The impact of competition on bank orientation


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Research Question

Does interbank competition affect bank orientation (relationship versus transactional banking)?
Competition and Relationships

- Banks in competitive markets may be unwilling to incur losses that may never be repaid (as firms switch) Petersen & Rajan (QJE 1995)

- But interbank competition may increase relationship lending (to shield rents), though decrease industry specialization Boot & Thakor (JF 2000)
This Study

Analyses the entire loan portfolio of a mid-sized bank, lending to small firms (13,098 borrowers) in a continental European bank-based financial system

- Relates Bank Orientation to:
  - Index of Concentration in the Postal Zone of the Borrower
  - Index of Multi-Market Contact
  - Physical Distance Measures

- Controls for:
  - Branch Size
  - Postal Zone and Firm variables
This Study Finds

- Competition ↑
- Relationship Banking ↑

- Suggests Competition and Relationships not necessarily inimical  
  Boot & Thakor (JF 2000)
Contributions

- Relationship Banking Measure
  - Theoretically motivated
  - Robust
  - Suited for Cross-Section
Rest of the Talk

- Theoretical Predictions and Empirical Work
- Data
  - Dependent Variables: Relationship Banking & Industry Specialization
  - Multi-Market Contact & Distance Measures
- Relationship Banking
  - Competition
  - Local and National Coordination
  - Robustness
- Conclusions and Current / Possible Work
Theory: Petersen and Rajan (QJE 1995)

Less competition in banking markets …
Exogenous market power for the bank
Firm flexibility to switch banks is limited

Monopolistic bank can extract future firm surplus
Intertemporal risk sharing possible
Credit available for low quality firms
… more relationship banking
Theory: Petersen and Rajan (QJE 1995)

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More competition in banking markets …
Bank chooses its orientation and specialization
Specialization enhances project success
Relationship rents less affected by competition

↓

More competition, more relationship lending
but less industry specialization
as higher-quality firms are being serviced

… more relationship banking
Theory: Boot and Thakor (JF 2000)

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More competition, more relationship lending,
but less industry specialization,
as higher-quality firms are being serviced
… more relationship banking
Theory: Boot and Thakor (JF 2000)

- Bank Rents
- Low \( \Theta \): Quality of bank borrowers
- High
Theory: Boot and Thakor (JF 2000)

Bank is a monopolist

Bank Rents

low Θ: quality of bank borrowers high
Transactional Rents

Bank Rents

Transaction Rents

Θ

Θ_T

Bank Lending

Capital Market
Relationship Rents: Components

Bank Rents

“Generic” & Specialization Relationship Rents

Cost per Relationship Loan

\[-S\]

\[\Theta_T\]

\[\Theta\]
(Total) Relationship Rents

Bank Rents

Relationship Rents

\[ \Theta_T \]
Relationship and Transactional Lending

Bank Rents

Relationship transactional
An Increase in Interbank Competition…

… Increases Relationship Lending
... But Decreases Industry Specialization

- Industry Specialization affects likelihood of:
  - retaining a borrower if rival bank appears
  - attracting a borrower from a rival bank that made a bid
  - value of relationships

- Interbank competition decreases \textit{ex post} rents so \textit{ex ante} optimal investment in sector specialization is smaller
  - specialization is also less valuable for additional high-quality borrowers
## Theory: Bank Orientation

<table>
<thead>
<tr>
<th></th>
<th>Fierce Competition</th>
<th>Weak Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Many Banks</td>
<td>Transactional</td>
<td>Relationship</td>
</tr>
<tr>
<td>Low Concentration</td>
<td>Transactional</td>
<td></td>
</tr>
</tbody>
</table>

**Mayer (EER 1988)**

**Petersen & Rajan (QJE 1995)**

**Dinc (RFS 2000)**

**Anand and Galetovic (2001)**

**Yafeh & Yosha (EFR 2001)**

**Boot & Thakor (JF 2000)**

**Dell'Ariccia & Marquez (JFE 2003)**

**Hauswald & Marquez (2003)**
Hence, ... 

Whether Interbank Competition affects Relationship Banking is ultimately an empirical question, but current empirical work is mostly indirect, sometimes limited, and seemingly contradictory in its findings.
Hence, ...

