Switching Costs, Profitability and Competition in Pakistan Banking

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Abstract

Using a sample of 25 banks over the period 2011 to 2017, this paper develops a model that investigates the determinants of bank switching costs in terms of bank characteristics and non-bank variables and the influence of switching costs on banks' profits. In keeping with the extant empirical literature it reports a positive relationship between bank profitability and switching costs. The main result is that bank size measured by total assets has a complex relationship with switching costs. Competition between small banks creates the incentive for lock-in and increased switching costs whereas very large banks are less exercised by lock-in and switching costs. The switching costs have a significant influence on the profits of banks, which indicates that switching costs provide a separate mechanism for profits generation. The study also finds that market concentration has a negative relationship with profitability, confirming the accepted view that less competition market lead to a low efficiency market with deadweight loss.

Key Terms: Pakistan banking, switching costs, bank profitability, competition

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1. Introduction

It is generally accepted that switching costs in banking represents a source of rent that increases the profitability of the banks. In addition to the administrative costs of changing a bank account, it is conjectured that in the loan market there are additional costs associated with informational asymmetries where the existing lender is more informed about the quality of the borrower than a potential new lender. Switching costs in the Pakistan banking market is a relatively unexplored area of research. What has been published focuses on the consumers' brand choice or loyalty in telecommunication industry or banking sector using survey data or micro data (e.g. Shujaat et al., 2015; Bilal, 2010; Shah et al., 2013). While these studies recognize the significance of switching costs on banks' market share and profits, there has been no attempt to measure switching costs in the loan market, or to empirically model its determinants.

The purpose of this paper is to model the drivers of switching costs in Pakistan banks and to evaluate the contribution it makes to profitability. This subject is of interest because the growth and increasing competition of the Pakistan banking market has incentivised individual banks to develop 'lock in' strategies as a means of extracting marginal rents. This paper seeks to fill a gap in the applied literature and aims to measure the magnitude of switching costs in the Pakistan loan market and its influence on profits. The objective of this paper is twofold. First, since switching costs are heterogeneous (Stein, 2002; Berger et al., 2005) across banks and cannot be

directly observed, this paper applies the structural model of Shy (2002) to measure the switching costs for each bank in the data sample. Second, it uses this measure to identify the principal drivers of switching costs and its contribution to bank profitability in the Pakistan banking sector.

This paper is organized as follows. Section 2 reviews the relevant theoretical foundation and the literature on switching costs. Section 3 describes the methodology, and the empirical model. The penultimate section describes the data and presents the econometric results and the final section concludes.

2. Literature Review

The concept of switching costs can be traced to Porter (1980) and a number of theoretical studies have explored the effects of consumer's switching behaviour on firms' competition strategy[1]. In the banking market, the theoretical work of Sharpe (1990) explains how switching costs mainly arise from asymmetric information. It is suggested that banks make the best offers to their existing borrowers because they know the quality of their customers better than their competitors. Customers are then 'informational captured' by their own banks, and are thus charged higher price if they switch, since they are unable to transfer their quality information to new banks. Hence, switching costs have a significant effect on the bank-firm relationship and banks can

[1] Klemperer (1995) summarises the relevant theoretical literature. In general switching costs strengthen the lock in power of the firm with benefits for firm's profitability.

‘lock-in' their incumbent customers and earn a higher than profit on repeated lending (Shy, 2002; Kim et al., 2003; Vesala, 2007).

Empirical studies have focused on the relationship between switching costs, bank lending and the bank-customer relationship. Hubbard et al. (2002) find that small firms or firms with no bond rating face higher loan rate when switching between banks. Stango (2002) finds that switching costs are an important factor in the pricing of credit for commercial banks. In general bank customers switch less frequently than in other industries (Waterson, 2003). Bank's characteristics are also found to be linked with customer's switching behaviour. Bank size has a negative relationship with firm's switching behaviours (Gopalan et al., 2011, Stephan et al., 2012) as larger banks are more able to cross-sell and lock in customers with bundled product pricing; and increasing bank efficiency tend to decrease the probability of switching actions (Sapienza, 2002; Degryse et al., 2006) as more efficient banks are able to provide greater cross-subsidisation of products and ‘loss-leader’ pricing. Ho (2012) adds transaction costs to a static demand model to identify if switching costs influences consumer preferences. He finds that consumers face switching costs when changing providers and depositors prefer banks with more branch locations and higher quality employees. In an improved model, Ho (2015) studies the relationship between switching costs and the demand for deposits in China. Using provincial data for the big four banks it is shown that switching cost is an important factor in the choice of bank, and the consumer faces a 5% loss of their deposit value when they switch to

other banks. The research also finds that banks undertake a 'loss-leader' pricing strategy and reduce their service fees to attract consumers on the expectation of higher earnings in the future. Yin and Matthews (2018) finds that better loan terms are the main driven factors for firms switching their relationship banks. And large banks have higher likelihood to switch.

