Electronic Banking Capacities and Transparency in the Iranian Banking Network

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Innovations in electronic banking in Iran have led to the development in capacities such as payment instruments and transactions by cards, which are known as electronic payment equipment in the Iranian banking network. Financial supervision is required to be increasingly based on reporting and regulatory processes to efficiently and proactively monitor risk and compliance at banks and financial institutions. Besides, the banking system needs relevant information and instruments on strategy, assessments, and policy decisions in line with the required procedure to enhance transparency. Designing a new criterion in banking innovations by combining the Electronic banking instruments, considering the Electronic banking capacity proper and scaled to the banks' assets, equity and resources as well as distinguishing the impact of banks' profitability and capital are attributed as the key contributions in this paper rather than other similar researches. Results indicate that Electronic Banking capacities including the pin-pad, ATM, online branches, card services, and P.O.S volumes have positively and significantly influenced transparency since scales of these innovative capacities have expanded relative to the banks' assets and capital due to their contributions in the velocity and disclosure of data collection and analysis potentials. Results also denote that the state-owned banks in Iran are less transparent than private banks and the size of the bank hurts transparency. The return on equity in the form of bank ownership is multiplied as well as results also indicate that the productivity of equity returns has a positive effect on transparency. The ratio of non-interest income to total income also has a positive impact on transparency. There would be needed to provide transparent information on fee-based services to develop non-interest income. Hence, to improve transparency, the development of fee-based and non-profit-based services are required.

Keywords: Payment Instruments, Transparency, Risk, Compliance.
JEL Classification: G21, G23, F34

1 Introduction
Banking regulation framework confronted with structural transformation in the last quarter of the previous century to prevent the loss of large amounts of

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funds that have been lost due to speculations in the foreign exchange market. Basel I agreements represented the minimum capital requirements as a universal rule for banks though limitations led to changes and reforms in the accord to consider the quality of loan portfolio, reputational risk in line with the risk management. In the next version of the Basel accord, the third pillar of the Basel II agreement emphasized on the disclosure of information depicting the adequacy of the capital, capital structure, quality of assets, processes and risk management methods as well as the risk-taking policy of the bank. Also, the fact that base the interest in banking transparency includes banks that seemed to be competitive consider themselves as being in trouble due to hidden information. One of the most cases of troubled banks which collapsed in the United States in 2008 is Lehman Brothers which is partly considered to be owing to the lack of transparency.

The widespread availability of relevant, reliable information about the periodic performance, financial position, investment opportunities, governance, value, and risk of publicly traded firms is considered to be defined as transparency, according to Bushman and Smith (2003). To quantify transparency and develop a measure for it seems to be problematic due to reasons such as complications that are surrounding the transparency elements, specific information which is disclosed contrary to the real information by firms in items including demand deposits, saving deposits, documentary credits, guarantees, etc.

Financial innovations have been developed at a speedy pace in the international markets during the last few decades, where a relationship can be found as complementarity. Financial products and services as critical elements underlying the development of financial innovations. New York and after that London have been emerged by financial products and services adopted and circulated for international purposes. Markets in the developed and lower level of economic development countries welcome financial innovations, as well as the propagation of the innovations, which are internationally favored by the process of integration. Moreover, supervision and regulation of the financial activity would be proper issues of problems besides the innovations' appropriate positive impacts. Building a regulatory framework for financial innovations development is required since it would be useful to the system on the one hand, and restricting the innovations that could affect the stability of the financial system.

Providing a new analytical structure in banking innovations by combining the electronic banking instruments, considering the electronic banking capacity proper and scaled to the banks' assets, equity and resources as well

as distinguishing the impact of banks' profitability and capital are attributed as the key contributions in this paper rather than other similar researches.

This paper is characterized in 5 sections: The first of which includes the introductory points regarding bank transparency and its dimensions and relationships with the Electronic banking capacities in Iran, and literature review about transparency in banking systems as well as explaining Sample, Variables and Model Specification in line with empirical results consecutively in section 3 and 4. Concluding remarks would constitute the Fifth part of the paper to describe the impact of Electronic banking capacities on the transparency of the Iranian banking system.

