Takalo, Tuomas

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Tuomas Takalo
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Bank of Finland
Research Unit

PO Box 160
FIN-00101 Helsinki

Phone: +358 9 1831

Email: research@bof.fi
Website: www.suomenpankki.fi/en/research/research-unit/

Switching Costs in the Finnish Retail Deposit Market*

Tuomas Takalo

February 11, 2019

Abstract

I calibrate switching cost for the Finnish retail deposit market by using the approach developed by Oz Shy (2002). It turns out that switching costs faced by deposit customers of the main banks are high, ranging from 200 euros to nearly 1,400 euros. Over the past 20 years, switching costs have increased by roughly 50% in real terms, but in relation to average account balance, switching costs have not essentially changed. I conjecture that differences in the switching costs among the Finnish banks might be explained by differences in their loyalty programs.

KEYWORDS: Swithcing costs, bank competition, customer loyalty programs.
JEL CODES: G21, L13, L49.

*Contact e-mail: tuomas.takalo@bof.fi. This paper contains data and calibration methods behind the results reported in Section 2 of Rune Stenbacka's and Tuomas Takalo's article "Switching Costs and Financial Stability", forthcoming in the *Journal of Financial Stability*, and discussion of implications of those results. I thank Rune Stenbacka for detailed comments on the draft. I also thank Juho Anttila for research assistance and Sara Stenvik for useful discussions.

1 Introduction

Bank switching costs are recognized as a determinant of financial stability (Brown et al., 2014, and Stenbacka and Takalo, 2019). The existence of significant switching costs in deposit markets is also well documented (see, e.g., Kiser, 2002, Carbo-Valverde et al., 2011, and Brunetti et al., 2016). The evidence is, however, often indirect. A notable exception is Shy (2002) who develops a method of calibrating switching costs directly, and applies it to Finnish deposit market data. In this paper I measure switching cost in the Finnish deposit market by using the approach developed by Oz Shy (2002). As the data in Shy (2002) comes from year 1997 and here around the year 2017, the results also show how bank switching costs have changed over the past 20 years in Finland. In contrast to Shy (2002), I can use banks' real names, and market shares are based on accurate numbers. However, determination of bank service fees is much more complicated today than it was in the 1990s due to more sophisticated product versioning of banks.

Switching costs faced by customers of the largest banks appear to be high, ranging from 200 euros to nearly 1,400 euros. In relation to the average account balance of a customer, switching costs range from 2% to 15%. Comparing these numbers with those reported by Shy (2002) suggests that while switching costs have increased some 50% in real terms over the past 20 years, switching costs per average account balance have not essentially changed. As in Shy (2002), the customers of the smallest bank face much lower switching costs than the customers of its larger rivals.

Prior to this study, Shy's method has been used to measure switching costs in the banking industry at least by Egarius and Weill (2016) but they do not analyze deposit market switching costs separately (Shy's method has also been employed in master theses - see, e.g., Carlström, 2010, and Stenvik, 2016). Egarius and Weill (2016) find that cooperative bank customers tend to encounter lower switching costs than the customers of other banks. In the Finnish case,

however, the another stakeholder bank type, savings bank, appears to create the lowest swithching costs to their clients, and the clients of the main cooperative bank - the OP Group - face the highest switching costs. These findings suggest that the OP Group's loyalty program has been successful to lock-in their owner-customers and the absence of the loyalty program in savings banks might be a major reason for their clients' lower switching costs.

I next replicate the main parts of Shy's (2002) model. Then, in Section 3, I explain the institutional environment of the Finnish banking industry and collection of the data. I combine the data with the model in Section 4 so as to provide new evidence of the deposit market switching costs. Section 5 concludes.

2 Model

I replicate here the key features of the model in Shy (2002), referring the reader to the original source for more details and proofs (see also Shy, 2001).

Consider a market with k banks, $\{k \in Z | k \geq 2\}$, indexed by $i = 1, ...k$. Each bank i has initially $N_i \in Z_{\geq 0}$ customers who face the choice of either remaining in the bank or switching to another one. A customer's utility is given by

$$U_i = \begin{cases} -f_i, & \text{if the consumer stays} \\ -f_j - \delta_i, \forall j \neq i, & \text{if the consumer switches} \end{cases} \tag{1}$$

in which $f_i \in R_{\geq 0}$ is the service fee charged by bank i, and $\delta_i \in R_{\geq 0}$ is the switching cost in the case where bank i's customer decides to change her banking relation to bank j.