Since switching costs cannot be observed directly, previous studies have focused on methods of indirect estimation. According to Kim et al. (2003), the average switching cost can be estimated parametrically using a model based on bank loans, market share, interest rate, and net interest margin. In contrast, Shy (2002) constructs a 'quick-and-easy' way to calculate consumer switching costs in a given industry based on the Nash-Bertrand equilibrium model[2].

The relevant studies of switching costs in the Pakistan have focussed on consumers and therefore may not provide a strong guidance for the research in this paper. For example, Shah et al. (2013) selects the sample of 200 respondents from different cities of Pakistan to check the switching costs in telecom sector. They find that the customers show loyalty and retention to the services of telecom industry when expected quality is provided. Shujaat et al. (2015) has a similar study which suggests that price, brand image, network quality, value added services and promotional

[2] Switching costs is determined by the price-setting behavior of the bank and its market share. The full methodology is outlined in the appendix

activities directly influence consumer switching behaviour among youngsters. As to banking sector, Arif et al. (2013) shows that bank size is an important factor for Pakistan banks to generate profits, which means lock-in customers is important in banking sector. They highlight that commercial banks in Pakistan can maximize their profitability if they manage to increase size by expansion strategies and restructuring. Using 316 customers' survey data, Bilal (2010) finds that perceived quality, satisfaction, trust, switching cost and commitment are the factors which influence the loyalty of the customers of banks.

3. Methodology: determinants and profitability of switching costs

Determinants of switching costs

Switching costs arise mainly from asymmetric information which contains two ingredients: information asymmetry in the bank-borrower relationship and imperfect information sharing between banks. Large banks tend to have more customers and resources that give them a comparative informational advantage over small banks. Small firms which are usually considered as opaque are less likely to switch banks (Gopalan et al., 2011)[3]. Hence bank size may be an important driver in determining the level of switching costs.

A low cost and ample source of funding for Pakistan banks is customer deposits.

[3] Information sharing by banks will reduce switching costs (Gehriga and Stenbecka, 2007) but in practice information sharing usually is confined to negative information (e.g. default record).

Banks that have greater access to customer deposits will be less constrained on the supply of credit than banks have less access to deposits. An ample source of funding means that banks are able to better secure credit lines to customers and lower their likelihood of switching banks. Therefore higher deposits are expected to increase switching costs.

Banks can also create barriers for consumers to change suppliers (Smidt et al., 2006), by providing a 'bundled product' thus enabling effective lock-in. Banks that have a high relative income from non-interest earnings indicate their capacity to provide financial services that lock-in their customers. Hence, high non-interest income is an indicator of low frequency of switching.

Based on above analysis, we use the switching costs as the dependent variable regressed on individual bank characteristics (a measure of the degree of asymmetric information, operational efficiency, and artificial barrier and funding sources) and a set of non-bank variables (macroeconomic measures of the economy and industry factors). That is:

$$SC_{it} = \alpha_0 + X_{it}\alpha_1 + M_{it}\alpha_2 + u_{it} \qquad (1)$$

, where SC_{it} stands for switching costs, X_{it} stands for bank characteristics, M_{it} is a set of non-bank variables. The three main variables selected as bank characteristics are; Bank Size (SIZE), (Stephan et al. (2012) find that bank size has a negative effect on firm's switching behaviour, which suggests that large banks have a stronger lock-in

power); Deposit over total asset ratio (DEP), which is captured by total deposit over total assets. Non-interest income ratio (NIR) stands for banks' bundle of service activities. Banks with high non-interest income ratios indicate a wider range of off-balance sheet business, which strengthens the lock-in power of the banks through strategic cross-selling to borrowers[4].