2 Literature Review

Availability to outside stakeholders in including depositors, investors, borrowers, counterparties, regulators, policymakers, and competitors of relevant, reliable information about the periodic performance, financial position, business model, governance, and risks of banks can be defined as bank transparency. The joint output of a multifaceted system whose parts collectively produce, gather, and validate the information and disseminate that information to participants outside is known as the bank transparency. Components include mandated, publicly available accounting information; information intermediaries such as financial analysts, credit rating agencies, and the media; and supervisory disclosures (including stress-test disclosures), banks' voluntary disclosures, and information transmitted by securities prices (Bushman and Smith (2003); Bushman, Piotroski, and Smith (2004)).

To picture the link between transparency and the Electronic Banking capacities, two areas should be cleared: (a) Transparency situation at international level and (b) agents involving transparency improvement known as the supervisory level.

(a) Transparency situation at the national and international levels

The use of new technologies for internal supervisory purposes is a definition that the Basel Committee on Banking Supervision provided for supervisory technologies as well as the description as use of technologically enabled innovation by supervisory authorities (BCBS 2017, 31) reminds the importance of the position that innovative technologies have in financial supervisions. To reach a higher level of transparency, supervisory authorities look at supervision requirements at the national and international levels to understand what Basel Accord has described dimensions of transparency as well as what circulars are prepared and provided to the supervisory bodies in

the banking system. Iranian banking system including the central bank and banks and financial institutions in line with the Regtechs have a common concern, which is improving transparency in the Iranian financial system. Basel Accord (1998), on the other hand, recommended six levels of transparency for the international banking system to emphasize the importance and position of transparency and prevent asymmetric information at market level and supervisory agencies.

Checking the key indicators in evaluating health and transparency in banks would clarify the financial discipline and performance in the six levels of transparency based on the given recommendations in the Basel accord. In its document, the Basel accord classified the headlines based on characteristics such as comprehensiveness, timeliness, reliability, and comparability.

Table 1

Basel recommendations on Bank Transparency Enhancement

Title	Recommendation Summary
Banks Financial Performance	Banks are supposed to disclose information and explain the banks' financial performance in such a way that it would be appropriate for the market and the supervisory agencies.
Banks Financial Situations	Users, including the board members, shareholders, market individuals and supervisory agencies, are to easily have access to the disclosed information by banks to analyze the solvency and liquidity management.
Strategies and methodologies of Risk Management in Banks	Methodologies and risk management directions are elements that include key factors in evaluating the banks' performance in which risk management structure, models, Value at Risk, simulation, credit rating process, and risk diminishing instruments such as collateral, guarantees, etc.
Value at Risk Resources	Using the information issued and disclosed by the banks, beneficiaries, and users would be informed about the resources at risk and would be able to forecast the future.
Current Accounting Procedures	Procedures used in the financial statements reporting could provide information to the readers and give it the possibility to make amendments to cases that are not directly addressed in the financial statements.
Information, Management, and Corporate Governance	Banks' financial situation, according to the disclosed information can be studied and utilized by the users concerning the strategies and the ability to manage risks. Transparency about the information is required in levels such as the board structure, senior management, and business specialties.

Source: Research Findings

(b) Supervisory Levels

According to chart 1, three main agents are involved in improving the transparency innovated by the new technologies in the banking system. These agents include central banks, Regtechs, and banks which are tracking better supervision to make transparent operations in the banking industry. Regtechs are supposed to provide compatibility and compliance with the law when new innovative technologies are in place. Central banks pose and direct the policy implementation among banks, which are the performer of the policies posed by the central banks.
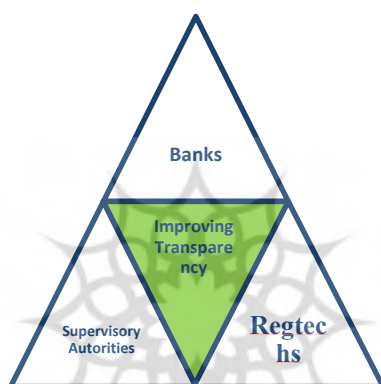

