Quality and duration of banking relationships
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INTRODUCTION

This chapter will assess the relationship between the perceived quality of cash management services as measured in the GlobalCash-Europe96 study and the duration of bank relationships. In addition to the responses received from Norwegian companies to the GlobalCash-Europe96 study, a panel data set was used containing annual information on the bank connections for virtually all Oslo Stock Exchange (OSE)-listed companies for the period 1979 to 1994.

The results from GlobalCash-Europe96 seem to indicate that the quality of cash management services for two of Norway's largest banks is higher than other commercial or savings banks in Norway. Correspondingly, the duration of a bank relationship between these two banks and OSE-listed companies tends to be significantly longer than the average bank in this study. This finding holds even while controlling for company-specific characteristics, such as the number of maintained simultaneous bank relationships, equity ownership concentration, size, growth potential and leverage.

Hence the perceived quality of cash management services is potentially positively related to the length of a company-bank relationship, although causation is not necessarily unidirectional. Banks offering high quality services may be able to retain companies longer, as the company's incentives to switch banks are lowered, ceteris paribus. Alternatively, longer relationships may result in a higher quality of services, as the bank learns and fine tunes its services, whilst companies may be better able to exploit the services offered.

When estimating the duration of a company-bank relationship, it is recognised that consistent estimation of the duration and likelihood of switching requires an estimator that is robust to the censored sampling distribution. Non- and fully-parametric estimators of hazard functions have been utilised which describe the likelihood of ending a given bank relationship, conditional on the length of the existing relationship. Also analysed is the sensitivity of the results to assumptions about the underlying distribution of durations.

The rest of the chapter is organised as follows:

- an overview of relevant survey results provided by GlobalCash-Europe96
- data on Norwegian bank relationships
- conclusions

CASH MANAGEMENT IN NORWAY

The GlobalCash-Europe96 study was co-ordinated in Norway by the Norwegian School of Management. Identified cash managers and treasurers in the 216 largest Norwegian companies (by sales) and non-banking financial institutions (by assets) received a personal letter and 12-page questionnaire in Norwegian. Each addressee was telephoned twice over a two to three week period to encourage completion of the questionnaire. Eventually, 41 responses were received (22 in EuroCash94) to yield a response rate of 19 per cent.

Representing nearly 40 per cent of total commercial and savings bank assets in Norway, two of Norway's leading banks dominate the Norwegian banking market. This was confirmed in the GlobalCash-Europe96 study. More than 70 per cent of cash managers used one of these banks for cash management services in 1996 (up from 65 percent in 1994), with 85 per cent listing either bank as their 'first bank' (see Table 12.1).

<table>
<thead>
<tr>
<th>Top two commercial banks: First bank</th>
<th>Second bank</th>
<th>Third bank</th>
<th>Total mentions</th>
</tr>
</thead>
<tbody>
<tr>
<td>34 (12)</td>
<td>17 (7)</td>
<td>3 (2)</td>
<td>54 (21)</td>
</tr>
<tr>
<td>Other commercial banks: Other commercial banks</td>
<td>3 (4)</td>
<td>9 (2)</td>
<td>3 (2)</td>
</tr>
<tr>
<td>Savings banks</td>
<td>3 (0)</td>
<td>2 (2)</td>
<td>1 (2)</td>
</tr>
</tbody>
</table>

Source: GlobalCash-Europe96, Question 23. The table reports answers given by cash managers in 41 (22) different Norwegian companies to the question 'Which banks do you use in your home country for cash management services?'
About 20 per cent of companies use other commercial banks, while less than 10 per cent of companies reported using a savings bank.

Further, according to GlobalCash-Europe96, the main criteria for Norwegian companies to allocate business between banks was (see Table 12.2):

(a) pricing;
(b) relationship;
(c) service quality.

<table>
<thead>
<tr>
<th>Table 12.2 Criteria used in allocating business between banks in Norway</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean rank</strong></td>
</tr>
<tr>
<td>Pricing</td>
</tr>
<tr>
<td>Relationship</td>
</tr>
<tr>
<td>Service quality</td>
</tr>
<tr>
<td>Technology</td>
</tr>
<tr>
<td>Level of commitment to your business</td>
</tr>
<tr>
<td>Domestic branch network</td>
</tr>
<tr>
<td>Reputation for cash management</td>
</tr>
<tr>
<td>Bank ratings</td>
</tr>
<tr>
<td>To compensate for other services</td>
</tr>
</tbody>
</table>

Other criteria which were mentioned on the survey could easily be included in one of these three categories: to compensate for other services is a price consideration; technology and domestic branch network are important elements of quality; and the level of commitment to your business, the reputation for cash management, and the bank ratings have effects upon the value of the relationship.