Determinants of banks' profit with switching costs

Set N banks in a competitive market, where $i \in \{1,2,\dots,N\}$. Customers have been lock-in to their incumbent banks in previous period. When they switch to non-relationship banks, they bear the switching costs. Assume when choosing from which bank to borrow, the firms compare the gain from the difference of prices charged by the various suppliers and the loss from switching costs. Here similar as Kim (2003), switching costs (s) are added to the prices charged by the non-relationship banks. Hence the probability of a firm staying with its bank is given by $pr_t(i \to i) = f\{p_{it}, p_{iRt} + s_{it}\}$, where p_{it} is the prices charged by incumbent bank i and p_{iRt} is the prices charged by rival banks. Since higher switching costs (s_{it}) help bank i to lock-in more customers, there is $\frac{\partial pr_t(i \to i)}{\partial s_{it}} > 0$. Symmetrically, the probability for firms switching from rival banks to bank i is given by $pr_t(R \to i) = f\{p_{it} + s_{iRt}, p_{iRt}\}$, where s_{iRt} is the rival bank's switching costs. Switching costs of

[4] This could be seen as artificial cost set by banks to prevent customer switching behavior (Klemperer, 1987b).

rival bank's offer a barrier for their customer switching to bank i, hence $\frac{\partial pr_t(R \to i)}{\partial s_{iRt}} < 0$. So the total loans of bank i in period t (L_{it}) is given as:

$$L_{it} = pr_t(i \to i) * L_{it-1} + pr_t(R \to i) * L_{iRt-1} \quad (2)$$

, where is the market share of rival banks of bank i.

Denote π_{it} as the profit of bank in period t. N_{it} is probability of the non-performing lending. r is the interest rate of deposit, which is assumed as homogenous for all banks. C_{it} stands for the non-interest expense. Here assume total amount of lending is equal to total amount of deposit for bank I in period t ($L_{it} = D_{it}$). The profit function of bank I in time t is as follow:

$$\pi_{it} = (p_{it} * (1 - N_{it}) - r) * L_{it} - C_{it} \quad (3)$$

Substitute equation (2) into (3), there is:

$$\pi_{it} = (p_{it} * (1 - N_{it}) - r) * [pr_t(i \to i) * L_{it-1} + pr_t(R \to i) * L_{iRt-1}] - C_{it} \quad (4)$$

In equation (4), it is clearly that $\frac{\partial \pi_{it}}{\partial s_{it}} > 0$, which suggest switching costs have a positive effect on banks' profits.

A great amount of previous studies claims that profits of banks are linked to bank characteristics and macroeconomics variables. Similar to Stephan et al. (2012) and Gopalan et al. (2011), here I set the profits determination model as:

$$\pi_{it} = \beta_0 + \beta_1 \text{switching costs}_{it} + X_{it}\beta_2 + M_{it}\beta_3 + \varepsilon_{it} \quad (5)$$

,where π_{it} stands for profit of bank, SC_{it} stands for switching costs, X_{it} stands for bank characteristics, M_{it} is a set of non-bank variables. In addition to the standard variables used in similar studies we allow for the potential effect of the fund source (DEP) which is captured by total deposit over total assets. Deposits remain the major source of funding for banks in Pakistan. As a cheap source of funds, a larger proportion of deposits contribute to banks' profit level (García-Herrero et al., 2009), and also increases their ability to satisfy customers' credit needs, which reduces the incidence of customers' switching to other banks for credit help (Farinha and Santos, 2002) .

Empirical Method

As we mentioned above, the two dependent variables in equation (1) and (5) have some common causes, which tends to lead to a biased estimation[5]. Therefore, the seeming uncorrelated regression (SUR) method is chosen for the empirical model. The SUR equation that is used in our paper is designed as follows:

We set two equations, each containing T observations (two explained variables: *SO_2/GIP* and *WWATER/GIP*), explanatory and control variables are in every equation:

$$y_i = x_i^T \beta_i + \alpha_i + \varepsilon_i,\ i = 1,2 \qquad (6)$$

where i represents the equation number, y_i, α_i and ε_i are T-dimensional vectors,

[5] Seemingly unrelated regression (SUR) is a structural equation technique that jointly estimates two (or more) interdependent regression equations where the dependent variables share some common, unmeasured causes, resulting in contemporaneous correlation among error terms (Zellner, 1962).

