

THE IMPACT OF INTERNET BANKING ON THE USE OF  
BANKING SERVICES

by

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Abstract

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The study adds to literature investigating insights from Internet banking diffusion through banking markets. It mainly contributes with referring to individual level data on behavioral variables (particularly number of transactions and amounts of money kept on banking accounts). The data from one Ukrainian large bank are investigated. Analysis reveals that customers who adopt e-banking differ from others on such characteristics as age, income, activity and wealth in bank before the start of usage. After adoption they tend to increase a gap in behavior. Internet banking may be considered as a signal from a customer about being a "good one".

## TABLE OF CONTENTS

INTRODUCTION.....	1
LITERATURE REVIEW .....	4
METHODOLOGY.....	8
DATA .....	12
3.1 Takers versus non-takers.....	14
3.2 Before versus after adoption .....	19
RESULTS.....	22
5.1 Wealth in bank .....	22
5.2 Number of transactions .....	25
CONCLUSIONS.....	28
WORKS CITED .....	29

## LIST OF FIGURES

<i>Number</i>	<i>Page</i>
Figure 1. Internet banking as a cause to change behavior.....	10
Figure 2. The model with cumulative changes in behavior.....	11
Figure 3. Age distributions.....	14
Figure 4. Tenure distributions.....	15
Figure 5. Ln (wage) distributions.....	16
Figure 6. Number of transactions distributions.....	17
Figure 7. Ln (wealth) distribution.....	18
Figure 8. Change in wealth after e-banking adoption in November 2013.....	20
Figure 9. Change in wealth after e-banking adoption in October 2013.....	20
Figure 10. Change in activity after e-banking adoption in November 2013.....	21
Figure 11. Change in activity after e-banking adoption in October 2013.....	21
Figure 12. Predicted continuous changes in wealth.....	25
Figure 13. Predicted continuous changes in number of transactions.....	27

## LIST OF TABLES

<i>Number</i>	<i>Page</i>
Table 1. Descriptive statistics of all variables used in the regression analysis .....	13
Table 2. Mean comparisons.....	19
Table 3. Estimated results for ln (wealth).....	23
Table 4. Estimated results for ln (activity).....	26

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## *Chapter 1*

### INTRODUCTION

Internet banking (e-banking) is a remote service, where access to account information and any transactions is granted at any time from any computer with an Internet connection. The number of Internet users in Ukraine has been growing by 20-30% annually over the last 5 years. Thus, online becomes more and more common for Ukrainian customers, and banks are motivated to propose a new and convenient way to use their services.

The majority of Ukrainian banks started proposing modern e-banking services only recently. An important question is how the conversion from plain vanilla banking to online one affects the bank customer's behavior. In this thesis we focus on whether it leads to more customer initiated transactions and higher amounts on balances. The effect can arise via several channels:

1. since clients are able to do transactions online, more money can remain on the account while the number of transactions done through the bank can increase
2. since through internet banking customers may monitor money on their accounts day and night, the sense of control over the account will increase, which can imply more trust. According to Montier (2007), easy monitoring will lead to the illusion of control over the uncontrollable performance of banks.

Increasing trust to banking institutions may particularly be very important. Coupé (2011) shows that trust leads to higher likelihood of saving ones money at the bank. If the research shows that e-banking services lead to more money

being kept at banking accounts, this could be a reason for authorities to stimulate the spread of Internet access and the promotion of Internet usage.

From the business point of view, customers are happy to reduce transaction costs, while banks may collect the same or even higher fees. Moreover, the information about customer transactions can be easily collected, which enables banking institutions to analyze clients' needs. Online services are likely to be the future of the banking system, and the number of Internet banking users is likely to continue to increase. If their behavior differs from the standard customers' one, for banks it would be particularly interesting to know how. Thus, research results would thus also be relevant for business.

In the study we focus on one big retail bank. It is in top-10 Ukrainian banks in all ratings by assets, capital or individual deposits. We assume it operates similarly to others, which makes all findings relevant for the whole retail banking sector in Ukraine.

The bank pays a lot of attention to segmentation of its clients. It differentiates in size of relationships, activity or socio-demographic characteristics and proposes different products and conditions to different categories of customers - from simply more communication to change in interest rates. For example, the bank separates customers who receive wage on accounts within the institution, which accounts to about 55% of the whole customer base. On the one hand, such clients always have some funds or make transactions, which is desirable. On the other hand, the bank is interested in continuous relationships with its customers and proposes higher interest rates to those depositors who prolong their deposits. However, despite being wealthy, currently there are pretty no ways for a person to signal that she is a 'good' or 'loyal' customer.



Definitely, a decision to make online transactions together with a bank evidences about higher loyalty. The objective of this research is to figure out how such customers differ from others and what do they signal about.

The remained part of the paper has the following structure. Chapter 2 provides literature review and reveals a room for investigating individual characteristics of the Internet banking takers. Chapter 3 builds methodology. Description of the data used for the analysis is contained in Chapter 4. Chapter 5 reports results and Chapter 6 concludes.

## *Chapter 2*

### LITERATURE REVIEW

Internet banking was first proposed in the early 1990s. Since that time it has been developing rapidly together with the increased use of Internet. However, its effect on the use of banking accounts is still an underexplored question.

The majority of studies can be divided into three groups. The first group investigates the necessary conditions for bank customers to start using Internet banking. Based on surveys, Al-Rfou (2013) reveals that customers tend not to use the service even if they have it provided. Complexity of usage, low privacy and bad quality of Internet connection are the suggested reasons for Jordan.

This evidence is confirmed by Ali Bayrakdaroglu (2012), who adds awareness as an important factor. The results were obtained from questionnaires distributed among different bank users. The author states that evaluation of factors of e-banking usage varies according to demographic characteristics of customers as well.

Koskosas (2008), Liao and Wong (2007) claim the importance of trust and stringent security control for efficient Internet banking. In that way, the level of trust to an institution may be the reason to take e-banking.

The evidences above are all in favor of strong self-selection bias for Internet banking users.

The second group of studies measures the aggregate effect of e-banking on the bank performance. According to Drigă *et al.* (2009), Internet banking can bring sustainable competitive advantage in terms of market share, but not in making profits. The results are based on the World Retail Banking Report 2009 (for 8 European countries, the US and Japan). It reveals that an active Internet Banking user on average paid for transactions 34% less than an active branch user. However, these findings were caused by European banks' aggressive policy aiming to discourage customers from visiting branches. The amounts of savings, time with bank or number of transactions were not investigated.

