

THE IMPACT OF INTERNET BANKING ON BANK PERFORMANCE: EMPIRICAL EVIDENCE FROM INDIAN BANKS

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Abstract *The paper illustrates the current state of Internet banking in India and discusses its implications for the Indian banking industry. The present study examined the impact of Internet banking on the performance of banks. The present study employed panel data regression on the information drawn from the sample of 31 bank's websites from 1997-2016. Using data on the financial performance, the current study analyzed the impact of Internet banking on banks' performance. The results revealed that Internet banks helps in accelerating the financial performance of banks as proxied by ROA and ROE.*

Keywords: *Internet Banking, Banking, Performance, Financial Services, Risk*

INTRODUCTION

Customers can conduct their day-to-day business as well as other activities relating to banking at their own place of business or home through another spectrum of banking that is internet banking (Siu and Mou, 2005; Kesharwani and Bisht, 2012; Okiro and Ndungu, 2013). Most of the banks use business strategy of click and mortar along with the traditional networks of branches of brick and mortar as well as transactional websites. E-banking encompasses the complete sphere of technology initiatives that have occurred in the banking industry by employing electronic channels such as mobile phones, telephone, and internet etc. to deliver services and products of banks (Steven, 2002; Lal and Saluja, 2012). There is tremendous growth in the internet banking

services primarily because of the reduced costs and enhanced profits for banks and at the same time enriching convenience of customer by executing transactions with rapidity and ease (Stoica et al., 2015). In today's environment of intense decision-making, internet banking ensures accuracy and timeliness of flow of information which helps in decreasing the latency of the information. Customers perceived internet banking to be useful because of the various facilities provided by it such as checking account balances, transferring funds, sending of monthly e-statements, apply for loan, online request for demand draft/cheque, online payments; mobile recharges; investment services; home mortgage; insurance and other financial services etc (Jun and Cai, 2001; Sumra et al., 2011). Fig. 1 illustrates the procedure of sending and receiving information in the internet banking.



Source: Sharma (2016)

Fig. 1: Information Exchange in the Internet Banking

However, there has been growth in the concerns regarding risks attached to the internet banking services. Perceived risks refer to the unfavorable and uncertain consequences associated with the expectations of the customer (Bauer, 1960). For instance, customers consider online services

such as internet banking as a threat to their personal security (Martin and Camarero, 2008). In the opinion of Vivo et al. (1998) applications and outcomes of internet services are mostly operated in an open environment thus exposed to privacy and security threats viz. spywares,

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malwares, phishing activities, password sniffing and spoofing etc. There has been tremendous increase in the internet based attacks such as breaches of personal privacy, fraud or theft, hackers attack etc (Baker, 1999; Pennathur,

2001; Rotchanakitumnuai and Speece, 2003; Littler and Melanthiou, 2006). Table 1 illustrates the various types of risks perceived by the customer.

Table 1: Multi-Faceted Risk Perception and Definitions

Risk Facets	Definition
Performance risk	The possibility of the product malfunctioning and not performing as it was designed and advertised and therefore failing to deliver the desired benefits.
Financial risk	The potential monetary outlay associated with the initial purchase price as well as the subsequent maintenance cost of the product. The current financial services research context expands this facet to include the recurring potential for financial loss due to fraud
Time risk	Consumers may lose time when making a bad purchasing decision by wasting time researching and making the purchase, learning how to use a product or service only to have to replace it if it does not perform to expectations.
Psychological risk	The risk that the service will lower the consumer's self-image.
Social risk	The risk that using a product or service may lead to embarrassment before one's social group.
Privacy risk	Potential loss of control over personal information, such as when information about you is used without your knowledge or permission.
Physical risk	The risk to the buyer's or other's safety in using products.
Overall risk	A general measure of perceived risk when all criteria are evaluated together.

Source: Luo et al. (2010)

INTERNET BANKING IN INDIA

In the mid-90's, internet banking emerged in India when new introduced banks in private sector, started with a new business model with strong information technology as its backbone (Kesharwani and Bisht, 2012). ICICI bank was pioneer in India to offer internet banking services in the year 1998 followed by Citibank and HDFC Bank in 1999 (Lal and Saluja, 2012). Internet banking facilitated sharing and storing of financial as well as personal information among the banks. However, it has been observed during recent years that there has been resistance on the part of customers to utilize internet banking services because of varied reasons such as preference for face-to-face transactions; security reasons; lack of knowledge of online transactions; do not find user friendly environment or sometimes even do not have such facility in their current bank. But Government of India as well as several regulatory bodies has taken various initiatives from time to time for the development of internet banking. For instance, IT Act, 2000 was enacted by GOI to provide legal recognition to all means of electronic commerce including electronic transactions. In order to protect the financial stability of country, RBI continuously monitors and reviews the legal requirements of internet banking (Lal and Saluja, 2012).