x_i is matrix and β_i is a vector. Stacking the two equations yields:

$$\begin{bmatrix} y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} x_1 & 0 \\ 0 & x_2 \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \end{bmatrix} + \begin{bmatrix} \alpha_1 \\ \alpha_2 \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \end{bmatrix}, \qquad (7)$$

with the variance-covariance matrix $\Omega = \text{var}\begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \end{pmatrix} = \begin{pmatrix} \varepsilon_1 \varepsilon'_1 & \varepsilon_1 \varepsilon'_2 \\ \varepsilon_2 \varepsilon'_1 & \varepsilon_2 \varepsilon'_2 \end{pmatrix}$.

Assume that in the model disturbances, ε_{it} are independent across time and have equal variance. σ_{ii} denotes the variance in the i^{th} equation. The covariance matrix Ω is comprised of 2×2 blocks of the form $\text{E}(\varepsilon_i \varepsilon'_i) = \sigma_{ii} I_T$, where I_T is a T-dimensional identity matrix.

Assume that there are contemporaneous correlations among disturbances of different equations:

$$\text{E}(\varepsilon_{it} \varepsilon_{js}) = \begin{cases} \sigma_{ij}, & t = s \\ 0, & t \neq s \end{cases}$$

The covariance matrix Ω is comprised of 2×2 blocks of the form $\text{E}(\varepsilon_i \varepsilon'_j) = \sigma_{ij} I_T$ whenever $i \neq j$.

By combining two assumptions we get $\Omega = \begin{pmatrix} \sigma_{11} I_T & \sigma_{12} I_T \\ \sigma_{21} I_T & \sigma_{22} I_T \end{pmatrix} = \begin{pmatrix} \sigma_{11} & \sigma_{12} \\ \sigma_{21} & \sigma_{22} \end{pmatrix} \otimes I_T = \Sigma \otimes I_T$, where Σ is the T-dimensional contemporaneous covariance matrix and $\otimes$ denotes the matrix Kronecker product. The SUR model is usually estimated by the feasible generalized least squares (FGLS) method. The first step of this method uses the residuals ε from ordinary least squares regression for (6) to estimate the elements of matrix Σ:

$$\sigma_{ij} = \frac{1}{T}\varepsilon'_i\varepsilon_j = \frac{1}{T}\sum_{t=1}^{T}\varepsilon_{it}\varepsilon_{jt}$$

In the second step, with the variance matrix $\widehat{\Omega} = \hat{\Sigma} \otimes I_T$ to run generalized least squares regression for (6), GLS estimator β^{SUR} is obtained:

$$\beta^{SUR} = (X'\widehat{\Omega}^{-1}X)^{-1}X'\widehat{\Omega}^{-1}y$$

The benchmark empirical equation set is designed as follows,

$$SC_{it} = \alpha_0 + \alpha_1 \ln(Size)_{\text{it}} + \alpha_2 DEP_{it} + \alpha_3 NIR_{it} + \alpha_4 HHI_t + \alpha_5 GM2_t + \alpha_6 GGDP_t + u_{it} \quad (8)$$

$$ROA_{it} = \beta_0 + \beta_1 SC_{it} + \beta_2 \ln(\text{Size})_{\text{it}} + \beta_3 NEI_{it} + \beta_4 DEP_{it} + \beta_5 CAP_{it} + \beta_6 HHI + \varepsilon_{it} \quad (9)$$

In equation (8) and (9), switching costs are values, which have been constructed according to the method of Shy (2002). Market competition (HHI) stands for the competition level in the banking market, which is measured as the ratio of the five largest banks' assets to the total assets of the entire banking sector. The higher HHI stands for the higher level of market concentration. The growth rate of money supply (GM2) stands for the money supply changes. GGDP stands for annual growth rate of real GDP, which measures the macro effect on switching costs. The variables definition are summarised in table 1.

