table 1: **DI regressions**

Variable definitions: lDI - log of the inverse of the standard deviations of equity returns (suffixes eu and a denote the sample of European and Asian banks, respectively); ltobinq - log of Tobin Q defined as the sum of market value of equity and total liabilities over total assets; (lnQ-lnQ*)_(-) - the difference between ltobinq and the optimal threshold when ltobinq is lower than the threshold; (lnQ-lnQ*)_(+) - the difference between ltobinq and the optimal threshold when ltobinq is greater than the threshold; logta - log of total assets in USD; lla - log of total loans to total assets; ldl - log of total deposits to total liabilities; llev - log of total liabilities over total shareholder equity. L. denotes a one-period lag. *** denotes 1% significance level, ** denotes 5% significance level, and * denotes 10% significance level.

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	Q*=1.01			Q*=1.00			Q*=1.01		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	lDI	**lDI**		**lDIeu**	**lDIeu**		**lDIa**	**lDIa**	
L.ltobinq	**0.5713***** **(5.7239)**		**-0.3802***** **(-3.2330)**	**0.0700** **(0.5538)**		**-0.7087***** **(-4.0607)**	**0.6011***** **(2.8888)**		**0.3988** **(1.4742)**
L.(lnQ-lnQ*)_(-)		**5.5092***** **(15.9453)**			**1.5679***** **(3.9935)**			**3.2535***** **(6.1405)**	
L.(lnQ-lnQ*)_(+)		**-0.5803***** **(-5.5566)**			**-0.3443**** **(-2.2553)**			**-0.5741***** **(-2.5822)**	
L.logta	0.0515*** (16.0109)	0.0494*** (15.5523)	0.0515*** (11.5849)	0.0038 (1.5510)	0.0036 (1.4673)	-0.0056 (-1.2511)	-0.0193*** (-3.8568)	-0.0262*** (-5.1405)	-0.0676*** (-7.8388)
L.lla	-0.0386** (-2.1720)	-0.0327* (-1.8503)	0.0055 (0.2474)	0.0568*** (3.3804)	0.0532*** (3.1649)	0.1061*** (3.6423)	-0.0146 (-0.5628)	-0.0448* (-1.7919)	0.0355 (1.2549)
L.ldl	0.0600** (1.9724)	0.0414 (1.3260)	0.1000** (2.3557)	0.0270*** (2.6768)	0.0278*** (2.7609)	0.0391*** (2.9610)	0.2065*** (7.4632)	0.1825*** (6.7233)	0.2202*** (5.7773)
L.llev	-0.3251*** (-20.9958)	-0.3721*** (-24.3342)	-0.1410*** (-5.8427)	-0.0229** (-2.2479)	-0.0353*** (-3.4698)	-0.0290* (-1.7403)	-0.0467*** (-3.6912)	-0.0612*** (-4.6584)	-0.0081 (-0.4283)
Constant	-1.5378*** (-8.1154)	-1.2538*** (-6.3750)	-2.5492*** (-8.9703)	-1.8724*** (-20.6017)	-1.8022*** (-19.6509)	-1.8896*** (-12.9852)	-2.0138*** (-13.3340)	-1.5834*** (-9.6455)	-1.5320*** (-6.6853)
Observations	9,080	9,080	4,138	4,248	4,248	1,546	3,278	3,278	1,299
R-squared	0.4214	0.4484	0.3601	0.5537	0.5594	0.0336	0.4748	0.4875	0.1377
Number of banks	629	629	458	310	310	394	197	197	138
Sample	**US**	**US**	**US**	**Europe**	**Europe**	**Europe**	**Asia**	**Asia**	**Asia**

Rent components: efficiency rents

- We adopt a "production function" approach following Syverson (2011) and Egan et al. (2017), and assume a bank operates with an investment arm and a funding arm, as in Atkenson et al. (2018).
- The revenue and cost functions per unit of assets take a Cobb-Douglas form, given by:

$$\frac{R_{it}}{A_{it}} = \exp^{(\eta_i^R + u_{it} + a_1 \rho_{it}^L)} A_{it-1}^{\alpha_R} LA_{it-1}^{\beta_R} DI_{it-1}^{\gamma_R} \tag{2}$$

$$\frac{C_{it}}{A_{it}} = \exp^{(\eta_i^C + v_{it} + b_1 \rho_{it}^D + b_2 \rho_{it}^G)} A_{it-1}^{\alpha_C} DL_{it-1}^{\beta_{1C}} LEV_{it-1}^{\beta_{2C}} DI_{it-1}^{\gamma_C} \tag{3}$$

where A_{it} is total assets,LA_{it} is the loan-to-asset ratio, DL_{it} is the deposit-to-liabilities ratio, LEV_{it} is the liabilities-to-equity ratio, and DI_{it} is distance-to-insolvency.

