

Banking Competition Efficiency in Europe: A Frontier Approach

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Outline

- Motivation/background:
 - competitive efficiency in banking is important (see EC Report, 2007), but how do you measure it?
- Main idea:
 - borrow from “frontier analysis” to separate cost of producing fee-based services from competition effects on raising fee-based revenues (we look at non-interest income and spread)
- Framework: frontier analysis
 - data, model, and estimation
 - elasticities and assessing cross-country competition
 - comparison different rankings
- Conclusions and policy recommendations

Motivation/background

- A recent EC report (2007) outlined how specific bank fees for payment and other services differ markedly across Europe.
- Among others, the report compared:
 - Account maintenance fees
 - Consumer transaction fees
 - Market rate/deposit interest rate spread
 - Merchant card interchange fees
 - Account switching fees
 - Tying loans to first having a deposit
 - Cross-country banking profitability
- Found differences “too large” to be due solely to cost differences, suggesting markedly different competition levels across Europe.

- The EC report showed how specific fees differ across countries but did not identify the countries. The data are confidential.
- Comparing prices for individual services is not helpful. A high price for one service in one country compared to all others can be offset by a low price for a different service or low or no payment of interest on deposits.
- Moreover, retail banking $\approx 50\%$ of total European banking activity or € 275 billion. Accounts for around 2% of European GDP and 3 million jobs.

Competitive efficiency is important, so its measurement too!

Main idea

- Bank fee/service pricing can differ due to:
 - Lack of competition (the thrust of the EC report)
 - Service cost/productivity differences across countries.
- We will try to determine the relative importance of these two influences. They have different policy implications.
- We impose that: *retail banking revenues* = $f(\text{cost}, \text{productivity})$, and the unexplained part reflects influence of competition.
- Two revenue flows: non-interest income and spread.

Framework

- The *usual* approach would neglect costs and “explain” cross-country service revenue differences using:
 - Herfindahl-Hirschman Index: banking market concentration,
Problem: need information on ease of new bank entry;
 - Lerner Index: overall mark-up of price over marginal cost,
Problem: need to estimate marginal cost;
 - H-Statistic: regression of $P_{output} = \beta (P_{input}) + \gamma (...)$.
A value of $\beta < 1.0$ indicates imperfect competition since output and input prices are not closely related,
Problem: how close to 1.0 should β be to indicate effective competition?

- The 3 “standard” measures of competition should be positively correlated across countries and over time.
- Past analysis shows that the correlations are at times negative, not positive, across 14 European countries. Thus choice of competition measure can affect the conclusions obtained.
- Alternative: borrow from “frontier analysis” to separate cost of producing fee-based services from competition effects on raising fee-based revenues.

- Our approach: Distribution Free Approach (DFA)

$$\ln \text{revenue} = f(\ln \text{cost}, \ln \text{productivity}) + \ln e + \ln u$$

Assumption: $\ln e$ will average close to zero (random error), while the average of $\ln u$ reflects the average effect of competition

Bank/country with lowest average residual is also the bank where variation in underlying cost and productivity explains the greatest amount of the variation in revenues.

- This minimum value determines frontier and relative competitive efficiency (CE):

$$CE_i = u_i / u_{\min} - 1$$

Data

- Collecting data on 11 countries over 20 years: 1987 to 2006.

The countries are:

France

Netherlands

Denmark

Germany

Spain

Finland

U.K.

Belgium

Norway

Italy

Sweden

- Can determine degree of banking market competition in one country relative to another. Can not determine the absolute level of competition, even for the most competitive country.

Table 1: Revenue and Cost Growth Rates: 11 Countries, 1987-2006

	Revenue	Operating Cost (OC)	Non-Interest Income/OC	Spread/ OC	PL	Labor/ Deposits	Payment Cost
Sweden	7.0%	4.4%	7.2%	-1.8%	5.8%	-6.0%	-3.3%
Norway	1.5	2.3	1.5	-2.5	5.3	-7.0	-4.4
Netherlands	7.7	6.5	4.2	-1.1	4.6	-7.3	-4.5
Belgium	8.0	3.8	4.7	3.7	4.5	-7.6	-3.6
Finland	2.7	1.6	2.5	-0.2	3.1	-8.9	-4.8
France	6.1	4.3	7.1	-1.6	4.6	-5.3	-2.7
Denmark	4.9	3.7	7.2	-0.9	4.9	-5.4	-5.0
Germany	4.2	5.5	3.0	-2.5	4.4	-5.4	-3.9
Italy	4.5	3.8	3.8	-0.9	2.6	-6.0	-3.2
U.K.	5.0	6.5	-0.4	-1.8	5.4	-7.4	-3.2
Spain	2.4	4.2	6.0	-3.9	3.8	-6.7	-6.5
Average	4.9	4.2	4.3	-1.2	4.4	-6.6	-4.1

- Table suggests that banking sectors are able to raise revenue more rapidly than their costs,
- Source of revenues is shifting: from spread to non-interest income
- Source of costs is shifting: labor intensity and unit payment cost are decreasing