Figure 1. Agents Involving Transparency Improvement. *Source:* Research Findings

Bringing the banking services to age and ensure that today's banking services go beyond acceptance of deposit and creation of credit is a system called Electronic banking. With the help of Electronic banking technology, the banking system has conceptualized a network as the whole financial system, providing adequate services at a low cost and high-efficiency level. Real-time online financial services to customers, investors, and all stakeholders in the financial section are regarded as capacities to make a financial system more robust, enlarged and functional. The cost would decrease as well as the economy will grow and GDP will increase as a result of designing a system based on the Electronic banking system. Higher flexibility and credibility will be resulted by reducing the burden of carrying cash to decrease transaction risk through the extensive use of Electronic Banking as well as the internet banking as it uses the internet facility in providing financial services and transmitting financial information between the banks' stakeholders and the operators of the banking system. Payments and

fund transfers are both electronically done without carrying the cash as well as higher freedom and accuracy in line with the integrity of financial services and business transaction activities. Three main concerns comprising of technology failure, human manipulation and poor customer relationship resulted in the creation of transparency as well as the dissemination of accurate financial information.

Ben Douissa (2011) studied a new measure in calculating bank transparency based on Basel II requirements was analyzed according to the four dimensions, including completeness, opportunity, credibility, and accessibility measures of information. The contribution includes a bank transparency index using a sample of 69 banks across 7 emerging economies and results indicate that the top of transparent entities in the sample comprises Turkish and Thai banks. Less transparent banks have been from North Africa. Also, the majority of selected banks focus on the direct effect of corporate social responsibility known as the philanthropic activities. Emerging countries face failure mostly in the field of banking transparency effects essentially not the quantity of the revealed information, but rather its quality. These countries had compiled only 50.48 % of the Basel Committee recommendations relevant to banking transparency. Moreover, disparities between countries in line with the dimensions of the revealed information have been observed and a detailed analysis of the different dimensions of information indicated banking transparency indexes regarding two criteria of opportunity and credibility.

Three indexes of information disclosure for banks were presented, first, as a bank publicly traded on the NYSE, NASDAQ or AMEX is required to comply itself with the rules regarding disclosure necessary in the markets, bank rating in which investors should have more information if the bank is rated by a rating agency as the second index and the information in financial statement built the third measure of disclosure (Baumann and Nier (2003)).

Quality of regulated disclosure, acquiring private information, and information disclosure are variables used for developing transparency according to the study done by Tadesse (2006) in which the database was based on the database of Barth et al. (2001).

The level of transparency would be influenced by crucially on the way that the relevant agents' payoffs vary with the underlying state as well as its optimal level of transparency, which is considered to be interior. Also, extensive studies have been implemented about the effect of information level on equilibrium as well as to identify the transparency with the private signals given by creditors in line with its precision (Bannier and Heinemann (2005)).

The impact of transparency on the probability of default is another aspect to study the speculative attack on the currency peg (Heinemann and Illig, (2002)). The economic mechanisms underlying the effects of transparency in both settings are analogous based on the model of currency crises and somewhat more complicated for example, transparency affects the creditors' payoffs to roll over and the banks' ex-ante incentives for risk-taking, which are determined endogenously.

Another branch of the literature which has debated the social value of public information and the role of social conformity was following Morris and Shin (2002), and examples in Angeletos and Pavan (2004) and Svensson (2006). Signal analysis and its relationship with transparency take its steps by introducing an additional independent public signal that may render multiple equilibrium if its precision is sufficiently high (Hellwig, (2002)) and may make it more difficult to assess the impact of changes in the level of transparency interpreted as changes in the precision of either the private or the public signal. Conformity plays no role in introducing public information as an announcement by a central bank disclosing information about banks' assets, which poses no problem. Realizing the fundamentals to be weak or strong from a signal revealed would be dependent back to the effect of changes in the level of precision of the public signal even if the public signal is sufficiently imprecise that the uniqueness of equilibrium is preserved (Prati and Sbracia (2010)).

According to Osabuohien (2008), the application of knowledge for the execution of a given task is the technology that can be referred to, which includes the necessary skill and processes for performing activities in a proposed context. ICT is a term that denotes computer systems, telecommunication, networks, and multimedia applications to work (Frenzel, 1996). Electronic Data Processing (EDP), Management Information System (MIS) are terms that have come into use in the late 1980's replacing earlier terms, although they are still partly in use, as noted by Frenzel (1996). Moreover, a subject which has fundamentally been regarded as essential and constitutes the concerns to all banks plus a pre-requisite for local and global competitiveness in the banking industry (Adewuyi (2011)) is referred to as electronic banking (E-banking) and application of its concepts, techniques, policies, and implementation strategies to banking services. It highlights the adoption of Information and Communication Technology (ICT) in the banking sector. According to (Kim et al. (2006)), Internet banking is defined as the act of conducting financial intermediation on the Internet. Furthermore, the advancement of technology which has played an essential role in