Whether Interbank Competition affects Relationship Banking is ultimately an empirical question, but current empirical work is mostly indirect, possibly limited, and seemingly contradictory in its findings.
### Empirical Evidence: Bank Orientation in Local Markets

<table>
<thead>
<tr>
<th></th>
<th>HHI=0</th>
<th>Local Market for Deposits</th>
<th>HHI=1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petersen &amp; Rajan (QJE 1995)</td>
<td>Rate ↓ &amp; credit ↑ for young</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black &amp; Strahan (JF 2002)</td>
<td>more</td>
<td>New firm incorporations</td>
<td>fewer</td>
</tr>
<tr>
<td>Fischer (2000)</td>
<td>less</td>
<td>Information transfer &amp; credit</td>
<td>more</td>
</tr>
<tr>
<td>Elsas (JFI 2005)</td>
<td>high</td>
<td>Prob. of Hausbank status: low</td>
<td>high</td>
</tr>
</tbody>
</table>
## Empirical Evidence: Bank Orientation in *National* Markets

<table>
<thead>
<tr>
<th>Study</th>
<th>Arrival of New Banks</th>
<th>Share of Foreign Banks</th>
<th>Equity investment by banks</th>
<th>% Assets by Largest 3 Banks</th>
<th>Industries dependent on external finance hurt less by bank concentration</th>
<th>Single bank relationships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farinha &amp; Santos (JFI 2002)</td>
<td>Many</td>
<td>High</td>
<td>Low</td>
<td>0%</td>
<td>Industries dependent on external finance hurt less by bank concentration</td>
<td>Single bank relationships</td>
</tr>
<tr>
<td>Steinherr &amp; Huveneers (JBF 1994)</td>
<td></td>
<td></td>
<td>High</td>
<td>low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cetorelli and Gambera (JF 2001)</td>
<td></td>
<td></td>
<td>high</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ongena &amp; Smith (JFI 2000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Data

Detailed in Degryse & Van Cayseele (JFI 2000)

13,098 borrowers
sole proprietorships (81%), small, medium, and large firms

- Main Bank and Duration of Relationship
- Firm characteristics
  - Size, Legal Form, Industry Affiliation (NACE 2-digits)
  - Age
  - Accounting Statements
Data Sets

- Loan Portfolio of 1 Belgian Bank “Butchers and Bakers”
- Firm Databases
- List of All Bank Branches
- Relationship Characteristics for each borrower
- Bank Market Characteristics: Concentration & Distance
- Additional Firm Characteristics
Samples

Take firm characteristics at first loan & require full identification

“All”: 13,098 borrowers

Calculate physical distance to Lender & Competing Bank Branches

“Distance”: 11,222 borrowers

Both Single-Person Business & Sole Proprietorship

“SPB & SP”: 9,213 borrowers

Collect Age

“Age”: 1,991 borrowers

Collect Firm Characteristics

“Augmented”: 645 borrowers
Samples

Take firm characteristics at first loan & require full identification

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Calculate physical distance to Lender & Competing Bank Branches

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“Augmented”: 645 borrowers
Dependent Variable

Relationship Banking
  = Main Bank * Dummy (= 1 if Duration of Relationship > 1 yrs)
Main Bank * Dummy (= 1 if Duration of Relationship > 1) ??

- Why dummy? Theory is dichotomous.
- Why interaction Main Bank / Duration? Scope and length = key dimensions of bank - firm relationships
  - Belgian small firms use multiple banks: Degryse, Masschelein & Mitchell (2003), de Bodt, Lobez & Statnik (EFM 2005), …
  - Checking account hypothesis: Nakamura (JRB 1993), Vale (SJE 1993), …
  - Duration: Boot & Thakor (IER 1994), Sharpe (JF 1990), Rajan (JF 1992), …
  - Robustness: Main Bank and Duration separate as dependent variables
  - Median loan repayment duration = 1/2 years
  - Robustness: 3-Years
    Additional Advantages: ± 50%, % interpretation, Elsas (JFI 2005)
Main Independent Variables

**Herfindahl - Hirschman Index** based on branches Fisher (2000)

Postal zone (± 30km²) as relevant geographical market

relevant loan market is *local* for small businesses

Hannan (JBF 1991), Sapienza (JF 2002), Mallett and Sen (RIO 2001)

*proximity* plays a role in loan pricing Degryse and Ongena (JF 2005)

**Multi-Market Contact** Evans & Kessides (QJE 1994)

Sum bank pairs weighted by frequency of contacts in other postal zones

- Mutual Forbearance: M-M contact facilitates collusion
- Competition: M-M contact spurs competition
Main Independent Variables