LITERATURE REVIEW

Nui Polatoglu and Ekin (2001) and Simpson (2002) asserted that internet banking helps in maximizing operating profits

by decreasing operating costs. Furst et al. (2002), found that banks offering internet banking are generally more profitable. Hasan et al. (2005) studied the impact of internet adoption and profitability of the bank for the period 1993 and 2001 in the Italian banks and found a positive relationship between the two. Hernando and Nieto (2006) analyzed the relationship between internet banking and financial performance (ROA and ROE) of Spanish banks between 1994 and 2002 and found that internet banking services helps in reducing overhead expenses and thereby improves both ROA and ROE over the period of time. Using a sample of 424 internet banks and 5175 non-internet banks of US, DeYoung et al. (2007) established that internet banks are more profitable as compared to non-internet banks. Further, Acharya et al. (2008) by taking a sample of community banks in the US, found that internet banking improves the bank's performance significantly. Atay (2008) advocated that internet banking helps in enhancing efficiency as well as profitability of the banks by considering various economic factors such as general education level in the country, internet access and the R&D expenditures. Similarly, in the opinion of Ciciretti et al. (2008), the performance of the Italian banks as measured by return on average assets and return on average equity is influenced through internet banking services. Onay et al. (2008) also posited that internet banking has a positive impact on the financial performance of the banks.

In the opinion of Egland et al. (1998), there are no major differences in the internet and non-internet banks in terms of efficiency, profitability and credit quality. By employing

econometric model on sample of Greek banks, Giordani and Floros (2013) established that a significant positive relationship exist between the overall operating expenses and implementation of internet banking services. However, they found insignificant relationship between profitability and internet banking in the Greek banks. Using a sample of 15 Jordanian banks for the period of 2000-10, Al-Smadi and Al Wabel (2010) found that internet banking has a negative impact on the performance of the banks. Thus, authors suggest promoting the confidence of electronic banking among customers. Similarly, Sullivan (2000) and Sathye (2005) found insignificant impact of internet banking services on the performance as well as risk of the bank.

The extant literature exhibits a mixed evidence of the impact of internet banking on the performance of the bank. Thus, it is necessary for bank regulators, bankers, academicians and researchers to know how internet banking affects bank's performance. The present study endeavors to fill this gap by providing a systematic analysis of impact of internet banking on the performance of sample Indian banks. Based on the above literature, the following hypothesis can be formulated:

H1: There is significant relationship between the internet banking and the financial performance of the banks.

NEED AND SIGNIFICANCE OF THE STUDY

The analysis of the impact of internet banking on the financial performance of banks has become an area of growing interest to managers as well as researchers because of the increasing importance of modern technologies of information and communication for delivering the financial services. Despite the conspicuous use of internet banking, there is dearth of empirical studies analyzing the impact of internet banking on the performance of banks especially in

emerging countries like India. The present study endeavors to fill this research gap.

OBJECTIVES OF THE STUDY

The study objectives are as follows:

1. To examine the internet and non-internet banks.
2. To study the impact of internet banking on the performance of sample banks in India.
3. To propose likely initiative to improve the system of internet banking.

RESEARCH DESIGN

Sample Selection and Data Sources

To analyze the impact of internet banking on the performance of the Indian banks, panel data regression has been employed on the balanced panel data taken from the sample of 31 banks from 1997-2016 amounting to 620 company-year observations for 20 years. This period has been taken because it has witnessed a major growth in the internet banking. ICICI bank was pioneer in India to initiate internet banking in the year 1998 followed by Citibank and HDFC Bank in 1999 (Lal and Saluja, 2012). The data has been extracted from the Prowess database as well as annual reports of the banks. STATA and Eviews softwares have been used in the current study.