Table 1: Variable Definition

Variables	Definition	Unit

Switching costs	SC	Estimated value according to Shy (2002)[6]	-
Return on asset	ROA	Net income over total asset	%
Bank size	SIZE	Annual total asset of Banks	Th PKR
Fund source	DEP	Total deposit over total assets	%
Non-interest income ratio	NIR	Non-interest income over total gross income	%
Banking Market Competition	HHI	The sum of the squares of the market shares of the five largest banks	-
Growth rate of money supply	GM2	Annual growth rate of money supply (M2)	%
Annual growth of GDP	GGDP	Annual growth ratio of real GDP	%

4. Data and Empirical Results

Bank data is obtained from Bureau Van Dijk BANKSCOPE and consists of commercial banks whose market share is greater than 0.01%. The sample consists of 25 banks over 7 years of data, from 2011 to 2017. Some banks have zero cells for data during some years, hence the regression data is unbalanced[7]. Figure 1 shows the relationship with ROA and the estimated switching costs according to the method of Shy (2002) in sample year.

[6] Please refer to the appendix for the details.

[7] These gaps appear randomly and it is not expected to bias the results. See Woolridge (2009).

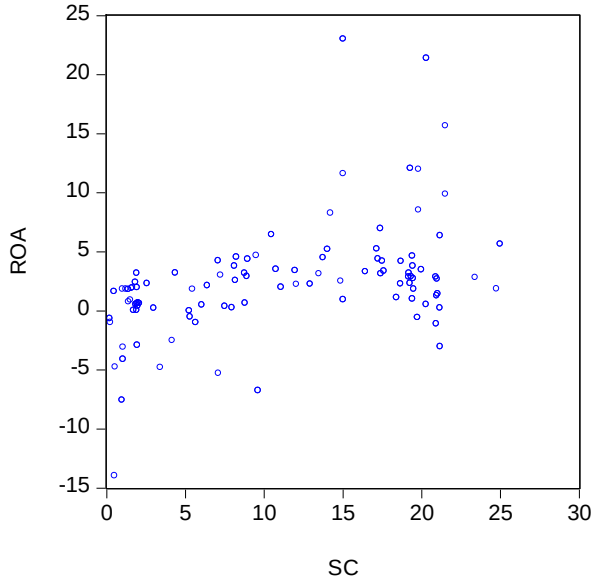

Figure 1: Scatter graph of Switching costs and ROA

A summary of the variables used in the model are presented in table 2. Several facts are worth noting. The high variation in switching costs and other bank characteristics is an indication of the heterogeneity of performance of Pakistan banks' profit performance measured by ROA is strongly skewed with a median value below 2.5%. The large commercial banks hold the largest market share. However, we can observe a increasing in banking market competition with the decreasing HHI value.

Table 2: Summary Statistics

	Obs.	Mean	S.D.	Min	Max
Key variables					
SC	104	11.183	7.807	0.215	24.991
ROA(%)	106	2.451	4.777	-13.960	23.010
Other bank’s characteristics					

SIZE (Th PKR)	106	25095302	24417924	1096490	$1.17*10^8$
DEP (%)	94	81.142	14.007	27.546	98.241
NIR (%)	105	2.476	9.884	5.484	37.507
Macro Variables					
HHI	106	384.269	172.666	310.009	924.876
GM2 (%)	106	12.380	1.961	9.930	17.030
GGDP (%)	106	5.399	0.840	2.360	6.070

The system of equations is estimated using SUR. The independent variables have no significant correlation between each other[8]. Table 3 presents some selected results of the base line model.

In column 2 we see that *SIZE* is a significant driver of switching costs. The large banks in Pakistan usually have a nationwide branch network that is preferred by Pakistan bank customers, which tends to provide a stronger capability of lock-in strategy. Also, bigger banks have an advantage in exploiting the asymmetric information, gap with small firms (Gopalan et al., 2011; Yin and Matthews, 2016). Greater access to funding measured by *DEP* has a positive significant relationship with switching costs as a liquid source of funding means greater bargaining power in lending and lock-in capability. The measure of income mix *NIR* is an indicator of the strength of the off-balance sheet business conducted by the bank. A bank that has

[8] The test results are available upon request.

significant earnings from services has the capability to cross-sell financial services with loan products creating a stronger lock-in effect. This is consistent with the finding that other business relationships than the customer-loan relationship alone strengthen the bank-firm relationship, which make an extra barrier for firms to switch (Yin and Matthews, 2018). It is worth to notice that macroeconomics factors have significantly impact on switching costs. The growth rate of money supply (M2) gives a negative effect on switching costs. This indicates that increasing liquidity in loan market decrease the lock-in power for banks. Unlike money supply, the growth rate of GDP shows significantly positive impact on switching costs. The annual growth of GDP indicates the loan demand increasing level to some extent. Higher demand level increases the market power of banks, which make them easier to hold up their customers.