Closeness of Lender
Remoteness of Competitors

Branch Size
Proportion of bank loan portfolio at the bank branch
<table>
<thead>
<tr>
<th>Variables</th>
<th>Variable Definitions</th>
<th>Number of Observations = 645</th>
<th>Number of Observations = 9213</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship Banking</td>
<td>= 1 if the length of the relationship with the borrower exceeds one year and if the bank considers itself as main bank(^4)</td>
<td>0.66 0.47 0.00 1.00 1.00</td>
<td>0.51 0.50 0.00 1.00 1.00</td>
</tr>
<tr>
<td>In(Duration)</td>
<td>Log of the length of relationship with current lender, in years</td>
<td>1.73 0.70 0.00 1.84 3.13</td>
<td>2.02 0.81 0.00 2.25 3.31</td>
</tr>
<tr>
<td>Main Bank</td>
<td>= 1 if the firm buys at least two products from the bank and if the current account turnover is at least BEF 100,000 per month(^{a,b}) the proportion of the number of loans of the bank branch loan portfolio in the same industry as the borrower, in percentage</td>
<td>0.67 0.47 0.00 1.00 1.00</td>
<td>0.53 0.50 0.00 1.00 1.00</td>
</tr>
<tr>
<td>Bank Industry Specialization</td>
<td>Summed squares of bank market shares by number of branches in borrower’s postal zone(^5)</td>
<td>15.6 13.6 0.6 11.7 100.0</td>
<td>18.7 13.8 0.6 15.7 100.0</td>
</tr>
<tr>
<td>Herfindahl–Hirschman Index</td>
<td>Summed squares of bank market shares by number of branches in borrower’s postal zone(^5)</td>
<td>0.18 0.14 0.06 0.14 1.00</td>
<td>0.17 0.12 0.06 0.15 1.00</td>
</tr>
<tr>
<td>(Herfindahl–Hirschman Index)(^2)</td>
<td>Herfindahl–Hirschman Index squared</td>
<td>0.05 0.14 0.00 0.02 1.00</td>
<td>0.04 0.12 0.00 0.02 1.00</td>
</tr>
<tr>
<td>Multi-Market Contact</td>
<td>Sum of the bank pairs in borrower’s postal zone weighted by the relative frequency of their bilateral contacts in other postal zones</td>
<td>0.17 0.08 0.00 0.18 0.33</td>
<td>0.18 0.07 0.00 0.19 0.34</td>
</tr>
<tr>
<td>Closeness of Lender</td>
<td>Inverse of one plus the shortest traveling time to the lender, in minutes</td>
<td>0.21 0.15 0.02 0.17 1.00</td>
<td>0.23 0.15 0.02 0.20 1.00</td>
</tr>
<tr>
<td>Remoteness of Competitors</td>
<td>One minus the inverse of one plus the shortest traveling time to the closest quartile competitor in borrower’s postal zone, in minutes</td>
<td>0.73 0.15 0.00 0.75 0.93</td>
<td>0.73 0.15 0.00 0.77 0.96</td>
</tr>
<tr>
<td>Branch Size</td>
<td>Proportion of bank loan portfolio at the bank branch, in percent</td>
<td>0.27 0.16 0.01 0.24 0.91</td>
<td>0.24 0.15 0.01 0.21 0.91</td>
</tr>
<tr>
<td>Number of Firms in Postal Zone</td>
<td>Number of registered firms in the borrower’s postal zone, in thousands</td>
<td>0.85 0.97 0.00 0.52 6.01</td>
<td>0.74 0.86 0.00 0.45 6.10</td>
</tr>
<tr>
<td>Industry Concentration in Postal Zone</td>
<td>Proportion of registered firms in borrower’s postal zone in industry of borrower, in percentage</td>
<td>0.01 0.03 0.00 0.00 0.20</td>
<td>0.02 0.03 0.00 0.00 0.31</td>
</tr>
<tr>
<td>Assets of Firms in Postal Zone</td>
<td>Average amount of assets of registered firms in the borrower’s postal zone, in billions of BEF</td>
<td>0.08 0.18 0.00 0.05 3.74</td>
<td>0.07 0.13 0.00 0.04 3.74</td>
</tr>
<tr>
<td>Urban</td>
<td>= 1 if located in agglomeration &gt;250,000 inhabitants</td>
<td>0.11 0.32 0.00 0.00 1.00</td>
<td>0.09 0.29 0.00 0.00 1.00</td>
</tr>
<tr>
<td>Firm Age</td>
<td>in hundreds of years</td>
<td>0.20 0.26 0.00 0.08 0.96</td>
<td>n/a n/a n/a n/a n/a</td>
</tr>
<tr>
<td>Firm Assets</td>
<td>in billions of BEF(^a)</td>
<td>0.01 0.05 0.00 0.01 0.88</td>
<td>n/a n/a n/a n/a n/a</td>
</tr>
<tr>
<td>Firm Earnings/Assets</td>
<td>in percentage</td>
<td>0.12 0.15 -0.53 0.09 1.25</td>
<td>n/a n/a n/a n/a n/a</td>
</tr>
<tr>
<td>Firm Short-Term Debt/Assets</td>
<td>in percentage</td>
<td>0.41 0.22 0.00 0.38 0.96</td>
<td>n/a n/a n/a n/a n/a</td>
</tr>
<tr>
<td>Model: Estimation:</td>
<td>I</td>
<td>II</td>
<td>III</td>
</tr>
<tr>
<td>-------------------</td>
<td>---</td>
<td>----</td>
<td>-----</td>
</tr>
<tr>
<td>Dependent Variable</td>
<td>Probit Relationship Banking</td>
<td>Probit Relationship Banking</td>
<td>Probit Main Bank</td>
</tr>
<tr>
<td>Herfindahl-Hirschman Index</td>
<td>$-126.52^{**}$</td>
<td>$-110.78^{*}$</td>
<td>$-118.17^{*}$</td>
</tr>
<tr>
<td>(Herfindahl-Hirschman Index)$^2$</td>
<td>$150.50^{**}$</td>
<td>$142.32^{**}$</td>
<td>$158.72^{**}$</td>
</tr>
<tr>
<td>Multi-Market Contact</td>
<td>$77.58^{**}$</td>
<td>$80.42^{**}$</td>
<td>$112.86^{**}$</td>
</tr>
<tr>
<td>Closeness of Lender</td>
<td>$33.97^{**}$</td>
<td>$33.03^{**}$</td>
<td>$32.82^{**}$</td>
</tr>
<tr>
<td>Remoteness of Competitors</td>
<td>$11.97$</td>
<td>$8.34$</td>
<td>$12.35$</td>
</tr>
<tr>
<td>Branch Size</td>
<td>$-11.49$</td>
<td>$-7.96$</td>
<td>$-8.05$</td>
</tr>
<tr>
<td>Number of Firms in the Postal Zone</td>
<td>$5.74^{**}$</td>
<td>$6.17^{**}$</td>
<td>$6.24^{*}$</td>
</tr>
<tr>
<td>Assets of Firms in the Postal Zone</td>
<td>$6.05$</td>
<td>$6.25$</td>
<td>$5.16$</td>
</tr>
<tr>
<td>Industry Concentration in the Postal Zone</td>
<td>$-12.34$</td>
<td>$-10.22$</td>
<td>$28.21$</td>
</tr>
<tr>
<td>Urban</td>
<td>$2.67$</td>
<td>$1.47$</td>
<td>$-9.62$</td>
</tr>
<tr>
<td>Firm Age</td>
<td>$-0.13^{*}$</td>
<td>$-0.11$</td>
<td>$0.08$</td>
</tr>
<tr>
<td>Firm Assets</td>
<td>$-42.70$</td>
<td>$-38.79$</td>
<td>$-118.01^{**}$</td>
</tr>
<tr>
<td>Firm Earnings/Assets</td>
<td>$31.24^{**}$</td>
<td>$20.40^{**}$</td>
<td>$-7.52$</td>
</tr>
<tr>
<td>Firm Short-Term Debt/Assets</td>
<td>$-12.98$</td>
<td>$-10.71$</td>
<td>$-21.19$</td>
</tr>
<tr>
<td>Constant</td>
<td>$16.67^{***}$</td>
<td>$-1.91$</td>
<td>$-1.35$</td>
</tr>
<tr>
<td>(Pseudo)-$R^2$</td>
<td>$0.37$</td>
<td>$0.38$</td>
<td>$0.40$</td>
</tr>
</tbody>
</table>