In general, two of Norway's leading banks are perceived to be the 'best bank for cash management services' in 1996 (see Table 12.3) with 28 mentions as the best bank and 26 as the second best. Other commercial banks or savings banks are far behind both in terms of best and second best mentions and in the comprehensive scoring, independent of the weighting scheme used to calculate this score. The question that naturally arises is whether this difference in perception between banks corresponds to differences in pricing, relationship or quality.

<table>
<thead>
<tr>
<th>Table 12.3 Best Norwegian banks for cash management services in 1996</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Best bank</strong></td>
</tr>
<tr>
<td>Total mentions</td>
</tr>
<tr>
<td>Top two commercial banks</td>
</tr>
<tr>
<td>Other commercial banks</td>
</tr>
<tr>
<td>Savings banks</td>
</tr>
</tbody>
</table>

The GlobalCash-Europe96 study provides some evidence with respect to the differences in pricing. Question 27 in the survey probes by asking 'Why do you think that the banks you have named are the best?' A list of 12 criteria includes pricing and, on this basis, 22 respondents chose either of two of Norway's leading banks as the best or second best bank. The conditional nature of the question unfortunately leaves only a single observation for a savings bank and no observations for other commercial banks.

The GlobalCash-Europe96 study also investigates in more detail the difference in quality of the cash management services experienced by the respondents. The detailed results reported in GlobalCash-Europe96 - Statistical Report for Norway are summarised in Tables 12.4 and 12.5, using a scoring scheme described in detail below the tables. Cash managers using the top two banks seem equally pleased with the quality of their delivered cash management services. Savings bank customers seem less satisfied. They appear to be concerned especially about the quality of international EFTs, pooling and the netting services provided by savings banks.

The third criterion, which is most frequently used by companies in allocating business across banks, is the ongoing relationship. Unfortunately the GlobalCash-Europe96 study had no questions analysing this aspect of cash management. To shed some light on the possible relationship
Table 12.4  Experienced quality of cash management services in 1996

<table>
<thead>
<tr>
<th>Lead bank</th>
<th>Second bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance reporting</td>
<td>Domestic International EFT</td>
</tr>
<tr>
<td>Top two commercial banks</td>
<td>51</td>
</tr>
<tr>
<td>Other commercial banks</td>
<td>8</td>
</tr>
<tr>
<td>Savings banks</td>
<td>50</td>
</tr>
</tbody>
</table>

Source: GlobalCash-Europe96, Question 24 and authors' own calculations. The table reports answers given by cash managers in 41 different Norwegian companies to the question 'How do you rate the banks which you use in your home country for their cash management services?' Possible answers were: Excellent, Good, Average, Poor and Very Poor. Calculation: for each bank the proportion of companies answering 'Excellent' scores 100, 'Good' scores 50, 'Poor' scores -50 and 'Very Poor' scores -100. The obtained score is then averaged over the number of banks in the set. The total score is the average score for the different services received.

Table 12.5  Experienced quality of cash management services in 1994

<table>
<thead>
<tr>
<th>Lead bank</th>
<th>Second bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance reporting</td>
<td>Domestic International EFT</td>
</tr>
<tr>
<td>Toptwo commercial banks</td>
<td>51</td>
</tr>
<tr>
<td>Other commercial banks</td>
<td>33</td>
</tr>
<tr>
<td>Savings banks</td>
<td>NA</td>
</tr>
</tbody>
</table>

NA = not applicable

Source: EuroCash94 and authors' own calculations. The table reports answers given by cash managers in 22 different Norwegian companies to the question 'How do you rate the banks which you use in your home country for their cash management services?' The possible answers and scores are as shown in the table.
between perceived quality of cash management services and the duration of the bank-company relationship, an analysis was conducted of a panel data set containing annual information on the bank connections for virtually all OSE-listed companies for the 16-year period 1979-94.