Variable Selection and Description

The variables used to investigate the impact of internet banking on the financial performance of the banks have been discussed in the following Table 2:

Table 2: Variables Used in the Present Study

Sr. No.	Variable	Measurement	Meaning	Authors
DEPENDENT VARIABLES				
1.	ROA	Net income after taxes to average assets	It measures the effectiveness of banks to generate profits from use of their assets.	Hernando, and Nieto (2006); DeYoung et al. (2007); Malhotra and Singh (2007); Ciciretti et al. (2008); DeAndres and Vallelado (2008); Tunay et al. (2015)
2.	ROE	Net income after taxes to average equity	It is an indicator of efficiency with which capital is used by the banks.	Berger et al. (2005); Hernando, and Nieto (2006); DeYoung et al. (2007); Ciciretti et al. (2008); Tunay et al. (2015)
INDEPENDENT VARIABLE				
3.	I N T E R - NET	Dummy 1 and 0	It is a dummy variable equal to one if bank <i>i</i> began operating a transactional internet website and zero otherwise	DeYoung et al. (2007); Malhotra and Singh (2007);

Sr. No.	Variable	Measurement	Meaning	Authors
CONTROL VARIABLES				
4.	AGE	Natural logarithm of number of years of incorporation	It measures age of the bank <i>i</i> at time <i>t</i> in terms of year of incorporation	DeYoung (2001); Malhotra and Singh (2007);
5.	SIZE	Natural logarithm of total assets	It measures the size of bank <i>i</i> at time <i>t</i> in terms of total assets	Hernando, and Nieto (2006); Iannotta et al. (2007); Malhotra and Singh (2007); DeAndres and Vallelado 6.(2008); DeYoung (2001); Stoica et al. (2015);
6.	LOANS	Total loans divided by total asset	It measures business activity, i.e., loan as a percentage of total assets	Berger et al. (2005); Hernando, and Nieto (2006); Iannotta et al. (2007); DeAndres and Vallelado (2008)
7.	FINCOST	Interest expended divided by total funds	It is an expenses management ratio	Malhotra and Singh (2009)
8.	DEMAND	Demand and saving deposits divided by total funds	It indicates dependence on traditional source of financing, i.e., deposits	Malhotra and Singh (2009)

Source: Researcher's own compilation

Data Analyses

The software packages, EViews (version 9), SPSS (version 16.0) and STATA (version 12) were utilized for analyzing

the data in the present study. Panel data regression model is used on the regression models as presented in Table 3 to examine the relationship between internet banking and financial performance of the banks.

Table 3: Regression Equations Used in the Present Study

Regression Model	Variables	Equation
Model 1	The financial performance (ROA) has been regressed on the internet banking dummy variable and control variables.	$ROA_{it} = \beta_0 + \beta_1 INTERNET_{it} + \beta_2 AGE_{it} + \beta_3 SIZE_{it} + \beta_4 LOANS_{it} + \beta_5 FINCOST_{it} + \beta_6 DEMAND_{it} + \varepsilon_{it}$
Model 2	The financial performance (ROE) has been regressed on the internet banking dummy variable and control variables.	$ROE_{it} = \beta_0 + \beta_1 INTERNET_{it} + \beta_2 AGE_{it} + \beta_3 SIZE_{it} + \beta_4 LOANS_{it} + \beta_5 FINCOST_{it} + \beta_6 DEMAND_{it} + \varepsilon_{it}$

Source: Researcher's own compilation

Where, *INTERNET*, equal to one if bank *i* began operating a transactional internet website and zero otherwise; *ROA* equals to Net income after taxes to average assets; *ROE* equals to Net income after taxes to average equity; *AGE* is Natural logarithm of number of years of incorporation; *SIZE* is Natural logarithm of total assets; *LOANS* is Total loans divided by total asset; *FINCOST* is Interest expended divided by total funds; *DEMAND* Demand and saving deposits divided by total funds

EMPIRICAL RESULTS AND DISCUSSION

Descriptive Statistics

The analysis begins by examining the characteristics of all the variables used in the present study by employing descriptive statistics (mean, standard deviation, minimum, and maximum) for the financial years 1997-2016 using

the full sample of 620 company-year observations. Table 4 provides the descriptive statistics for the variables used in the study. Panel A shows the descriptive statistics for dichotomous internet banking variable used in the regression model, whereas Panel B shows the descriptive statistics for proxies of financial performance (*ROA* and *ROE*) used in the study. Panel C reports the details of control variables employed in the present study.

The statistics shows that about 77 percent of the sample banks offer internet banking services (*INTERNET*). The examination of the results in Panel B shows that *ROA* varied significantly, ranging from -4.67 to 9.57 directors with a mean of 1.10. *ROE* is between -108.5 and 43.09 with an average not exceeding 12.95. Panel C reports the statistics of control variables used in the present study. As can be inferred from the Table 4 average *SIZE* of sample companies as measured by the natural logarithm of total assets is 5.06 with maximum and minimum values of 7.37 and 2.48 respectively. This suggests that the sample for the present

study covers small as well as large size companies. In terms of average *LOANS*, the average company has a mean value of 0.49, with maximum and minimum values of 0.74 and

0.02 respectively. *FINCOST* covers a narrow range from 0.01 to 2.28 with a mean of 0.34. *DEMAND* ranges from 0.04 to 8.22, covering a wide range, with mean as 1.48.