The profits of bank i are then given by

$$\pi_i(f_1, ..., f_k) = f_i q_i \tag{2}$$

in which $q_i \in Z_{\geq 0}$ is the number of customers who will choose to deposit in bank i.

The banks are indexed according to a decreasing market share order so that bank 1 has the largest market share and bank k has the smallest market share. It is further assumed that i) each bank i, $i \neq k$, fears being undercut by bank k, and sets its fee f_i in reference to f_k, and that ii) the smallest bank k fears that it is targeted by the largest bank 1, and therefore sets its fee f_k in reference to f_1.

Under these assumptions there exists a vector of fees $(f_1, ..., f_k)$ that satisfies the Undercut-proof Property (UPP). In price competition, firms have an incentive to undercut a rival's price in order to attract customers from their competitor. Intuitively the UPP is satisfied when no bank can increase its profits by undercutting a rival bank and no bank can increase its service fee without being undercut by a rival.

Formally, when the UPP is satisfied, each bank i, $i \neq k$, chooses its fee f_i to maximize $\pi_i(f_i, f_k)$ (as given by equation (2)) subject to the constraint

$$f_k q_k \geq (f_i - \delta_i)(N_i + N_k), \quad i \neq k, \tag{3}$$

taking f_k as given. Bank k in turn chooses f_k to maximize $\pi_k(f_k, f_1)$ subject to

$$f_1 q_1 \geq (f_k - \delta_k)(N_i + N_k), \quad i \neq k, \tag{4}$$

taking f_1 as given.

Equations (2)-(4) imply that the banks choose the highest possible prices satisfying constraints (3) and (4). Therefore constraints (3) and (4) hold as equalities. Furthermore, in an UPP equilibrium it must hold that $q_i = N_i \ \forall i$. Substituting N_i for q_i in equations (3) and (4), and solving for δ_i yields the UPP switching costs as

$$\begin{aligned} \delta_i &= f_i - \frac{N_k f_k}{N_i + N_k}, \quad i \neq k \\ , \delta_k &= f_k - \frac{N_1 f_1}{N_1 + N_k}. \end{aligned} \tag{5}$$

Equation (5) implies that estimating switching costs only requires information about banks' service fees and the relative number of retail customers in each bank.

3 Institutional Environment and Data

3.1 Finnish Retail Banking Industry

Since the Finnish banking crisis of the early 1990s, there has been a large number of mergers in the Finnish banking industry. As a result the Finnish retail banking market is concentrated. As shown by Table 1 the deposit market shares of the two and four largest banks are over 65% and 80%, respectively. In what follows, I will focus on the four largest banking groups, the OP Group, Nordea, Danske Bank and the Savings Banks Group.

Table 1: Bank Deposit Market Shares in Finland in 2016

Bank	Deposits (M€)	Market share (%)
OP Group	55,198	37.5
Nordea	40,723	27.7
Danske Bank	18,411	12.5
Savings Bank Group	6,072	4.1
Others	26,694	18.1
Total	147,098	100

Notes: This table lists deposit account balances (excluding deposits from financial institutions) at the largest banks in Finland, and the corresponding deposit market shares at the end of year 2016. Deposit and market share figures are in million euros and percentages, respectively. Source: Finance Finland (2017).

The Finnish retail banking market is also characterized by the use of customer loyalty programs, which reward customers for concentrating all their banking services and assets on the same bank. Typically, a customer gets cash bonuses, discounts, or other benefits once she has a threshold amount of assets (e.g., deposits and loans) at her bank.

Of the four main banks in Finland, three run a customer loyalty program. The market leader, the OP Group, is a cooperative, offering loyalty discounts

to those customers who are also its owners. The amount of discounts awarded to a customer depends on the customer's average monthly assets and loans at the OP Group. The loyalty benefits at Danske Bank and Nordea, the two main commercial banks in Finland, depend on the amount of assets in the bank; the key details of their programs are listed in Table 2. Out of the four main banks, only the Savings Banks Group has typically no customer loyalty programs.