### BANK RELATIONSHIPS IN NORWAY

#### Introduction

A distinguishing feature of a bank may be its ability to reduce costly information asymmetries between those seeking financing and those willing to contribute capital. For instance, a bank may efficiently screen and monitor a company, reducing the need for other contracting parties to duplicate the effort. A bank can also help to reduce the likelihood that a company will choose poor projects by threatening not to renew future debt contracts. Thus a company that establishes a relationship with a bank can reduce the uncertainty about future investment projects and obtain debt financing that would otherwise be unavailable or prohibitively expensive.

It is through the progression of a relationship that a bank learns more about a company's ability to meet future obligations, both through its payment history and through other ancillary services offered by the bank (e.g., deposit, clearing and payment services, lines of credit, etc.). Because of its ability to observe a stream of proprietary information, the bank may have the potential to 'informationally capture' customers who may find it difficult to obtain financing elsewhere.

Ongena and Smith (1997) explore the dependency between the length of a bank relationship and the decision to terminate the relationship and find no strong link between the two; in other words, companies with long relationships are as likely to leave their banks as companies with short relationships. Ongena and Smith (1997) do find that the decision to terminate a bank relationship is influenced by factors other than the duration of the relationship. For example, companies which maintain a relationship with more than one bank at a time are more likely to end a given relationship. Moreover, the likelihood of leaving a bank decreases with the company's adjusted market value of equity (a measure of company size) and increases with the company's growth potential (as proxied by the ratio of market-to-book value of the company) and leverage.

The perceived quality of the banking services a company receives is also a natural candidate for influencing the likelihood that a company will terminate a given relationship (in turn influencing the duration). For instance, longer relationships may result in higher quality of services. Alternatively, the bank can learn and fine tune its services, while companies may be better able to exploit the services offered.

#### Bank Relationship Data

Data was obtained on bank relationships of OSE-listed companies for the years 1979 to 1994 from *Kierulfs Handbook*, an annual handbook published by *Oslo Børs Informasjon AS*, a data-publishing subsidiary of the OSE. The handbook contains financial and accounting information on all listed companies, as well as other company-specific information. In particular, as part of the listing requirements, each company must report on an annual basis its primary bank connections (up to a maximum of four banks).

The duration of a relationship is defined to be the number of years a company is observed maintaining a bank connection. In a given year, the sample chosen covers roughly 100 OSE companies, representing 97 per cent of the population of exchange-listed companies.

A sample observation is defined as one company-bank relationship. The number of company-bank observations equals the total number of companies in the sample multiplied by the number of bank relationships maintained by each company over the sample period. The final data set contained 263 company-bank relationships. Table 12.6 gives some insight into the concentration of the relationships within the banking industry in Norway by listing the number of relationships by bank. Despite the relatively large number of banks represented in the sample, the relationships are concentrated. Approximately 75 per cent of the companies maintain a relationship with at least one of Norway's two leading banks.

#### Survivor Functions

Let $T$ represent the duration of a relationship (i.e., the amount of time that passes before a relationship ends). A simple probabilistic way to describe the length of a relationship is through a *survivor function*, $S(t) = Pr(T > t)$, which yields the probability that the relationship lasts at least to time $t$ (the survivor function equals one minus the cumulative distribution function of $T$).

It is possible to examine separately the likelihood of ending a banking relationship, conditional on the duration of the relationship. Pairwise
cohort comparisons of the estimated survivor functions for different categories can be plotted: that is, the survivor function of relationships of companies banking with bank $X$ can be plotted against relationships of companies not banking with bank $X$. This process can be repeated for each individual bank or group of banks (e.g., commercial banks or savings banks). When plotted, it becomes apparent that two of Norway's largest banks are likely to have relationships that last significantly longer than relationships with other commercial or savings banks. This means that the likelihood of a relationship with either of these two banks lasting beyond 10 years is roughly 90 per cent. On the other hand, the likelihood of a relationship with other commercial banks lasting this long is estimated to be only 30 per cent.

**CONCLUSIONS**

There is an interesting correspondence between the results from GlobalCash-Europe96 with respect to quality ratings of cash management services by the four main Norwegian banks and the duration of bank relationships between OSE-listed companies and their banks. The results from GlobalCash-Europe96 seem to indicate that the quality of cash management services at two of the largest Norwegian banks is higher than the quality at other commercial banks or savings banks. Simultaneously, the estimated duration of bank relationships between the two of the largest Norwegian banks and OSE-listed companies tends to be much longer than other commercial banks and savings banks. This is even the case when controlling for company characteristics like the number of bank relationships, ownership concentration, size, Tobin's Q, and debt structure.