Table 3: Estimation for the Simultaneous Equations Model with SUR

Variables	SC	Variables	ROA
Ln(SIZE)	0.479***	SWITCHING	0.170***
	(2.686)	COSTS	(3.440)
DEP	0.015***	Ln(SIZE)	0.157***
	(4.341)		(5.339)
NIR	0.002**	DEP	0.004**
	(2.025)		(2.268)
HHI	-0.095	HHI	-0.005**
	(-0.673)		(-2.206)
GM2	-0.573***	GM2	0.417*
	(-3.042)		(1.824)
GGDP	0.386**	GGDP	0.334*
	(2.139)		(1.717)
C	-1.663	C	-2.354***

	(-0.702)		(-3.482)
R^2	0.416	R^2	0.446
D.W.	1.892	D.W.	1.731
Obs	90	Obs	90

Notes: Standard errors are reported in the parentheses. * significant at 10% level; ** significant at 5% level; *** significant at 1% level.

Column 4 of table 3 shows the base-line result for bank profits. It is clear that *SC* provides a source of hidden profit to the bank. This result is consistent with the prediction of theory (Klemperer, 1987a,b; Beggs and Klemperer, 1992), indicating that the lock-in power is an important variable in banks' profit strategy. Size plays a significantly part in profitability, which is consistent with the finding of Arif et al. (2013). Banks with higher equity to assets ratios will normally have a lower need of external funding, which has again a positive effect on their profitability (Dietrich and Wanzenried, 2011; Vong and Chan 2006). In addition, it is notable that the market competition level measured by the HHI has a negative effect on profits indicating a perverse effect in the case of the Pakistan banking market. This result confirms the findings of Fu and Heffernan (2009) for China and Dietrich and Wanzenried (2011) for Swiss banks[9]. Large banks in a highly concentrated market are more likely to support the projects guided by the government which usually have low profitability level.

[9] Many previous studies examined the relationship between market structure and bank profitability according to "market-power hypothesis" and "efficient-structure hypothesis". Since our paper focuses on switching costs and profitability, we do not make further analysis on this issue.

Although in table 3, HHI shows no significantly relations with switching costs, we plan to insert a variable of squared HHI to check whether a non-linear relationship between market competition and switching costs. Besides, according to previously studies, size is shown to be a positive monotonic driver of switching costs, but we control for possible differential effects as differences in size may generate differential lock-in responses known as the "fact cat" effect[10] (Farrell and Klemperer, 2007). Translating to the banking market this suggests that large size bank have less motivation in raising their switching costs, but small size banks will be more positive. To capture this effect we include ln(SIZE) interactive variables that differentiate size ranges. Variable Small is a dummy variable equal to 1 when the bank asset is lower than the sample average. Table 4 summarises our results.

Table 4: Structural Estimation of competition & bank size affecting on switching costs

	(1)	(2)	(3)	(4)
Variable	SC	SC	SC	SC
Ln(SIZE)	0.481***	0.477***	0.248**	0.260**
	(2.769)	(3.321)	(2.487)	(2.553)
DEP	0.016***	0.016***	0.015***	0.014***
	(4.653)	(4.646)	(4.512)	(4.341)
NIR	0.003**	0.003**	0.002**	0.002**
	(2.253)	(2.294)	(2.049)	(2.043)
HHI	-0.003	0.002	0.007	0.007

[10] Large firms tend to be lazier and lose their consumers to the smaller firm, which is known as the 'fat cat' effect, with the larger firm being a nonaggressive "fat cat" and small firms being more aggressive in attracting and keeping consumers.