Table 2: Loyalty Programs of Nordea and Danske Bank

Nordea			
Regular customer	Key customer		
Assets ≥6,000€	Assets ≥30,000€		
Products from ≥3 different categories	Products from ≥5 different categories		
Regular monthly income ≥500€	Regular monthly income ≥500€		
Danske Bank			
Level 1	Level 2	Level 3	Level 4
Assets 0-10,000€	Assets 10,000-50,000€	Assets 50,000-150,000€	Assets ≥150,000€

Notes: This table lists the requirements for each level of the customer loyalty programs of the two main commercial banks in Finland, Nordea and Danske Bank, in 2017. "Assets" includes both savings and loans.

The economics of customer loyalty programs has been extensively studied (see, e.g., Basso et al., 2009 and Kari et al., 2017 for a discussion of the issues). According to the literature, loyalty programs could be seen as a way for banks to increase switching costs, lock-in customers, and even deter entry, since a customer will lose her loyalty benefits if she transfers her assets to a different bank. Alternatively, loyalty programs could be seen as a form of product versioning where a bank with a market power attempts to price discriminate its customers. Loyalty programs also provide valuable information for banks about their customers, allowing for more accurate customer tracking and database

marketing. The competitive implications of customer loyalty programs are not clear; as in the case of switching costs more generally, they can make markets more or less competitive depening on circumstances (see, e.g., Basso et al., 2009, Ruiz-Aliseda, 2016, and Stenbacka and Takalo, 2019)

The Finnish banks' customer loyalty programs have raised competition policy concerns. In particular, the OP Group runs a loyalty program in which loyalty bonuses accumulate from the use of banking and insurance services and can only be used for the payment of banking service charges and insurance fees. The Finnish Competition and Consumer Authority (FCCA) launched an investigation into the OP Group's loyalty program in December 2015 after a rival insurance provider, If P&C, filed a complaint, accusing the OP Group for abusing its dominant position by bundling the Group's banking and insurance products via its loyalty program. This complaint prompted the OP Group to withdraw from Finance Finland, the industry association of the financial sector firms in Finland. The FCCA has also raised a concern that the banks have been using Finance Finland as a collusive device so as to raise service fees, albeit the FCCA's investigation in this matter has focused on the consumer credit market (see FCCA, 2016).

3.2 Measuring Market Shares and Service Fees

While equation (5) suggests that estimating switching costs only requires information about service fees charged by each bank and the relative number of retail customers in each bank, I do not have these figures but need to approximate them from available data.

I approximate a bank's markets share in terms of retail customers by a bank's market share in terms of retail deposits, as given in Table 1. Shy (2002) suggests of using the number of bank accounts as a proxy for the bank's customer base. The problem with this proxy is that many accounts are inactive. For example, according to the Bank of Finland sources, there were in total 16,211,877 bank accounts in Finland in 2016, which corresponds roughly 3.5 bank account per

adult person.[1] The deposit market share proxy circumvents this problem but I cannot take into account the skewed distribution of deposits across customers in calculations. Using a bank's mortgage market share as a proxy for the bank's customer base would yield similar results but the fourth largest bank in terms of granted mortgages would be Aktia, just ahead of the Savings Banks Group.

Service fees are typically monthly or annual fees. Hence, when a customer contemplates switching a bank, relevant consideration is the discounted sum of fees that the customer expects to pay if she stays with her current bank or switches to another bank. I therefore calculate life-time fees by discounting the infinite sum of monthly and annual fees with the same four percentage real interest rate that is also used in Shy (2002). More specifically, the lifetime fee $f_{l,i}$ for bank i is calculated from the bank's monthly fee $f_{m,i}$ with the formula $f_{l,i} = 12 \cdot f_{m,i}/(1-d)$ where $d = 1/(1+r)$ is the discount factor when the real interest rate is $r \in R_+$. With $r = 0.04$, $f_{l,i} = 312 \cdot f_{m,i}$.