- The terms $\eta_i^R + u_{it}$ and $\eta_i^C + v_{it}$ denote efficiency rents,

Rent components: pricing power rents, asset side

- Let R^L_{it} be the loan rate charged by bank i at date t. The competitive loan rate $\bar{R}_{it}$ per dollar lent satisfies:

$$(1 - PD_{it})\bar{R}_{it} + PD_{it}(1 - LGD_{it}) = r_t \tag{4}$$

where PD_{it} s the probability of default, LGD_{it} is the loss given default, and r_t is the risk free rate Rearranging, we get:

$$\bar{R}_{it} = \frac{r_t - PD_{it}(1 - LGD_{it})}{1 - PD_{it}} \tag{5}$$

- The difference $S^L_{it} \equiv R^L_{it} - \bar{R}_{it}$ is a loan pricing power spread.
- The loan pricing power proxy is defined by:

$$\rho^L_{it} = S^L_{it}\frac{L_{it}}{A_{it}} \tag{6}$$

- This is a risk adjusted *Lerner index* weighted by the loan to asset ratio.

Rent components: deposit pricing power rents, liability side

- The deposit pricing spread is simply given by the difference between the risk free rate and the rate on deposits R_{it}^{D}.

- The deposit pricing power proxy is defined by:

$$\rho_{it}^{D} = max(0, r_t - R_{it}^{D})\frac{D_{it}}{LIAB_{it}} \tag{7}$$

  where $\frac{D_{it}}{LIAB_{it}}$ is the ratio of deposits to total liabilities.

- If $r_t - R_{it}^{D} < 0$, then the bank cost of providing deposit services is greater than the opportunity cost of deposits. The rent is therefore truncated at 0.

Rent components: government subsidy (guarantees), liability side

- Government guarantees ρ^G_{it} estimated using using a simple version of the *per dollar* premium for (deposit) insurance P_{it} based on the Merton (1977) model of deposit insurance derived by Ronn and Verma (1986).

- Two simplifying assumptions: no dividends are distributed, and that the premium is computed using total liabilities. P_{it} is given by:

$$P_{it} = N(y_{it} + \sigma_{it}\sqrt{T}) - \frac{V_{it}}{LIAB_{it}} N(y_{it}) \tag{8}$$

  where the value of bank asset is $V \approx MVE_{it} + LIAB_{it}$, $y_{it} = \frac{\ln LIAB_{it}/V - \sigma^2_{it}T/2}{\sigma_{it}\sqrt{T}}$, and $N(.)$ is the cdf of a standard normal random variable.

- The spread $1 - P_{it}$ can be viewed as the per-dollar "saving" a bank realizes by not being charged a premium on government guarantees, scaled by the leverage ratio:

$$\rho^G_{it} = (1 - P_{it}) \frac{LIAB_{it}}{A_{it}} \tag{9}$$

Franchise value and bank rents

- Rents estimated via estimation of revenue and cost functions

- The impact of rents on Tobin Q and franchise value ($Q > 1$) is assessed by estimating regressions of the following form

$$\ln Q_{it} = c_0 + c_1 \hat{\eta}_{it}^R + c_2 \hat{\eta}_{it}^C + c_3 \hat{\rho}_{it}^L + c_4 \hat{\rho}_{it}^D + c_5 \hat{\rho}_{it}^G + c_6 A_{it}^g + \ln W_{it-1} + \epsilon_{it} \tag{10}$$

- $(\hat{\eta}_{it}^R, \hat{\eta}_{it}^C, \hat{\rho}_{it}^L, \hat{\rho}_{it}^D, \hat{\rho}_{it}^G)$ denote rents

- A_{it}^g denotes growth opportunities measured by asset growth,

- The vector W_{it-1} includes lagged bank controls

Results: An increase in any of the estimated rents predicts higher Q

Variable definitions: ltobinq - log of Tobin Q (suffixes eu and a denote the sample of European and Asian banks, respectively); lDI - log of the inverse of the standard deviations of equity returns etaR - revenue productivity; etaCr - cost productivity; rhoL - pricing power rent on loans ; rhoD - pricing power rent on deposits; rhoG - government subsidy rents; assetg - change in log of total assets over

	(1)	(2)	(3)
	ltobinq	ltobinq_eu	ltobinq_a
etaR	0.0799***	0.0120***	0.0268***
	(9.0613)	(3.2564)	(5.0568)
etaCr	0.0818***	-0.0014	0.0017
	(10.6484)	(-0.4472)	(0.4602)
ppL	0.0441***	0.0019	0.0925**
	(3.9306)	(0.0822)	(2.1471)
ppDr	0.4973***	0.0916	-0.1087
	(10.2372)	(0.6657)	(-0.5793)
gsr	0.5375***	0.4267***	3.2710***
	(14.2966)	(6.1583)	(5.3548)
Observations	6,634	2,659	2,598
Number of banks	599	245	175
R-squared	0.4980	0.4229	0.8671
Country	**US**	**Europe**	**Asia**

Explaining the evidence

Two Merton models and a simple industry model with endogenous entry

- Merton 1: Merton's (1977) model as modified by Marcus (1984)
- Merton 2: Merton's (1978) dynamic model of a bank exposed to random costly audits

Results: The FVH would hold only under unrealistically high values of rents.

- Industry model: a trade-off between banks rents, pricing power and efficiency is introduced in the context of a banking industry where banks compute a la Cournot and entry/exit is endogenous.

Results: In a stationary long-run equilibrium, an increase in rents or a decline in competition (higher pricing power rents) result in higher bank risk