Table 4: Descriptive Statistics

Panel A: Independent Variable (Internet Banking)						
Dichotomous Variables	Frequency of 1's			Frequency of 0's		
	Symbol used	Frequency	Percent	Frequency	Percent	
Internet Banking	INTERNET	480	77.4%	140	22.6%	
Panel B: Proxy for Dependent Variable (Financial Performance)						
Continuous Variables	Symbol Used	Observations	Mean	Standard Deviation	Minimum	Maximum
Return on Assets	ROA	620	1.10	1.29	-4.67	9.57
Return on Equity	ROE	620	12.95	12.44	-108.5	43.09
Panel C: Control Variables						
Continuous Variables	Symbol Used	Observations	Mean	Standard Deviation	Minimum	Maximum
Age	AGE	620	1.59	0.39	0	2.17
Bank Size	SIZE	620	5.06	0.94	2.48	7.37
Loans	LOANS	620	0.49	0.14	0.02	0.74
Financing Cost	FINCOST	620	0.34	0.25	0.01	2.28
Demand	DEMAND	620	1.48	1.08	0.04	8.22

Note: Results are obtained using SPSS 16.0

Where, *INTERNET*, equal to one if bank *i* began operating a transactional internet website and zero otherwise; *ROA* equals to Net income after taxes to average assets; *ROE* equals to Net income after taxes to average equity; *AGE* is Natural logarithm of number of years of incorporation; *SIZE* is Natural logarithm of total assets; *LOANS* is Total loans divided by total asset; *FINCOST* is Interest expended divided by total funds; *DEMAND* Demand and saving deposits divided by total funds.

Multivariate Results

As the value of p in Hausman test is 0.4675, random effect panel data regression has been employed in Model 1 to study the impact of internet banking on financial performance as proxied by ROA in the sample banks. However, p-value in Hausman test for ROE is less than 1 percent, thus fixed effect panel data regression has been employed in Model 2.

Table 5: Regression Results of Internet Banking on Financial Performance of Sample Banks

Explanatory Variables	Model 1 (ROA)	Model 2 (ROE)
Intercept	7.338*** (0.000)	20.355*** (0.000)
INTERNET	0.279*** (0.017)	1.842** (0.027)

Explanatory Variables	Model 1 (ROA)	Model 2 (ROE)
AGE	0.029 (0.347)	0.683 (0.106)
SIZE	0.289*** (0.004)	0.544*** (0.000)
LOANS	0.075* (0.069)	0.211 (0.631)
FINCOST	-0.367*** (0.000)	-0.331 (0.167)
DEMAND	0.163*** (0.004)	1.939*** (0.002)
No. of Observations	620	620
Overall R ²	0.54%	0.49%
Wald Statistics (F)	62.19	38.57
Prob>chi square	0.000	0.000

Note: Results are obtained using EViews 9

Where, *INTERNET*, equal to one if bank *i* began operating a transactional internet website and zero otherwise; *ROA* equals to Net income after taxes to average assets; *ROE* equals to Net income after taxes to average equity; *AGE* is Natural logarithm of number of years of incorporation; *SIZE* is Natural logarithm of total assets; *LOANS* is Total loans divided by total asset; *FINCOST* is Interest expended divided by total funds; *DEMAND* Demand and saving deposits divided by total funds

The p-values are shown in parentheses.

*** indicates level of significance at 1 percent. The test of significance is two tailed.

** indicates level of significance at 5 percent. The test of significance is two tailed.

* indicates level of significance at 10 percent. The test of significance is two tailed.

Column 2 of the Table 5 exhibits the results for the effect of internet banking on *ROA* (Model 1). As evident from the table, the intercept ($\beta = 7.338$, $p < 0.01$) is found to be significantly positive at one percent level. For *ROA* (measure of financial performance), a significant positive coefficient is reported for *INTERNET* ($\beta = 0.279$, $p < 0.01$) at one percent level, suggesting higher financial performance is generated by banks offering internet banking (Furst et al., 2000; Hernando and Nieto, 2006; Atay, 2008; Ciciretti et al., 2008; Onay et al., 2008). A positive and significant coefficient has been reported for *SIZE* ($\beta = 0.289$, $p < 0.01$), while, negative and significant coefficient was reported for *FINCOST*. Further investigations reveal that *LOANS* ($\beta = 0.075$, $p < 0.10$) has a positive and significant coefficient at ten percent level. *DEMAND* ($\beta = 0.163$, $p < 0.01$) was found to be positive and significant. *AGE* reported insignificant positive relationship with *ROA*. The overall R^2 is 0.54 and the Wald statistics for the regression model is significant at one percent level of significance, indicating the model fitness.