Bouckaert and Degryse (1995) argue about two opposite effects of remote banking services on interest rates. Firstly, they promote depositors to add more saving accounts or keep more funds on existing ones, which facilitates attraction additional deposits at current interest rates. Secondly, providing remote services can decrease customer's transaction costs for other banks that offer similar services, facilitating competition and causing increase in interest rates.

The impact of e-banking on a bank size in the US is evaluated in Sullivan and Wang (2005). They claim that Internet makes it easier to serve and communicate with clients. Moreover, it saves costs for banks on conducting low-value-added transactions. Largest banks face higher demand for their services, thus, are more likely to figure out a cost saving opportunity, adopt Internet banking first, and enjoy further increase in size. In long run, when innovation reaches smaller banks, the banking industry converges to new post-innovation steady state distribution.

Isaeva (2012) and Nath *et al.* (2001) as well argue that Internet banking expands the customer base. The study by Nath collects data from 75 banks in the United

States and examines the views of bankers on providing banking services via the Internet. They see Internet banking as an opportunity to reduce transaction costs, expand the customer base and increase cross-selling.

In that way the whole sequence of studies from the second group show that since Internet banking was first proposed in early 1990s it was used with a view to expand customer base or not to lose those customers who want it. Meanwhile, the individual effects of online-banking adoption for a customer or differences between users and non-users have not been in focus.

In the third group the levels of customers' loyalty and satisfaction with Internet banking are measured. Maroofi and Nazaripour (2012), Raza *et al.* (2013) concentrate on how quality of online services influences customer's satisfaction. Looking at individual response and controlling for such factors as trust and reputation results into positive, but not significant effect of e-banking quality. Floh and Treiblmaier (2006) take into account a role of consumer characteristics such as age, gender or technophobia and conclude that the loyalty of e-banking customers is affected by trust, Web site quality and services quality. The described results are based on data from surveys where customers of the one Australian online bank were questioned. Respondents were not compared to non e-banking users.

The studies from the third group suggest the way to identify and explain customers' loyalty, but have no deal with measuring loyalty in terms of size of accounts or number of transactions. Moreover, they do not look for the customers without Internet banking.

Generally, the whole literature deals either with aggregate effect of online banking, its adoption, or concentrates on only those customers who have it. No literature is devoted to the exploration of difference between individuals (their preferences and behavior) with and without e-banking. However, such knowledge may be of particular interest for business. The proposed study aims to fill in the gap and, moreover, investigate the change in personal behavior after Internet banking adoption.

### *Chapter 3*

#### METHODOLOGY

We may think of the Internet banking adoption as of a treatment. This makes us interested in estimation of its impact on customers' activity and willingness to keep money at a bank. Thus, the number of transactions as well as account balances will be the variables of interest. Online banking adoption seems to make a customer more loyal, so one may expect having it to be a good explanatory factor with a positive impact on both of the characteristics.

It is important to reveal whether the estimated effect is not caused by the treatment selection bias. Individuals choose by themselves whether to use the product or not, thus the sample of customers with e-banking is not selected randomly.

The factors that push customers to the service adoption are likely to be endogenous and unobservable. However, we assume that during the analyzed period those characteristics at least do not fluctuate. Thus, the solution is to run panel data regression with individual fixed effects for customers before and after Internet banking adoption, which eliminates sample selection bias. Under this specification the effect of all time-invariant factors are not investigated. However, we control for clients income.

Another issue is that the behavior may change not immediately after e-banking adoption. All variables are observed on a monthly basis, and the study is capable

of tracking the changes in the dependent variables for several months after the treatment.

The most general linear model in use looks like:

$$\ln(\mathit{wealth})_{it} = \alpha_0 + \alpha_1 \ln(\mathit{wage})_{it} + \sum_{n=-3}^1 \beta_n \mathit{IB}_{it}^{t+n} + \omega_i + \varepsilon_{it} \quad (1)$$

*wealth* – all money on accounts

*wage* – average income for last 3 month

$\mathit{IB}^{t+n}$  – dummy for e-banking several months before or after the month in which wealth and wage are measured. Coefficient in front of  $\mathit{IB}^{t+1}$  measures what is the percentage change in wealth 1 month before Internet banking adoption, in front of  $\mathit{IB}^{t-2}$  - two months after.

$\omega_i$  – individual fixed effects.

In formula (1) a coefficient in front of  $\ln(\mathit{wage})$  can be viewed as an elasticity of money on accounts to income. Due to data limitations, the income in exact month of measurement is not observable. Last three month average is used instead. However, it is feasible to think that it takes some time to convert income into wealth. Moreover, it is common to receive invariable wages, so the proposed elasticity could serve as a good proxy.

The sequence of included variables  $\mathit{IB}^{t+n}$  allows figuring out how the effect of Internet banking evolves during several months after start of usage and one month before it. Descriptive statistics (see Figures 3-6) evidences that some changes in behavior may appear before the adoption. Of course such

anticipating changes can not be viewed as an impact in its general way, but rather as a reason or disturbances due to expectations.

The formula and interpretations for estimating effect on activity is very similar. The number of transactions is always a positive integer and Poisson regression is applied:

$$\ln(\text{activity})_{it} = \alpha_1 \ln(\text{wage})_{it} + \sum_{n=-3}^1 \beta_n IB_{it}^{t+n} + \omega_i + \varepsilon_{it} \quad (2)$$

*activity* – number of transactions.

In general, the estimated model looks like described on Figure 1. Decision about Internet banking adoption influences customer's behavior. The selected customer's type is captured by fixed effects.