	(-0.576)	(0.049)	(0.741)	(0.725)
GM2	-0.572***	-0.574***	-0.586***	-0.597***
	(-3.038)	(-3.042)	(-3.129)	(-3.134)
GGDP	0.328**	0.361**	0.346**	0.392**
	(1.990)	(2.131)	(2.094)	(2.202)
HHI× HHI	0.00001			
	(0.143)			
HHI× Ln(SIZE)		0.001		
		(0.057)		
Small× Ln(SIZE)			0.331***	
			(3.217)	
$(Ln(SIZE))^2$				-0.077**
				(-2.521)
C	-3.793	-1.413	-1.615	-21.437
	(-0.146)	(-1.034)	(-1.472)	(-1.547)
R^2	0.417	0.417	0.428	0.434
D.W.	1.889	1.892	1.977	2.023
Observations	70	70	602	70

Notes: Standard errors are reported in the parentheses. * significant at 10% level; ** significant at 5% level; *** significant at 1% level. The results of another part of equations, the ROA regressions, will be given upon request.

The results from Table 4 show that the variable HHI× HHI has no significantly impact on switching costs, which suggest that switching costs is less noticed for the banking competition in Pakistan banking market. The interactive term HHI× Ln(SIZE) shows no significant relationship with switching costs either. It is worth to notice that interactive term Small× Ln(SIZE) has a significant positive effect on switching costs, suggesting that small banks are more aggressive in locking in customers and creating

higher switching costs. As a robustness test we use the square of the bank size variable which has a significant negative relationship on switching costs else indicating a potential non-linearity in the association.

5. Conclusion

This paper has examined the determinants of bank switching costs in terms of bank characteristics and non-bank variables and the influence of switching costs on banks' profits. Our results confirm that switching costs contribute to bank profitability through a strategy of lock-in, representing a separate mechanism for profit generation. The results also highlight a complex relationship between bank size and switching cost. Our results show that in general there is a positive relationship between bank size and switching costs. As banks increase in size, the increase in customer base and branch network strengthens information flow and its lock in power. However, small banks have a stronger motivation to increase their switching costs power, and extend their market share; while large banks are less aggressive, which is called the 'fat cat effect' (Farrell and Klemperer, 2007). We find that in Pakistan, the 'small' banks generate higher switching costs than the 'large' banks. We find a non-linear relationship between bank size and switching costs, where after some critical size switching costs decline.

The empirical findings also suggest that bank's business strategy has a significant

effect on their 'lock-in' powers. Non-interest income ratio (NIR) has a significant relationship with switching costs, which suggests that business relationship other than the credit relationship between banks and firms strength the bank-firm relationships and raises switching barriers.

Our results also provide insights into the growing state of banking competition in the Pakistan banking market. We find that banking market competition has no impact on switching costs, but has negative effect on banks' profit. As policy implication for banks, it is worth to think to raise switching costs to lock-in more customers and gain more market shares, especially for the comparatively small banks.

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Appendix

The method to estimate switching cost:

Methodology

Models of switching cost are typically based on the two-period models of Klemperer (1987a, b), set in a Bertrand competition framework. Shy (2002) extends the model described above to a multi-firm industry for estimating switching cost using merely information on market shares and prices, which is based on a solution to the non-existence of a Nash-Bertrand equilibrium. In the case of banks, we replace price by the average lending interest rate. Define S_i to be the switching cost of a brand i consumer, and assume that S_i (i=1,2,……L) are known by all firms and consumers. Then, each firm $i \neq L$ takes P_L as given and sets maximal P_i to satisfy:

$$\pi_L = P_L N_L \geq (P_i - SC_i)(N_i + N_L) \qquad \text{(A.1)}$$

Accordingly switching costs is given as:

$$SC_{it} = P_{it} - \frac{P_{Lt} N_{Lt}}{N_{it} + N_{Lt}} \qquad \text{(A.2)}$$

, where the switching costs of bank i is estimated as a function of the average interest P set by bank i and L, and the market share of bank i and L at period t. P_{Lt} and N_{Lt}denote the average interest rate and market share of bank L which has the lowest market share in period t respectively. Assume that the bank with the smallest market share, bank L, is prey target of bank 1. Therefore, the price P_L of bank L would make undercutting its price by bank 1 unprofitable. That is,

$$\pi_1 = P_1 N_1 \geq (P_L - SC_L)(N_1 + N_L) \qquad \text{(A.3)}$$

Since P_{Lt} is observed, the unobserved remaining switching cost SC_{Lt}can be solved by treating equation (12) as an equality. Thus the switching costs of the bank that has the lowest market share at period t can be estimated as:

$$SC_{Lt} = P_{Lt} - \frac{P_{1t}N_{1t}}{N_{1t}+N_{Lt}} \qquad \text{(A.4)}$$