The empirical results in Column 3 of the Table 5 shows that the intercept ($\beta = 20.355$, $p < 0.01$) is significant at one percent level. For *ROE* (measure of financial performance), *INTERNET* ($\beta = 1.842$, $p < 0.05$) as well as *SIZE* ($\beta = 0.544$, $p < 0.01$) are found to be positively significant at five and one percent level respectively (Sullivan, 2000; Hernando and Nieto, 2006; Atay, 2008; Ciciretti et al., 2008; Onay et al., 2008). *DEMAND* ($\beta = 1.939$, $p < 0.01$) have positive relationship with *ROE* at one percent level of significance. *AGE* and *LOANS* reported a positive and insignificant coefficient, whereas, negative insignificant association has been reported for *FINCOST*. The overall R^2 is 0.49 and the Wald statistics for the regression model is significant at one percent level of significance, indicating the model is significant.

Regression Diagnostics

Multicollinearity

Multicollinearity is detected by using the Variance Inflation Factor (VIF) and tolerance level which indicates whether a regressor has a strong linear relationship with the other regressor employed in the regression model. The collinearity tolerance is the opposite of VIF. The larger the value of VIF, the more troublesome or collinear are the variables (Hair et al., 1998; Gujarati, 2003). As a rule of thumb, if the VIF of a variable exceeds 10, which will happen if R^2 exceeds 0.90, that variable is said to be highly collinear (Myers, 1990; Bowerman and O'Connell, 1990; Gujarati, 2003). Further, the closer is tolerance to zero, the greater the degree of collinearity of that variable with the other variables whereas the closer the tolerance is to 1, the greater the evidence

that the variable is not collinear with the other regressors. Tolerance below 0.2 indicates a potential problem (Menard, 2002) and tolerance below 0.1 indicates a serious problem (Field, 2005). Table 6 presents the VIF values for the multivariate regression models used in the present study. As can be inferred from the table, multicollinearity was not a serious problem for any of the regression models in the study as the coefficients of independent variables were quite below the rule of thumb.

Table 6: Variance Inflation Factors (VIF)

Variance Inflation Factors						
	INTERNET	AGE	SIZE	LOANS	FINCOST	DEMAND
VIF	1.20	1.24	1.54	1.44	1.52	1.51
Tolerance	0.833	0.805	0.649	0.694	0.659	0.662

Note: Results were obtained using STATA 12.0

Where, *INTERNET*, equal to one if bank *i* began operating a transactional internet website and zero otherwise; *AGE* is Natural logarithm of number of years of incorporation; *SIZE* is Natural logarithm of total assets; *LOANS* is Total loans divided by total asset; *FINCOST* is Interest expended divided by total funds; *DEMAND* Demand and saving deposits divided by total funds.

Auto Correlation

Serial correlation between errors is checked by Durbin-Watson test which assumes independent errors to be tenable. In the present study autocorrelation is not a problem because the value is closer to 2 (2.086).

Heteroskedasticity

Cross-sectional data normally suffers from the problem of heteroskedasticity. It results in inefficient estimates of the coefficients. Heteroskedasticity is not present in the models employed in the current study as can be inferred from the insignificant *p*-values in Table 7.

Table 7: Breusch-Pagan Test for Heteroskedasticity

Dependent Variable	Chi-square value	<i>p</i> -value
ROA	0.01	0.8030
ROE	0.03	0.9060

Note: Results are obtained using Stata 12

Where, *ROA* equals to Net income after taxes to average assets; *ROE* equals to Net income after taxes to average equity.

CONCLUSION

The banking industry has reaped tremendous benefits from internet banking. It helps in removing the traditional geographical barriers for customers (Sharma, 2016). This transition from the traditional means to electronic means has positively affected the banks by augmenting the profits. The internet banking services offered by sample banks helps in enhancing the financial performance of the banks. The banks must try to tackle the various security issues in order to evade security and operational risks by equipping itself with the latest technologies. The banks should strive harder to develop a smooth and an easy system for using internet banking by customer to enhance the number of users of internet banking and thereby attracting and retaining the customers. Banks must endeavor to facilitate their customer in the usage of internet banking and boosting their loyalty and confidence and at the same time keeping them well informed about the products and services offered through internet banking.

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