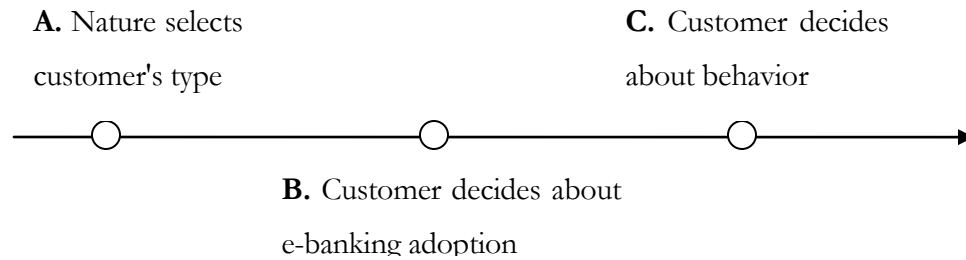


Figure 1. Internet banking as a cause to change behavior

It was already argued that customers' behavior may change not immediately after the start of usage. That is why the employed scenario is estimated in the next way (see Figure 2):



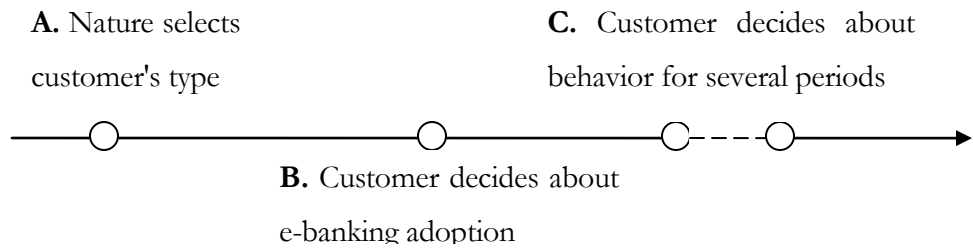


Figure 2. The model with cumulative changes in behavior

Other factors to incorporate in the model are previous period behavior and current period income. Fixed effects control for former, while latter is included in proposed OLS regressions.

## *Chapter 4*

### DATA

The data come from one Ukrainian big bank (hereinafter The Bank). There are 17 546 customers who are followed during the 6 months starting from August 2013 till January 2014. However, sample is restricted to the part of the total client base that receives wages on banking accounts. Such customers possess debit cards and for sure keep some funds, possibly deposits. Together with missing observations the restricted sample contains information for 9 178 - 9 554 customers. Each customer serves as an observation. Up to June 2013 less than 4% of The Bank customers were using this kind of service. The Bank proposes e-banking to everyone now. It is known who and when began making use of online services. Data samples contain dynamic monthly information about customers' transactions and balance amounts. Each month a fraction of customers adopts Internet banking.

Descriptive statistics of the dataset used in the regression analysis can be seen in Table 1.

Table 1. Descriptive statistics of all variables used in the regression analysis

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
wage (Jan)	9323	6940.57	25934.74	0.75	1278529.00
wealth (Jan)	9323	40170.67	578350.90	0.93	52700000.00
ln (wage) (Jan)	9323	8.18	1.01	-0.29	14.06
ln (wealth) (Jan)	9323	8.37	2.07	-0.07	17.78
activity (Jan)	9306	18.85	17.02	0.00	261.00
IB (Jan)	9323	0.79	0.41	0.00	1.00
wage (Dec)	9267	7024.57	24363.45	11.94	1477294.00
wealth (Dec)	9267	37725.14	563905.70	4.52	51800000.00
ln (wage) (Dec)	9267	8.22	0.99	2.48	14.21
ln (wealth) (Dec)	9267	8.31	2.06	1.51	17.76
activity (Dec)	9255	22.48	19.06	0.00	230.00
IB (Dec)	9323	0.69	0.46	0.00	1.00
wage (Nov)	9178	6249.23	23326.65	12.00	1757773.00
wealth (Nov)	9178	35574.68	553710.80	1.77	51000000.00
ln (wage) (Nov)	9178	8.14	0.96	2.48	14.38
ln (wealth) (Nov)	9178	8.22	2.07	0.57	17.75
activity (Nov)	9173	19.26	16.34	0.00	210.00
IB (Nov)	9323	0.51	0.50	0.00	1.00
wage (Oct)	9030	6051.83	21954.72	12.00	1726427.00
wealth (Oct)	9030	33835.45	547924.90	1.83	50300000.00
ln (wage) (Oct)	9030	8.12	0.95	2.48	14.36
ln (wealth) (Oct)	9030	8.16	2.10	0.61	17.73
activity (Oct)	9030	19.31	16.79	0.00	180.00
IB (Oct)	9323	0.38	0.49	0.00	1.00
wage (Sep)	8940	6091.78	28827.97	5.94	2429317.00
wealth (Sep)	8940	34561.09	540015.90	0.85	49000000.00
ln (wage) (Sep)	8940	8.12	0.94	1.78	14.70
ln (wealth) (Sep)	8940	8.24	2.05	-0.16	17.71
activity (Sep)	8940	11.50	10.70	0.00	116.00
IB (Sep)	9323	0.27	0.44	0.00	1.00

Table 1 - Continued

Variable	Obs.	Mean	Std. Dev.	Min	Max
wage (Aug)	8892	6166.66	13885.75	4.63	644275.40
wealth (Aug)	8892	34275.61	534418.10	0.91	48100000.00
ln (wage) (Aug)	8892	8.17	0.95	1.53	13.38
ln (wealth) (Aug)	8892	8.20	2.06	-0.09	17.69
activity (Aug)	8892	7.33	8.71	0.00	100.00
IB (Aug)	9323	0.15	0.35	0.00	1.00

### 3.1 Takers versus non-takers

Customers that adopt Internet banking are different from those ones who do not. This fact is illustrated on the Figures 3-7, where the distributions of November characteristics of the customers who started using e-banking in November are compared to the ones of the customers who never adopted the service during the given 6 month period or earlier.

