

Banks' Next Top Model

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Motivation

- Banks need to have their own funds - **equity/capital** - to cover possible losses
- The capital determines how much **risk** banks can take
- The regulator asks banks to have sufficient capital based on:
 1. "One-size-fits-all" framework
 2. **Banks' internal models**
- Banks incur **penalties** if the internal model does not properly predict risk
- These penalties comprise additionally required capital (up to 1/3 more) and possibly a model revision

Q: What is the effect of regulation on (a) model choices and (b) model performance?

Mechanism:

- Banks: how much capital does a model result in?
- Regulator: how well does a model predict risk?
- Banks know their true risk model (better)
- The regulator does not (and relies on what banks report)

This paper

- **Theory:** identify **optimal combination of capital and penalties** to ensure truthful reporting
- **Empirics:** test whether the existing regulation **improves banks' risk model quality**

Data

- 17 banks from Europe, Canada and the USA over 2002-2019
- **Hand-collected data** on the self-reported risk model outcomes and revisions: *quarterly, annual and Pillar III reports*
 - **Supervision data:** *Bank Regulation and Supervision Survey*
 - **Balance sheet data:** *SNL, Orbis, Fitch*
 - **Volatility data:** *St. Louis Fed, Eikon*

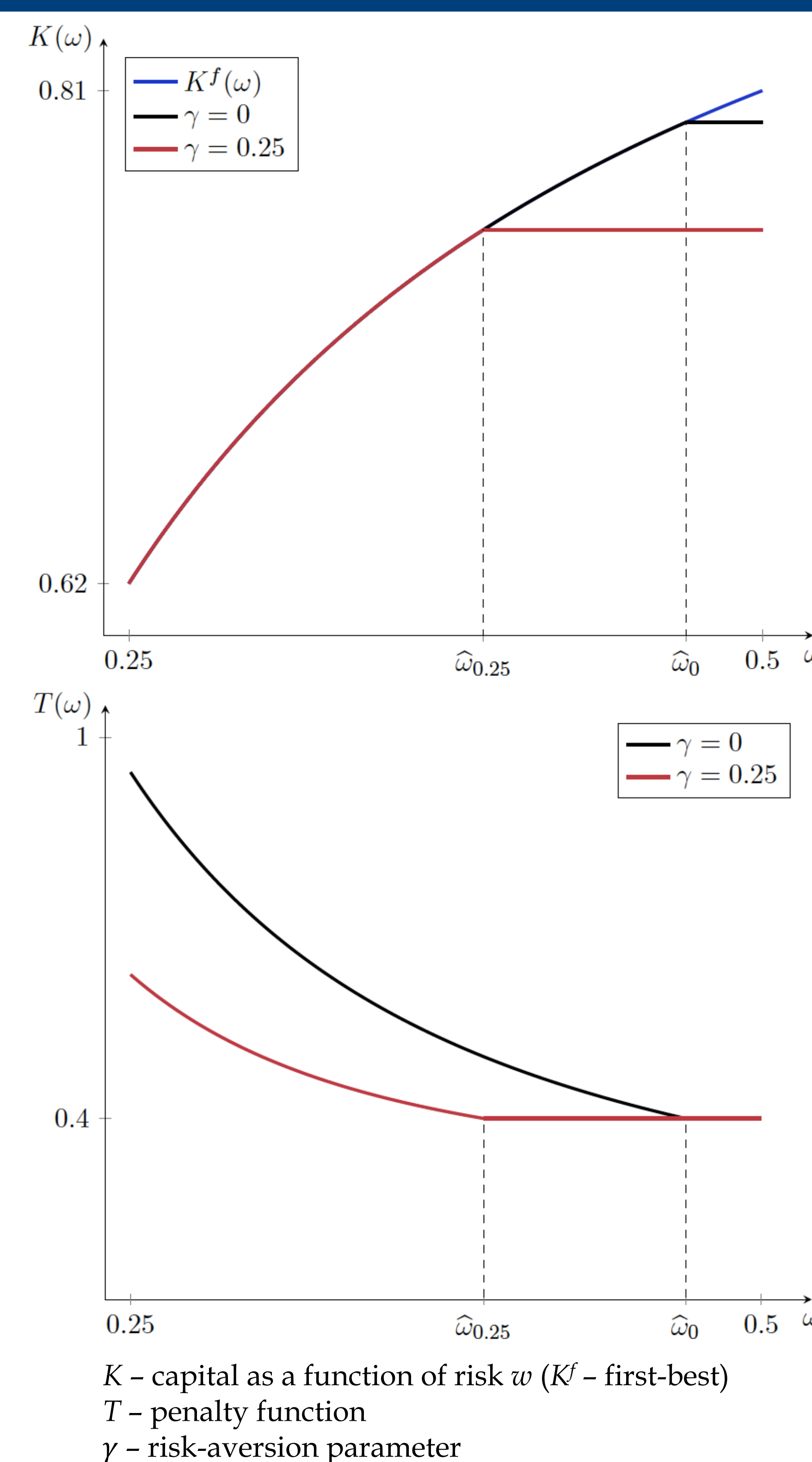
Basel Framework for Internal Models

Model Class	# Risk Underreporting in the Past Year	Δ Capital (1996)	Δ Capital (2022)	Supervisory action
Green	0	0.00	0.00	None
	1	0.00	0.00	
	2	0.00	0.00	
	3	0.00	0.00	
Yellow	4	0.00	0.00	May disallow the model
	5	0.40	0.20	
	6	0.50	0.26	
	7	0.65	0.33	
	8	0.75	0.38	
Red	9	0.85	0.42	Disallows the model
	≥ 10	1.00	0.5	

$$\text{Capital} = (3 + \Delta) \times \text{Risk}$$

- Risk-sensitive capital and penalties
- Penalties: mechanism to achieve the optimal capital requirement
- Risk models: tool to deal with uncertainty about penalties

Optimal Capital and Penalties



Testable Prediction

- It is optimal to penalise more risk-averse banks less
- **Problem 1:** only weak proxies for banks' risk aversion (Camba-Méndez & Mongelli, 2021)
- **Solution:** use model revisions as more risk-averse banks should revise their models more to better predict risk and decrease uncertainty about penalties if the model does not perform well
- **Problem 2:** model revisions are endogenous
- **Solution:** (i) IV; (ii) 2013 change in capital regulation for US banks as a quasi-exogenous shock to their risk reporting requirements

Results and Contribution

The current regulation is ineffective in incentivising better model choices and better model performance

- Banks tend not to use models to reduce uncertainty about penalties
 - Using new models is associated with more underreporting of risk
 - Following the change in regulation, banks with larger trading activities are those who enjoy lower capital requirements
- Contribution:** 1) to the theoretical literature on incentive problems in capital regulation (Cuoco & Liu, 2006; Colliard, 2019; Leitner and Yilmaz, 2019)
 2) to the empirical literature on the (mis)use of internal risk models (Begley et al. 2017, Mariathan et al., WP 2021)

Policy Implications

Empirical evidence suggests that the current penalties are insufficient to ensure truthful disclosure:

- Lower reported risk has two effects on capital requirements:
 - (i) lower capital requirement based on the reported risk
 - (ii) (possibly) more risk underreporting cases \Rightarrow if too many, higher capital requirement due to penalties
- To incentivise banks, regulation should be such that the penalty effect dominates
- Recent revisions of regulation may further impair truthful reporting:
 - ▶ Δ Capital is halved as of 2022 (Basel Committee, 2019)