Model

- Translog equations to relate revenues to cost and productivity drivers and input prices in SUR framework.
- Averaging residuals across countries over 3 time frames to compute CE_i (or, alternatively, based on pooled panel regression residuals)

$$\ln NII/OC = \alpha_0 + \sum_{i=1}^5 \alpha_i \ln X_i + 1/2 \sum_{i=1}^5 \sum_{j=1}^5 \alpha_{ij} \ln X_i \ln X_j + \sum_{i=1}^5 \sum_{k=1}^2 \delta_{ik} \ln X_i \ln P_k + \sum_{k=1}^2 \beta_k \ln P_k + 1/2 \sum_{k=1}^2 \sum_{m=1}^2 \beta_{km} \ln P_k \ln P_m \quad (1)$$

$$\ln SPREAD/OC = \theta_0 + \sum_{i=1}^5 \theta_i \ln X_i + 1/2 \sum_{i=1}^5 \sum_{j=1}^5 \theta_{ij} \ln X_i \ln X_j + \sum_{i=1}^5 \sum_{k=1}^2 \psi_{ik} \ln X_i \ln P_k + \sum_{k=1}^2 \phi_k \ln P_k + 1/2 \sum_{k=1}^2 \sum_{m=1}^2 \phi_{km} \ln P_k \ln P_m \quad (2)$$

where:

$$X_i = L/DEP, ATM/DEP, GAP, PC, ATMC, \\ P_k = PL, PK.$$

Cross-country bank competition efficiency

Table 2: Competition Efficiency (CE) for 11 Countries, Cross-Section vs. Panel Residual, 1987-2006

	Averaged Residuals:				Panel Residuals:					
	$CE_{NII/OC}$		$CE_{SPREAD/OC}$		$CE_{NII/OC}$		$CE_{SPREAD/OC}$			
Sweden	.140	(11)	.000	(1)	.90	(11)	0	.30	(4)	-3
Norway	.042	(4)	.026	(5)	.53	(2)	+2	.26	(1)	+4
Netherlands	.046	(5)	.034	(8)	.57	(3)	+2	.39	(10)	-2
Belgium	.075	(10)	.017	(4)	.66	(8)	+2	.30	(5)	-1
Finland	.057	(7)	.030	(6)	.64	(7)	0	.34	(6)	0
France	.036	(3)	.008	(2)	.61	(5)	-2	.27	(2)	0
Denmark	.054	(6)	.032	(7)	.60	(4)	+2	.29	(3)	+4
Germany	.065	(8)	.016	(3)	.68	(9)	-1	.36	(8)	-5
Italy	.069	(9)	.036	(10)	.82	(10)	-1	.36	(7)	+3
U.K.	.000	(1)	.091	(11)	.48	(1)	0	.36	(9)	+2
Spain	.028	(2)	.035	(9)	.62	(6)	-4	.39	(11)	-2

- Reduction in spread revenues is consistent with lower CE's, indicating greater competition; higher CE's for non-interest income could explain relative expansion of these priced activities.
- Most variation in banking revenues is associated with variation in operating cost and productivity influences, not so much with differences in banking competition (qualifying the EC Report outcomes). R²'s vary between 0,81 and 0,95.

Cost elasticities and revenues

	Non-Interest Income Activity Revenues	Loan-Deposit Rate Spread Revenues
Productivity:		
Labor/Deposit ratio	-.42*	-.83*
ATM/Deposit ratio	.06	-.17*
Scale Economy:		
Payment Cost Index	.82*	-.02
ATM Cost Index	.06	-.24*
Factor Input Cost:		
Price of Labor	.01	-1.08*
Capital Opportunity Cost	-.53*	.70*

* Elasticity is significantly different from zero at p-value = .01.

- Lower labour intensity raises revenues
- Higher "capital/output" ratio slightly decrease spread revenues
- Lower unit ATM cost increase spread revenues
- Surprise!! Lower unit payment cost decrease NNI revenues. Why?
Payment transactions are often not directly priced so this revenue source is not being "tapped".

Comparison of rankings

Table 6: Most and Least Competitive Countries

	Averaged Residuals:		Other Competition Measures:		
	$CE_{NII/OC}$	$CE_{SPREAD/OC}$	H-Statistic	Profit/Revenue	CR-3
Most Competitive	U.K. Spain France	Sweden France Germany	Netherlands U.K. Germany	Belgium Netherlands Germany	Spain Italy U.K.
Least Competitive	Italy Belgium Sweden	Spain Italy U.K.	Finland Denmark Italy	Sweden Finland Spain	Belgium Netherlands Finland

- Ranking differs according to type of activity, if you average these out you retrieve (inconsistent) results of "old studies"
- Interpretation: try to distinguish more banking activities and apply relative competitiveness to each subset of activities separately rather than to draw a summary conclusion based on aggregate banking activities
- Our study is in the "middle" of EC (2007) and conventional studies

Conclusions

- We devise an alternative indicator of bank competition and rank European banks/countries by their dispersion from a "competition efficiency frontier"
- Overall, competition differences appear to play a relatively small role in explaining variation in bank revenues
- One must take into account underlying activities of total bank revenues, otherwise "competition picture" is obscured
Here: NNI has risen from 20% to 44% of total revenues, but these activities seem to be associated with less competition
- Analysis shows that payment activities as an important potential revenue source remain untapped, since they are not directly priced
- Antitrust: Relying on just a single competition indicator may lead to inconsistencies