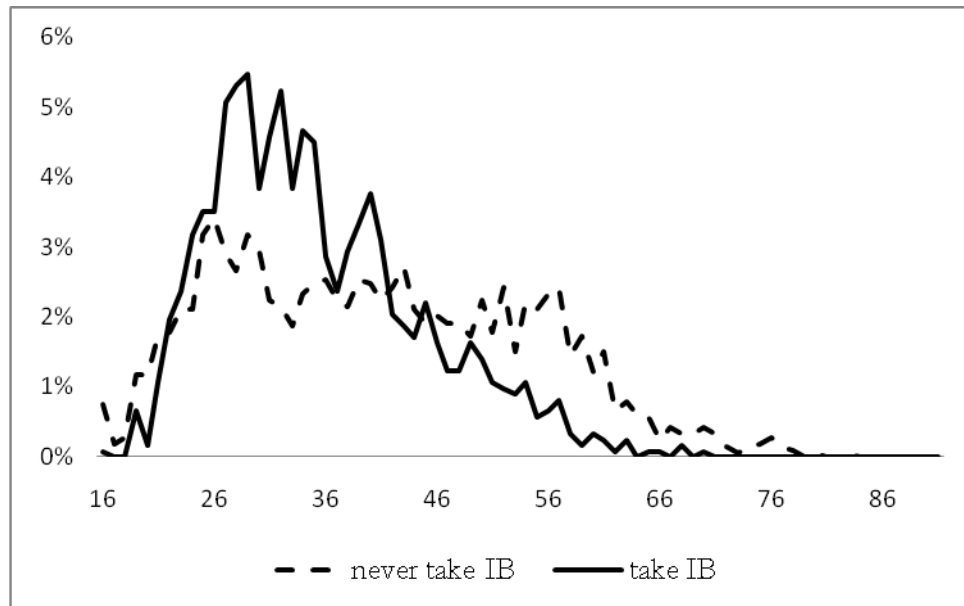


Figure 3. Age distributions

Younger people have higher propensities to take Internet banking with an intersection at about 42 years. Student's t-test with t-statistics of 13.64 rejects the hypothesis that the means of two distributions are the same. Results of this and other t-tests are summarized in Table 2.

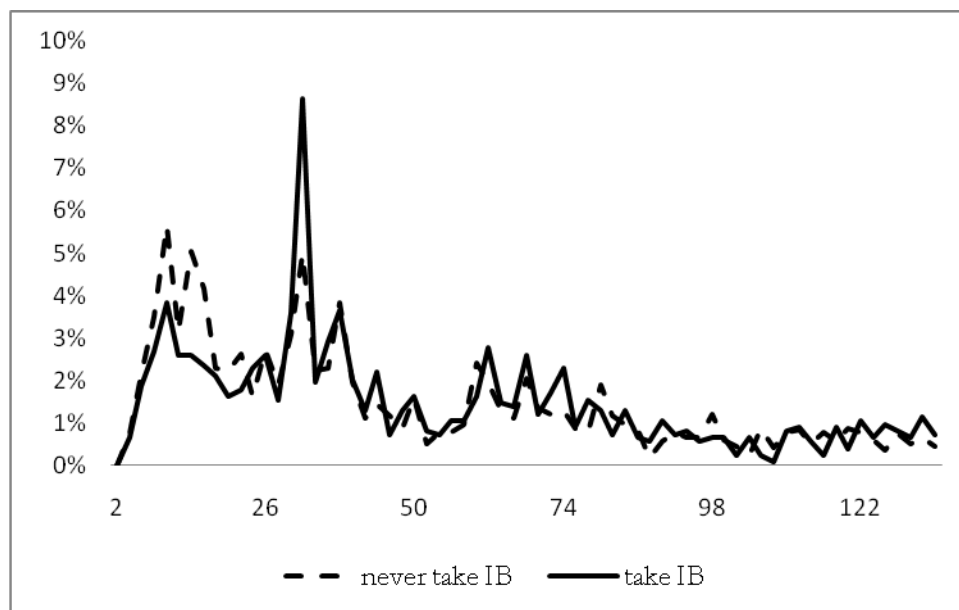


Figure 4. Tenure distributions

The distributions of tenure, which is number of month with a bank until an estimation period, are very close to each other. However, the values for e-banking takers are on average slightly higher.

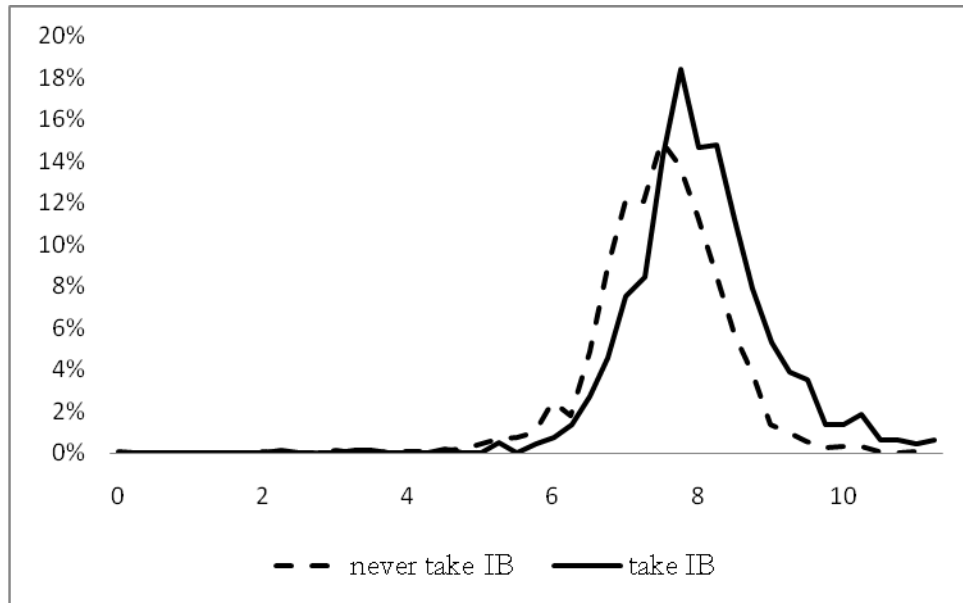


Figure 5. Ln (wage) distributions

Customers with higher wages on average have higher probabilities to adopt e-banking. The intersection is close to 2400 UAH monthly. The result is stable if consider wages one, two or three months prior to adoption, which can be seen in Table 2.