*Notes: The table reports the partial derivatives at the means, in percent, from (binary) Probit and Tobit models. The dependent variables are Relationship Banking, Main Bank, ln(Duration) and Industry Specialization. The definition of the variables can be found in Table 1. The number of observations is 645. The Pseudo-$R^2$ squared is calculated as in Zavoina and McElvee (1975)."
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable</td>
<td>Probit</td>
<td>Probit</td>
<td>Tobit</td>
</tr>
<tr>
<td>Relationship Banking</td>
<td>Main Bank</td>
<td>In(Duration)</td>
<td>Industry Specialization</td>
</tr>
<tr>
<td>Herfindahl–Hirschman Index</td>
<td>-64.39***</td>
<td>-65.09***</td>
<td>-126.46***</td>
</tr>
<tr>
<td>(Herfindahl–Hirschman Index)^2</td>
<td>67.44***</td>
<td>70.05***</td>
<td>117.53***</td>
</tr>
<tr>
<td>Multi-Market Contact</td>
<td>26.41**</td>
<td>30.17***</td>
<td>71.34***</td>
</tr>
<tr>
<td>Closeness of Lender</td>
<td>12.65***</td>
<td>10.38***</td>
<td>42.62***</td>
</tr>
<tr>
<td>Remoteness of Competitors</td>
<td>2.66</td>
<td>2.95</td>
<td>17.99***</td>
</tr>
<tr>
<td>Branch Size</td>
<td>-11.77**</td>
<td>-11.76***</td>
<td>-46.69***</td>
</tr>
<tr>
<td>Number of Firms in the Postal Zone</td>
<td>1.44*</td>
<td>1.47*</td>
<td>1.47</td>
</tr>
<tr>
<td>Assets of Firms in the Postal Zone</td>
<td>-2.00</td>
<td>-2.69</td>
<td>-3.82</td>
</tr>
<tr>
<td>Industry Concentration in the Postal Zone</td>
<td>-52.85</td>
<td>-44.70</td>
<td>-45.78</td>
</tr>
<tr>
<td>Urban</td>
<td>-1.82</td>
<td>-0.69</td>
<td>-4.45</td>
</tr>
<tr>
<td>Constant</td>
<td>-10.35</td>
<td>-10.67</td>
<td>163.05***</td>
</tr>
<tr>
<td>8 Postal Area Dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>49 Industry Area Dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>(Pseudo)-R^2</td>
<td>0.40</td>
<td>0.40</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Notes. The table reports the partial derivatives at the means, in percent, from (binary) Probit and Tobit models. The dependent variables are Relationship Banking, Main Bank, In(Duration) and Industry Specialization. The definition of the variables can be found in Table 1. The number of observations is 9213. The Pseudo-R squared is calculated as in Zavoina and McElvee (1975).
<table>
<thead>
<tr>
<th></th>
<th>645</th>
<th>9,213</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10.9%</td>
<td>8.6%</td>
<td>Proportion of Observations in Competitive, Intermediate, and Concentrated Postal Zones</td>
</tr>
<tr>
<td></td>
<td>64.5%</td>
<td>66.7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24.7%</td>
<td>24.7%</td>
<td></td>
</tr>
</tbody>
</table>