There are a number of weaknesses in this study. Since it is not possible to observe information specific to the contract between each company and its bank, it can only be guessed how important cash management services are in the complete spectrum of a banking relationship. The results are 'suggestive': that is, it is conceivable that other bank activities weigh more heavily in the decision by a company to continue or discontinue a relationship. This points to a second shortcoming of this work, namely the inability to observe the reason for the termination of a company-bank relationship. In this work, the implicit assumption is that any termination is initiated by the company. It is also possible that the bank terminates the relationship.
Quality and Duration of Bank Relationship

Drawing a parallel between the perceived quality of cash management services and the duration of banking relationships implicitly assumes pricing of these services to be more or less equal across banks. Although this assumption is more than likely too stringent, given the multidimensional and multiperiod character of the banking product, coupled with the desire to keep customer information proprietary, there is a lack of reliable data on the pricing of bank services, and of cash management in particular. Future GlobalCash studies should include more questions probing for price and pricing-based decisions. In addition it could be useful to ask cash manager respondents to report the duration of current cash management relationships (as far as the organisation's memory stretches), and the importance of cash management services in the entire banking relationship. This would allow for further fruitful research on the duration of bank-company relationships and the impact of these relationships upon companies' decisions related to the nature of future business.

APPENDIX: ESTIMATOR FOR THE SURVIVOR FUNCTION

Let \( h_i \) be the number of bank relationships with observed duration / and maximum duration /, where \( i \in [0,K] \), corresponds to the maximum fixed cut-off (15 years in our data set) and \( i < \). An observed duration of zero \( (i = 0) \) indicates that a firm listed a bank in one year, while both / and \( i \) are recorded as zero when a firm is listed for only one year. When \( i = \), the spell is right censored; one cannot distinguish whether the spell ended that year or continued in the unobserved future \( h_i \) is the number of censored spells).

Define \( h_i = \sum y_i h_i \) and \( n_i \) to be the number spells that have neither been completed nor censored as of length \( k \), \( n_k = \sum_{i=0}^{K} h_i \); a natural, non-parametric estimator for \( k \), the likelihood that a firm switches banks in the \( k \)th year given that the relationship has lasted \( k \) years, is

\[
\lambda(k) = \frac{h_k}{n_k} \tag{A.1}
\]

which is the number of switches in year \( k \) divided by the number of relationships that have survived to length \( k \). Note that the estimator \( \lambda(k) \) is robust to right censoring since the denominator in (A.1) normalises the number of switches at length \( k \) by the number of uncensored spells existing at time \( k \).

We define the estimator of the survivor function to be

\[
\hat{S}(k) = \prod_{i=0}^{k} (1 - \lambda(i)) \tag{A.2}
\]

which is the Kaplan-Meier (1958) or 'product-limit' estimator for the survivor function. The approximate variance of the survivor estimates is:

\[
\text{var}(\hat{S}(k)) = (\hat{S}(k))^2 \sum_{i=0}^{k} \frac{h_i}{n_i(n_i - h_i)} \tag{A.3}
\]

Notes

"The authors have benefited from the research assistance of Didrik von Haffenbradl and Therese Jørgensen. The research was supported by the Fund for the Advancement of Bank Education and the Research Programme in Competitive Enterprises at the Norwegian School of Management.

1. It is possible with GlobalCash-Europe96 to identify the perceived performance of over 250 banks throughout Europe. In order to secure future cooperation with banks, this information is available only to those organisations that fund the GlobalCash studies. In all other publications, the identity of individual banks must be disguised.
2. Much of the motivation for the analysis of bank relationships can be found in Ongena and Smith (1997).
3. See GlobalCash-Europe96 statistical report for Norway for more details.
4. For more details, see Ongena and Smith (1997).
5. Actual bank names could be revealed but, to maintain consistency with the principles of GlobalCash-Europe96, bank names are not revealed.
6. The table reports the number of relationships between OSE-listed companies and banks.
An estimator for the survivor function, robust to right censoring, is introduced in the Appendix.
8. Actual plots, statistical definitions and models can be further explored in Ongena and Smith (1997).

References