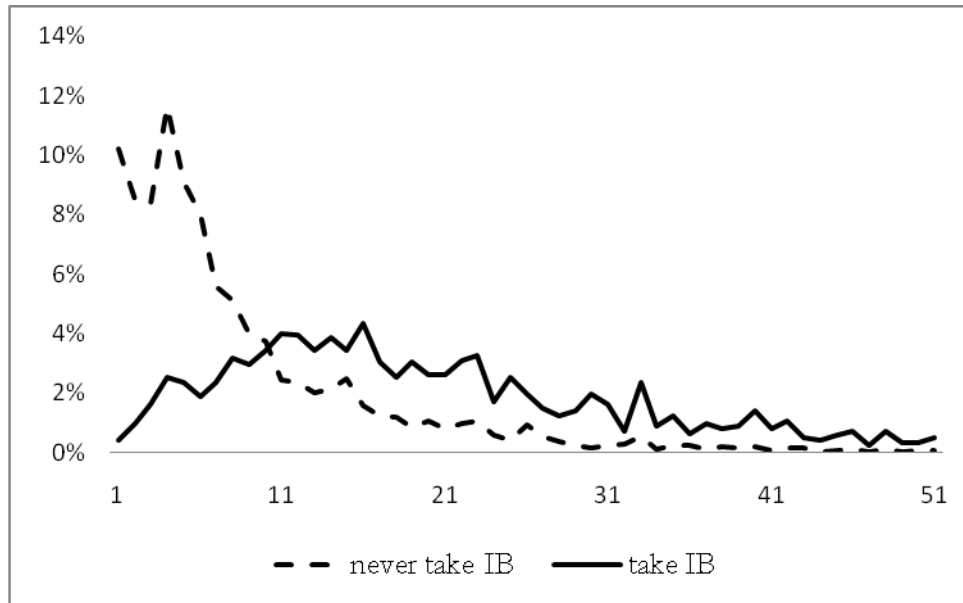


Figure 6. Number of transactions distributions

Customers who start using Internet banking already make higher number of transactions. The distinction is stable if evaluate differences one, two or three months before adoption. See Table 2.

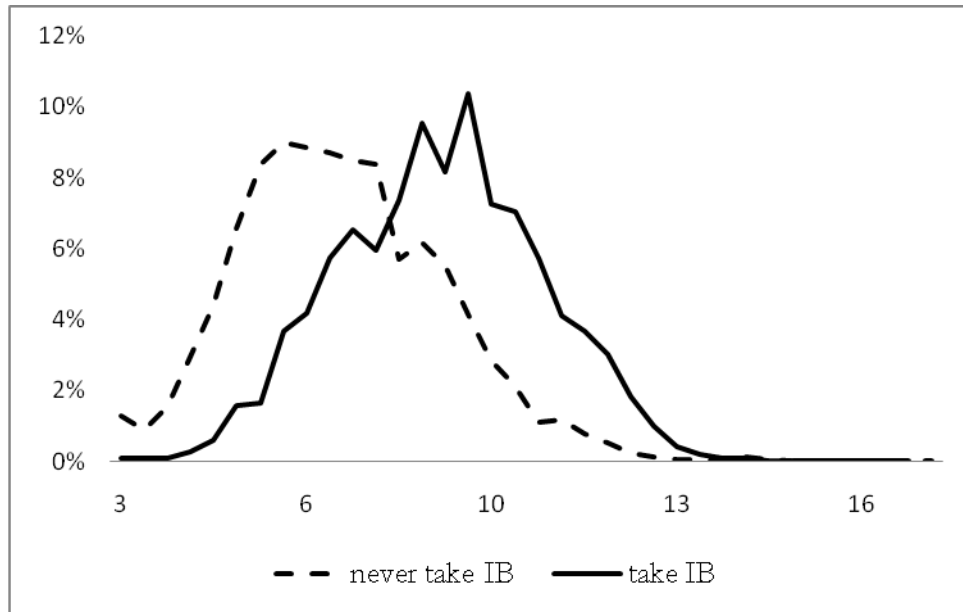


Figure 7. Ln (wealth) distribution

Sum of money on accounts is already higher for the agents who adopt e-banking. The intersection is close to 3000 UAH. The finding is stable if consider wealth one, two or three month prior to the start of usage, which can be seen on Table 2.



Table 2. Mean comparisons

Variable	Mean		t-test statistics
	take IB	never take IB	
Age	35.32	41.46	13.64***
Tenure	48.61	45.76	-2.19**
Ln (wage)	8.2	7.64	-16.98***
<i>1 month before</i>	8.13	7.64	-15.09***
<i>2 months before</i>	8.15	7.65	-15.54***
<i>3 months before</i>	8.19	7.69	-15.33***
Activity	22.26	8.51	-12.92***
<i>1 month before</i>	18.97	8.31	-25.07***
<i>2 months before</i>	11.53	5.22	-22.45***
<i>3 months before</i>	7.18	3.34	-18.62***
Ln (wealth)	8.51	6.71	-26.15***
<i>1 month before</i>	8.38	6.67	-23.96***
<i>2 months before</i>	8.45	6.85	-22.78***
<i>3 months before</i>	8.42	6.84	-18.62***

### 3.2 Before versus after adoption

Another thing is to look how the number of transactions and wealth in bank change after Internet banking adoption. Below (Figures 8-11) averages of these characteristics are tracked for groups of customers who started using e-banking in November or in October. Wealth sufficiently increases next month after the start of the usage. One can admit some further growth in the next months as well.