improving the standard of activities in the banking industry is the effect of (ICT) which cannot be overemphasized. Only the banks that have their whole activity networked electronically and have fully implemented the ICT can withstand the competition for survival in the new millennium (Adewuyi (2011)). Agboola (2003) states in his study that the Automated Teller Machines (ATMs) and deposit machines as electronic banking capacities now allow consumers to carry out banking transactions beyond banking hours either at the banking arena or remotely at any other place.

3 Sample, Variables and Model Specification

3.1 Sample
In this study, the impact of Electronic Banking Capacies is examined on Iranian banking transparency. Despite the limited number of studies that have focused on the effect of Electronic Banking Capacies on banking transparency, little research has covered cases in Iran. For this reason, we decided to choose a sample of Iranian banks as a developing country and examine the effect of Electronic Banking Capacies on banking transparency. The period from 2006-2018 has been chosen by the idea of investigating the impact of Electronic Banking Capacies on banking transparency during a long period of 12 years. Our samples are focused on private and state-owned banks. Besides, to measure transparency, we use Circular "Criteria for Minimum Standards of Transparency and Public Disclosure by Credit Institutions"(No. 93/120293) in Iran.

3.2 Variables
3.2.1 Dependent Variable
The dependent variable applied in this paper indicating the transparency as a dummy variable is (dtrans) and to measure transparency, Circular "Criteria for Minimum Standards of Transparency and Public Disclosure by Credit Institutions"(No. 93/120293) in Iran has been used.

The standards of transparency in this directive focus on four areas. Important event (7 indexes), corporate governance, and internal control (7 indexes), Risk management (25 indexes), financial statement (18 indexes). The following steps were taken to make transparency dummy variable:
1) Banks' performance is examined in four areas of transparency.
2) Table 1 depicts the indicators in both the worst and best cases with thresholds.

3) We define dummy variables for every index ($index_i$) .If $index_i$ is executed, the dummy is 1, otherwise, 0.
4) We measure indicators (i) with$\sum index_i$, that i is important event, corporate governance, and internal control, Risk management, financial statement.

$$indicator_i = \sum index_i$$

5) We measure $\sum indicator_i$ for every bank and every year.
6) We define transparency as:

$$transparency = \frac{\sum indicator_i}{57}$$

7) We define transparency dummy variables (dtrans). If $transparency > 0.5$, dtrans is 1, otherwise, it is 0.

Table 2
Indicators and Thresholds

Indicators	Worst Case	Best Case
Important event	0	7
Corporate governance and internal control	0	7
Risk management	0	25
Financial statement	0	18
Total	0	57

Source: Research Findings

3.2.2 Explanatory Variables
1) The explanatory variables in this study are related to electronic banking capacities.
2) We use the number of ATM, PinPad, Online Branches, Card, and P.O.S variables for measuring electronic banking capacities.

Table 3
Electronic Banking Capacities

Variables	Indicators	Symbol
Innovation	Innovation	Inov
E-banking variables to Asset	atm to asset	Atmasset
	pinpad to asset	Pinpadasset
	online to asset	Onlineasset
	card to asset	cardasset
E-banking variables to Capital	atm to capital	Atmcap
	pinpad to capital	Pinpadcap
	online to capital	Onlinecap
	card to capital	cardcap
E-banking variables to Deposit	atm to deposit	Atmdepo
	pinpad to deposit	Pinpaddepo
	online to deposit	Onlinedepo
	card to deposit	carddepo

Source: Research Findings

3) To make electronic banking capacities variables, we design the following steps:
4) We normalized every electronic banking indicators with:

$$Z_i = \frac{X_i - \mu}{\sigma_i}$$

5) That X_i is the number of ATM, PinPad, Online Branches, Card and Pos, μ is mean of X_i and σ_i is the standard deviation of X_i.
6) We define innovation(inov) indicator:

$$inov = \frac{\sum z_i}{4}$$

7) We adjust and scale the e-banking variables to the asset, capital, and deposit where, e.g., the ratio of e-banking variables to assets indicates whether the volume of e-banking services is proportional to the volume of assets. The ratio of e-banking to capital variables indicates whether banks have the capital needed to cover the risks associated with e-banking services. The ratio of e-banking to deposit variables indicates how much banks are attracting resources in proportion to e-banking services?