I collect information about banks' service fees from the VertaaEnsin.fi online platform in January 2018. VertaaEnsin.fi is a part of the CompareEurope-Group, a leading provider of online comparison platforms for financial services in Europe. VertaaEnsin.fi contains up-to date information about various retail banking packages, customer loyalty programs, and the associated account and payment card fees in Finland. To facilitate a customer's comparison of banks and their service fees, the platform also selects the most relevant service packages for each bank. I include all these packages in the service fee calculations, and double-check the accuracy of the information for these packages from the banks' websites.

VertaaEnsin.fi, however, contains no information about the Savings Banks Group. It provides service fee information for Oma Säästöpankki, the largest savings bank in Finland, but Oma left the Savings Banking Group in 2015. I therefore use Nooa Säästöpankki as the representative of the Savings Banks

[1] There were 5.503 million people in Finland in 2016, of which 84 were at least 15 years, see Statistics Finland, http://www.stat.fi/tup/suoluk/suoluk_vaesto.html, last accessed on 30 October, 2017.

Group. Nooa is owned by the other group member bank and is a large savings bank operating in the Helsinki metropolitan area. I obtain Nooa's fee information from the bank's website. Using the fee information for Oma from VertaaEnsin.fi as a representative of savings banks fees instead of Nooa's fees gives essentially the same results (see Section 4.3).

Using the collected service fee information, I calculate the average monthly and life-time fees for the banks. Table 3 displays the results.

A customer residing in Finland has a statutory right to basic banking services that include a current account, a payment card, and internet banking services (Amendment to Act on Credit Institutions §1054/2016). The first service package featured in Table 3 for each bank is such a mandatory banking service package. The other packages I consider typically include a more advanced payment card and some other services. The packages in the table are labeled according to the most advanced payment card included in a package. (In some premium packages, a customer can have access to another payment card and bank account for the same fee.)

Table 3 shows that the lifetime fees for the mandatory service package and for a package with a standard combined debit-credit card are roughly 1,000-2,000 euros. Customers having access to the highest loyalty benefit package in Nordea face the lowest fees. To reach such loyalty benefit levels, a customer needs to hold some non-negligible amount of assets in the bank (see Table 2). Therefore it is likely that such a customer pays other fees to Nordea, such as mortgage interest rates and repayment fees, or fund management fees, which are not captured by the service fee calculations here. Customers willing to purchase a premium service package at the lowest loyalty benefit level in Danske Bank face the highest fees, but such customers are probably rare.

Table 3 also reveals that the banks' average fees across all customer categories of a bank, except in the case of Danske Bank, are close to each other, approximately five euros per month or roughly 1,500-1,600 euros over the lifetime. However, Danske Bank's larger average fee is driven by the high price of

the premium (Platinum) service package for the lowest loyalty benefit levels. If the Platinum package is excluded from two or three lowest benefit levels, Danske Bank's average fee becomes similar to the rivals' average service fee.

Table 3: Service Fees of the Largest Finnish Banks

Bank and Package	Monthly fees (€)	Lifetime fees (€)
Savings Banks Group		
Debit/Credit	4	1,248
Gold Debit/Credit	6.25	1,950
All customers, average	5.13	1,599
OP Group		
Non-owner customers		
Electron	5.45	1,700
Owner-customers		
Debit/Credit	2.95	920
Gold Debit/Credit	6.50	2,028
All customers, average	4.95	1,550
Nordea		
Basic customers		
Electron	7.5	2,340
Regular customers		
Debit/Credit	5.25	1,638
Gold Debit/Credit	6.7	2,090
Key customers		
Gold Debit/Credit	0	0
All customers, average	4.86	1,517
Danske Bank		
Benefit level 1		
Debit	6.8	2,122
Gold Debit/Credit	6.9	2,153
Platinum Debit/Credit	18	5,616
Benefit level 2		
Debit	4.8	1,498
Gold Debit/Credit	5.9	1,841
Platinum Debit/Credit	12	3,744
Benefit level 3		
Debit	1.6	499
Gold Debit/Credit	3.8	1,187
Platinum Debit/Credit	9	2,808
Benefit level 4		
Debit	1.5	468
Gold Debit/Credit	3.7	1,154

Platinum Debit/Credit	8	2,496
All customers		
Average	6.83	2,132
Average excl. Platinum for bl. 1-3	4.83	1,505