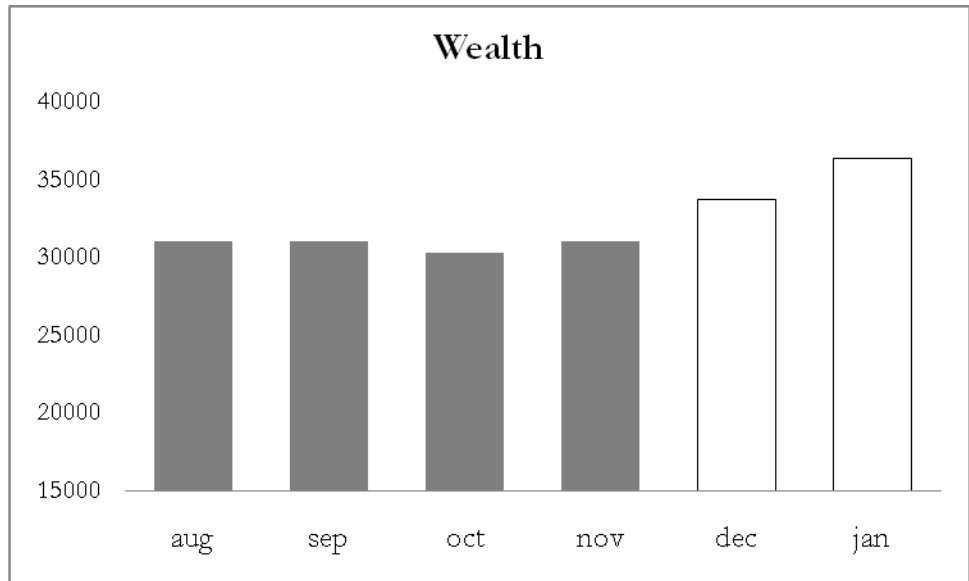


Figure 8. Change in wealth after e-banking adoption in November 2013

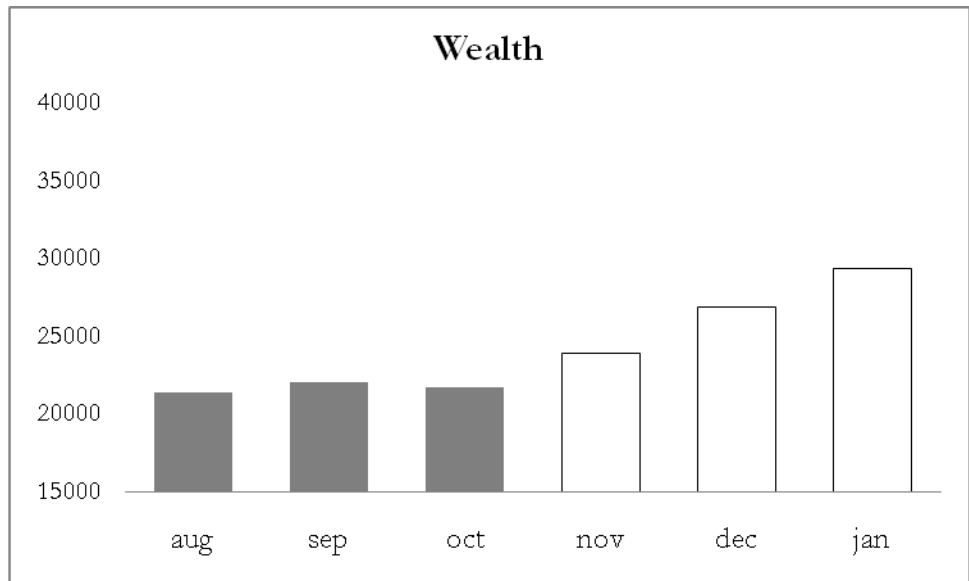


Figure 9. Change in wealth after e-banking adoption in October 2013

Despite the fact of different means, both groups follow similar patterns of increase right after adoption. Not more than 2 observations were excluded in each sample due to being outliers.

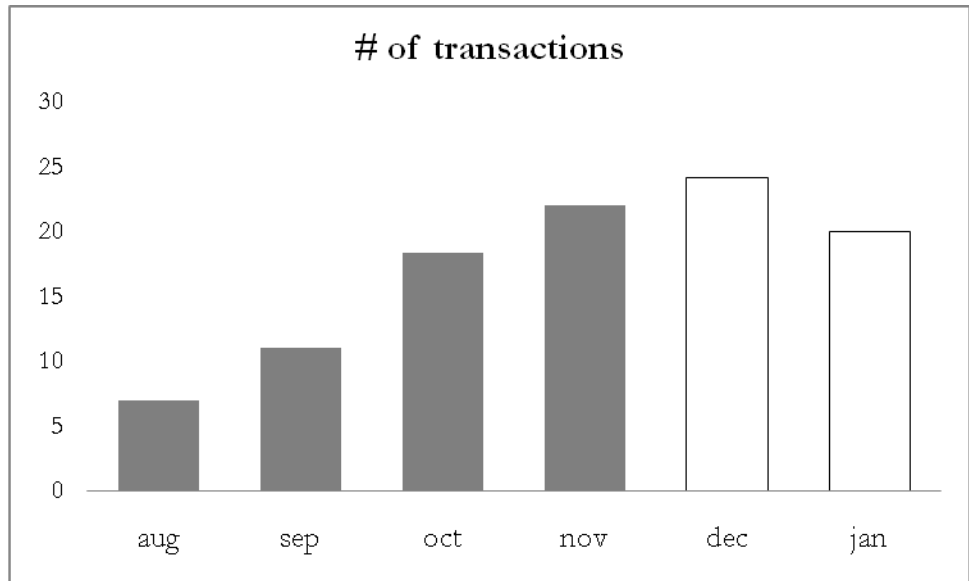


Figure 10. Change in activity after e-banking adoption in November 2013

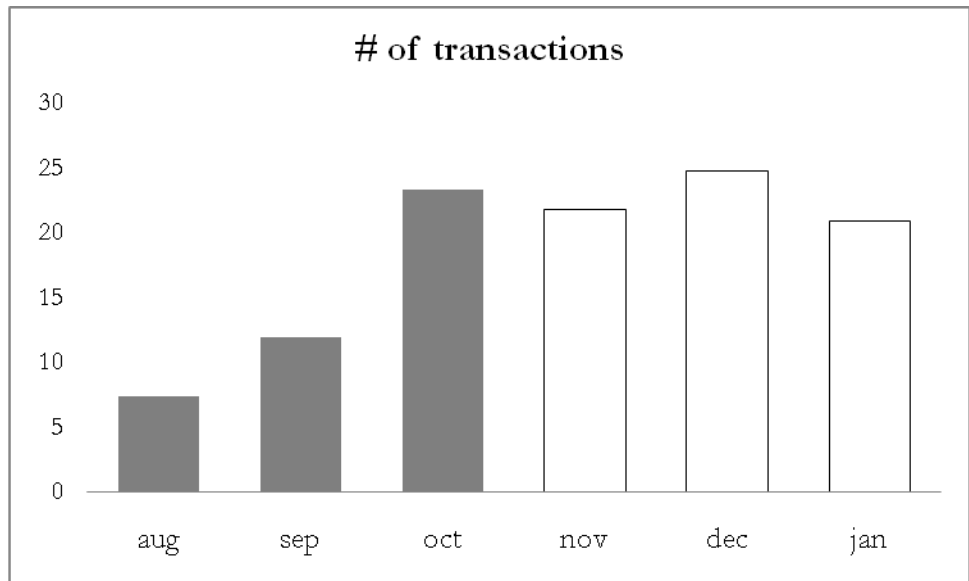


Figure 11. Change in activity after e-banking adoption in October 2013

The number of transactions seems to grow several months before the e-banking adoption, which can be considered as a reason to start usage. Next periods patterns can not be clearly observed.

## *Chapter 5*

### RESULTS

The customers that adopt Internet banking were considered in the analysis. They clearly differ from others on such characteristics as age, income, transaction activity and wealth in bank. The distinction in tenure appeared to be not so striking.