The figure plots Relationship Banking, in percent, and Duration, in years, as a function of the Herfindahl–Hirschman Index (HHI), using the estimated coefficients from the Probit Models 3.III and 4.I and the Tobit Model 3.VII. Other variables are set equal to their means. Two bottom rows indicate the proportion of observations in each HHI range (competitive, intermediate, concentrated) for both samples. The definitions of the variables are in Table 1.

Fig. 2. Bank market concentration and bank orientation.
Robustness

- Already mentioned:
  - Different samples
  - Main Bank and Duration of Relationship
  - Duration of Relationship cut-off at 3 years
  - Additional firm characteristics

- Other (see paper):
  - Multi-Market Contact$^2$, Distance$^2$
  - No observations with Duration > 10 years (7 years)
Other Dependent Variable

(Bank) Industry Specialization

= proportion of branch loan portfolio in industry of borrower (in %)
Conclusions

Competition $\uparrow$
Closeness of Lender $\uparrow$
(Bank Branch Size $\downarrow$)

$\downarrow$

Relationship Banking $\uparrow$

Boot & Thakor (JF 2000)
Stein (JF 2002)
Current Follow-Up

- Bank orientation: rules versus discretion
  - Cerqueiro, Degryse, Ongena (2008)
- Branch organization and lending reach/terms
  - Liberti (2006, 2007)
  - Degryse, Laeven, Ongena (2007)
- Bank/Market and creditor concentration
- Better measures of Industry Specialization