Notes: The first column explains service packages at each bank and the second column their corresponding monthly service fees. The lifetime fees in the third column are calculated by using four percentage real interest rate, as in Shy (2002). All service packages include at least the statutory banking services (a bank account, internet banking, and a payment card). The service packages in the first column are labeled according to the most advanced payment card included in the package. "Electron" means that a package only includes the Visa Electron debit card, "Debit/Credit" means that a package includes a standard combination card that has both debit and credit payment features, and "Gold" and "Platinum" mean that a package includes a premium combination debit-credit card (Visa Gold, Mastercard Gold, or Mastercard Platinum). Visa is the main provider of cards for the Savings Bank and OP Groups, and Mastercard for Nordea and Danske Bank. The service packages and fees are collected in January 2018 from the VertaaEnsin.fi online comparison platform and banks' websites. The Savings Bank Group is represented by Nooa Säästöpankki. "Average" is an average service fee across all customer categories of a bank, and "Average excl. Platinum for bl. 1-3" is an average service fee of Danske Bank when the Platinum package is excluded from the benefit levels 1-3 but included in the benefit level 4.

4 Results

4.1 Calibration Procedure

Using the model of Section 2, and the deposit market shares and service fees calculated in Section 3, I can attempt to measure the switching costs. A challenge in this exercise is that I do not know the distribution of customers across various levels of the banks' customer loyalty programs. Thus, while Table 3 suggests that three main banks with the largest market shares engage in product differentiation, there is no point to extend the single fee model of Section 2 to capture this phenomenon. I thus proceed as if the all banks would set a single fee as in the model of Section 2.

In equation (5), I first let $k = 4$, and then use the third column of Table 1 to set $N_1 := N_{OP} = 0.375$, $N_2 := N_N = 0.277, N_3 := N_{DB} = 0.125$ and

$N_4 := N_{SB} = 0.041$ in which the letter subscripts refer to the name of the bank. Of the four banks considered the OP Group (OP) has the largest market share and the Savings Banks Group the lowest. Therefore the model is based on the assumption that the Savings Banks Group sets its fee by using the fee of the OP Group as the reference point, and the other three banks set their fees in reference to the fee of the Savings Bank Group.

As an example of switching cost calculation, let us consider the OP Group. I approximate the OP Group's service fee by its average fee across its customer categories. The assumption is heroic. It is plausible to think that a majority of the OP Group's customers are also its owners and use a standard combined Visa Debit/Credit card. Thus, using the average service fee approximates the service fees upwards. Yet, the service fee calculations only take into account the basic internet banking account fees and fixed annual fees from a payment card. Since most customers use some other banking services (e.g., withdraw cash from ATMs, use credit features of a payment card, exchange currency, and so on), the service fees in my calculations are approximated downwards. Furthermore, since market shares are based on account balances and since it is plausible to think that customers using a Visa Gold card have larger account balances, the OP Group's service fee and, by implication, the switching costs of its customers, relative to account balances are more accurately captured than the average service fee and the switching cost in terms of euro amounts. In any event, by using Table 3, it is easy to calculate alternative switching costs by using alternative weightings of customer segments.

Under these assumptions, Table 3 reveals that the average life-time discounted sum of service fees charged by the OP Group (f_{OP}) is approximately $1,550$ euros. Similarly, the average life-time fee charged by the Savings Bank Group (f_{SP}) is approximately $1,599$ euros. Then, equation (5) suggests that the switching costs facing the OP Group's customers are given by

$$\delta_{OP} = f_{OP} - \frac{N_{SB} f_{SP}}{N_{OP} + N_{SB}} = 1,550 - \frac{0.041 \cdot 1,599}{0.375 + 0.041} \approx 1,392. \qquad (6)$$

Proceeding in the way outlined by equation (6) gives the switching costs for three remaining banks. In the case of Danske Bank, I use the average service fee that excludes the Platinum package from the benefit levels 1-3 but include it in the benefit level 4. To measure the switchings costs per average account balance, I calculate the average account balance by dividing the total account balance in the Finnish banking industry from Table 1 by the total number of bank accounts in Finland in 2016.

4.2 Results

The main results are summarized in Table 4. The two bottom rows display the calibrated switching costs. The mean lifetime switching cost is 1,004 euros, and 11% in relation to the average account balance. The Savings Bank Group's customers can switch a bank much more easily than the customers of the other banks. Shy (2002) also finds that the customers of the smallest bank face much lower switching costs than the customers of its rivals.