It was revealed that mostly younger people and customers with higher salaries start using the service. It is in line with common knowledge, which presumes that:

1. youth is more acquainted with Internet technologies
2. higher income implies more chances not to withdraw it all, but leave something on banking accounts, thus generating demand for convenient low-cost remote transactions

Customers with already higher number of transactions or higher in-bank savings have higher propensities to adopt e-banking. It is most likely to be due to demand for new, convenient and almost costless operations.

#### **5.1 Wealth in bank**

In Table 3 the maximum possible number of periods was integrated into each panel regression. The results are compatible.

Table 3. Estimated results for ln (wealth)

	ln (wealth)				
ln (wage)	0.356*** (43.13)	0.316*** (35.00)	0.285*** (28.69)	0.254*** (22.20)	0.222*** (14.85)
IB(-3)				0.0314** (3.16)	0.0239 (1.83)
IB(-2)			0.0561*** (6.21)	0.0652*** (6.46)	0.0468*** (3.53)
IB(-1)		0.0651*** (7.85)	0.0722*** (7.73)	0.0841*** (9.12)	0.0927*** (7.28)
IB(+0)	0.160*** (24.98)	0.130*** (15.64)	0.165*** (18.70)	0.153*** (16.11)	0.112*** (10.23)
IB(+1)					0.130*** (8.82)
Constant	5.247*** (78.30)	5.566*** (76.06)	5.773*** (71.83)	6.024*** (64.72)	6.199*** (51.78)
N	57363	47670	38040	28431	19108

t statistics in parentheses

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

The first finding is a coefficient in front of  $\ln(wage)$ . It could be considered as an elasticity of wealth in bank to regular income. It is expectedly positive. One percent increase in wage seems to add at least 0.2 percent increase in wealth, possibly more.

Main findings were obtained in line with Bouckaert and Degryse (1995) that suggests remote banking to be a stimulus for depositors to bring more funds on their accounts.

Coefficient in front of  $IB(+0)$  suggests positive effect from Internet banking adoption in the very period of usage start. On average it is 11-16% of wealth what is added due to online service. Of course, this result can not serve as a strict recommendation to force clients use e-banking. Reverse causality is possible. However, definitely the adoption of the service is a signal to pay more attention to such customers. They rise funds in line with start of usage and are most likely going to further increase amounts of money kept on their accounts.

This finding about future increase can be seen from coefficients in front of  $IB(-1)$  -  $IB(-3)$ . They are all positive, however, diminishing. It means that during next three months the funds *ceteris paribus* will only grow - each month with smaller rate.

An interesting observation is a coefficient in front of  $IB(+1)$ . It reveals that wealth in bank on average increases by 13% even one month before the adoption. Controlling for this fact decreases impacts of other factors.

Customers are not likely to choose a random point of time to start using e-banking. It possibly coincides with some activities as increase in funds or opening of new accounts. This may be the reason for such a huge growth in funds in month prior to adoption. Anyway, it does not diminish the value of Internet banking as a signal or the fact that customers still tend to increase their wealth in bank several month further.

The aggregate continuous effect from e-banking adoption can be seen on Figure 12.

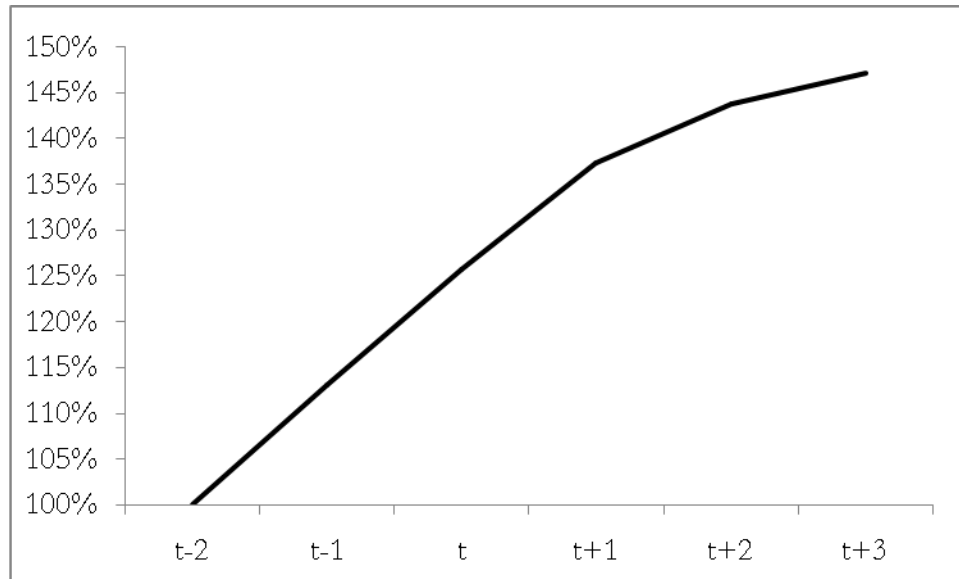


Figure 12. Predicted continuous changes in wealth

## 5.2 Number of transactions

The proposed model is similar to the one for estimating effects on wealth. And in Table 4 the maximum possible number of periods was integrated into each panel regression.

Coefficient in front of  $\ln(wage)$  again serves as elasticity. It is positive and implies that 1 percent increase in income leads to at least 0.15 percent increase in number of transactions. It is in line with the logic about not all wages being withdrawn from banking accounts and higher demand for convenient and low-cost remote transactions.

Table 4. Estimated results for ln (activity)

	<b>ln (activity)</b>				
ln (wage)	0.156*** (35.32)	0.216*** (43.15)	0.198*** (33.95)	0.204*** (24.42)	0.258*** (20.43)
IB(-3)				-0.0412*** (-7.42)	0.107*** (12.65)
IB(-2)			-0.0272*** (-6.42)	-0.0217*** (-3.77)	0.108*** (12.17)
IB(-1)		0.0544*** (15.41)	-0.0693*** (-15.89)	-0.0923*** (-17.73)	0.0678*** (7.90)
IB(+0)	0.565*** (196.60)	0.314*** (84.74)	0.174*** (41.23)	0.167*** (30.44)	0.241*** (32.29)
IB(+1)					0.124*** (11.69)
N	57032	47383	37735	28045	18674

t statistics in parentheses

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Strong increase in activity in the very month of adoption can be seen from the coefficient in front of  $IB(+0)$ . Number of transactions increases on average by at least 17% immediately.

Coefficients in front of  $IB(-1)$  -  $IB(-3)$  are not consistent, which implies mixed evidence. However, if control for  $IB(+1)$  they all become positive. Moreover, some inconsistency diminishes if we restrict samples to the one used in the last column. It can be seen in Table 5.

$IB(+1)$  reveals increase in number of transactions in a month prior to Internet banking adoption.

The aggregate continuous effect from e-banking adoption based on the last column in Table 4 can be seen on Figure 13.



Table 5. Estimated results for ln (activity) with restricted samples

	<b>ln (activity)</b>				
ln (wage)	-0.0988*** (-5.97)	0.211*** (13.11)	0.218*** (15.75)	0.284*** (21.68)	0.258*** (20.43)
IB(-3)				0.105*** (12.31)	0.107*** (12.65)
IB(-2)			-0.0509*** (-5.90)	0.110*** (12.16)	0.108*** (12.17)
IB(-1)		0.468*** (48.15)	-0.0804*** (-8.83)	0.0630*** (7.14)	0.0678*** (7.90)
IB(+0)	0.570*** (44.88)	0.660*** (60.93)	0.145*** (15.59)	0.238*** (31.19)	0.241*** (32.29)
IB(+1)					0.124*** (11.69)
N	17928	17848	17836	17836	18674

t statistics in parentheses

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

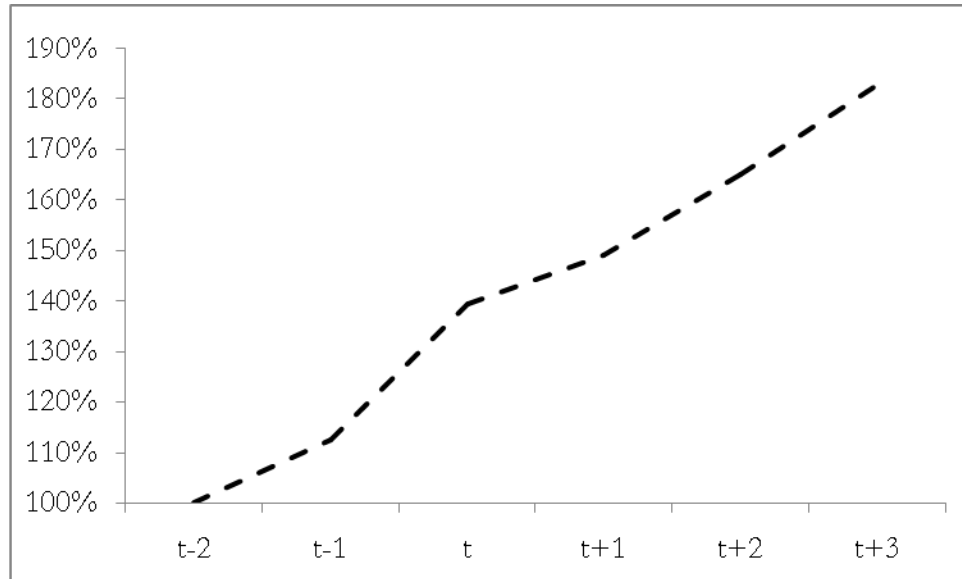


Figure 13. Predicted continuous changes in number of transactions

## *Chapter 6*

### CONCLUSIONS

The study contributes to a bunch of literature on the Internet banking diffusion mainly with referring to individual level data on behavioral variables (particularly number of transactions and amounts of money kept on banking accounts). While previous literature investigated mostly the aggregate effect of e-banking introduction on banking performance.

The data from one Ukrainian large bank are investigated. We assume that it operates similarly to others, so the research could be applicable for the whole industry. Analysis reveals that customers who adopt e-banking differ from others on such characteristics as age, income, activity and wealth in bank before the start of usage. After adoption they tend to increase a gap in behavior. Internet banking may be considered as a signal from a customer about being a "good one".

## WORKS CITED

- Al-Rfou, Ahmad Nahar. 2013. The Usage of Internet Banking. Evidence from Jordan. *Asian Economic and Financial Review*, 3(5): 614-623
- Bayrakdaroğlu, Ali. 2012. A Field Study for Factors Effecting Individuals' Usage of Internet Banking. *Business and Economics Research Journal*, 3(4): 57-75
- Bouckaert, Jan, and Hans Degryse. 1995. Phonebanking. *European Economic Review*, 39: 229-244
- Coupé, Tom. 2011. Mattresses versus Banks - The Effect of Trust on Portfolio Composition. Discussion paper
- Drigă, Imola, Dorina Niță, and Codruța Dura. 2009. Aspects Regarding Internet Banking Services in Romania. *Annals of the University of Petroșani, Economics*, 9(3): 239-248
- Floh, Arne, and Horst Treiblmaier. 2006. What keeps the e-banking customer loyal? *Journal of Electronic Commerce Research*, 7(2): 97-110
- Isaeva, Nataliya. 2012. Development of the Ukrainian Market of Financial Services on the Basis of Electronic Technologies. *Business Inform*, 7: 124-126
- Koskosas, Ioannis V. 2008. Trust and Risk Communications in Setting Internet Banking Security Goals. *Risk Management*, 10(2): 56-75
- Liao, Zhimin, and Weng Kee Wong. 2007. The Determinants of Customer Interactions with Internet-enabled e-banking Services. *Journal of the Operational Research Society*, 59: 1201-1210
- Maroofi, Fakhraddin, and Mohammad Nazaripour. 2012. Factors Affecting Customer Loyalty of Using Internet Banking in Iran. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 2(4): 53-65
- James Montier. 2006. *Behavioural Investing: A Practitioners Guide to Applying Behavioural Finance*. John Wiley & Sons, Ltd, 2007
- Nath, Ravi, Paul Schrick, and Monica Parzinger. 2001. Bankers' Perspectives on Internet Banking. *e-Service Journal*, 1(1): 21-36

Raza, Syed Ali, Syed Tehseen Jawaid, and Ayesha Hassan. 2013. Internet Banking and Customer Satisfaction in Pakistan. Working paper

Sullivan, Richard, and Zhu Wang, 2005. Internet Banking: An Exploration in Technology Diffusion and Impact. Working paper.