Table 4: Switching Costs in the Finnish Banking Industry in 2017

	OP Group	Nordea	Danske Bank	Savings Banks
Market share (%)	37.5	27.7	12.5	4.1
Average monthly fees (€)	4.95	4.86	4.83	5.13
Lifetime fees (€)	1,550	1,517	1,505	1,599
Switching costs (€)	1,392	1,311	1110	202
SC/avg. bal. (%)	15	14	12	2

Notes: The last row expresses switching costs per average account balance (9074 euros). The average account balance is calculated by dividing aggregate balance (147,098 M€), obtained from from Table 1, by the total number of bank accounts (16,211,877) in 2016, obtained from the Bank of Finland. Market shares are from Table 1, and monthly and lifetime fees are from Table 3. The fees reflect the situation at the beginning of year 2018 and other variables at the end of year 2016.

Comparing the results of Table 4 and Table 2 in Shy (2002) reveals that while switching costs have increased roughly 50% in real terms, there are no essential changes in switching costs per average account balance over the past 20 years in the Finnish banking industry.

An explanation for the Savings Bank Group's lower switching costs might be

that savings banks are non-profit stakeholder banks where managers might have lower incentives to lock-in clients. This explanation is put forward by Egarius and Weill (2016) who find that across all banking activities and in loan markets (they do not consider deposit markets separately), the customers of cooperative banks tend to have lower switching costs than the customers of other bank types. In my data, however, the customers of the cooperative bank (the OP Group) face the highest switching costs. Thus the differences in profit-maximization objectives do not appear to explain the findings here.

An alternative explanation could arise from the fact that as a cooperative, the OP Group attracts members based on common bonds. Such bank customers face higher switching costs. The importance of common bonds as a rationale for the cooperative bank membership has, however, diminished over time in Finland (Jones et al., 2016). Rather, I interpret the findings as to suggest that the OP Group's loyalty program has been successful to lock-in their owner-customers, and the absence of the loyalty program in savings banks might be a major reason for their lower switching costs

4.3 Robustness

My measurement exercise involves a number of strong assumptions. I have therefore conducted several robustness checks by using alternative short-cuts. I report here the results of the robustness check where I use the fee information for Oma Säästopankki from the VertaaEnsin.fi online comparison platform as a representative of savings banks fees instead of the hand-collected information for the fees of Nooa Säästöpankki (see Section 3.2).

VertaaEnsin.fi gives only one the monthly fee for Oma Säätöpankki: five euros per month for a standard banking service package with a combined debit-credit card. Using the four percentage real interest rate, the corresponding life time fee is 1,560 euros. Using this euro amount instead of 1,599 for the savings banks life time fee implies that the switching costs for the customers of the OP, Nordea, Danske Bank and Savings Banks are in euros 1,397, 1,390, 1,120, and

160, respectively. In words, the switching costs of the Savings Banks Group's clients are slightly lower and those of the other banks' clients correspondingly slightly higher. Compared to the average account balance, there are no essential changes.

5 Conclusion

I measure switching cost for the Finnish retail deposit market by using the approach developed by Oz Shy (2002). In Section 5 of his article, Shy (2002) also uses the Finnish deposit market as an example of switching cost measurement. As the data in Shy (2002) comes from year 1997 and here around the year 2017, the results also show how bank switching costs have changed over the past 20 years in Finland. In contrast to Shy (2002), I can use banks' real names, and market shares are based on accurate numbers.

I find that switching costs faced by customers of the largest banks are high, ranging from 200 euros to nearly 1,400 euros. In relation to the average account balance of a customer, switching costs range from 2% to 15%. Comparing these numbers with those reported by Shy (2002) suggests that while switching costs have increased some 50% in real terms over the past 20 years, switching costs per average account balance have not essentially changed. The customers of the OP Group appear to face the highest switching costs whereas the customers of the Savings Banks the lowest. I conjecture that these differences in switching costs among the Finnish banks might be explained by differences in their loyalty programs.

A future work should extend Shy's (2002) method to product versioning so as to accommodate different banking service packages.

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