3.2.3 Control Variables

Besides these two types of measures (dependent and independent variables), the following literature introduces a set of control variables in Table (4).

Table 4

Definition of the control variables

Variables	Indicators	Definition
Banking specific variables	ROA ROE Debt Ratio Banking opportunity of growth	Profit to Asset Profit to Capital Debt without deposit to liabilities Non-Interest income to total Income
Banking Structural variables	Bank size Bank age Ownership	Bank size is the logarithm of the asset. Ownership is dummy variable; dummy variable is one for private banks and zero otherwise.
Corporate Governance	percentage of independent directors shariah board size Structure of board Structure of ownership	number of independent directors/number of directors of the board number of shariah scholars in the board Dummy variable indicating whether the Director manager is different from the CEO equals 1; otherwise, 0. Possession structure is characterized as: institutional shareholders, family firms and nongovernmental legal entities as shareholders. If the share of institutional shareholders higher than other, 1; otherwise, 0.
Macroeconomics	Inflation Financial Market development	Total Market Capitalization to GDP

Source: Research Findings

3.3 Model Specification

Logit with Panel Data analysis has been used as the statistical estimation method to analyze two-dimensional (typically cross-sectional and longitudinal) panel data with the condition that the independent variable takes (0,1). The data are usually collected over time and the same individuals, and then a regression is run over these two dimensions. According to the standard

panel data regression model, it looks like $y_{it} = a + bx_{it} + \varepsilon_{it}$ where y is the dependent variable, x is the independent variable, a and b are coefficients, i and t are indices for individuals and time. The error is critical in this analysis. Assumptions about the error term determine whether we speak of fixed effects or random effects. In a fixed-effects model, the error term is assumed to vary non-stochastically over i or t making the fixed effects model analogous to a dummy variable model in one dimension. In a random-effects model, the error term is assumed to vary stochastically over i or t requiring special treatment of the error variance matrix.

To complete the methodology, four models have been introduced as well as they have been utilized for estimations. In the first model, the main independent variable is *Innovation* whereas, in the second one, electronic banking variables to asset ratios have been applied in which the ratio depicts the fact whether the supply of electronic banking services according to the volumes of assets would be regarded as high or not. In the third model, the key independent variable is electronic banking variables to the capital ratio which denotes whether banks' capital is proportionate and appropriate for covering the risks in electronic services. Electronic banking variables to deposit ratio is the next independent variable that is used in the fourth model to show whether banks would be able to receive resources proportionate to the supply of services to primarily explain the models, unit root test, as well as co-integration analysis, has been implemented after which doing the tests regarding fixed effects and random effects resulted in selecting the appropriate model.

4 Empirical Results

4.1 Unit Root Test and Co-Integration Test

To check whether our data is stationary, we use two types of Panel Unit Root tests: Common unit root test and Individual unit root test. In standard unit root process we use Levin, Lin and Chu Panel Unit root test and for individual unit root process we use three types of Panel unit root tests, the first one is Lm, Pesaran and Shin Panel unit root test, the second is Fisher type test, the ADF-Fisher Chi-square test and the last one is also a Fisher type test, the PP-Fisher Chi-square Panel unit root test. At 5%, all of the Variables except bank age, Total market capitalization to GDP and Debt ratio are stationary in Level. These variables are stationary after the 1st difference.

Because of non-stationary variables, we use three types of Panel Co-integration tests. A kind of test was introduced by Pedroni (1999) and a second

type was introduced by Kao (1999). The third one is Johnsen Fisher's (2000) Panel Cointegration. At 5% level of significance, the Pedroni residual co-integration test, Johnsen Fisher and Kao residual co-integration test reject the null hypothesis, which means variables have long-run relationships. Results are depicted in table 6, table 7 and table 8.

From table 6 -8 in every case of opportunity cost except in Panel V-Statistics long term and difference between long term and short term at 5% level of significance, the null hypothesis is accepted; otherwise in all case at 5% level of significance we reject the null hypothesis of no co-integration. It means the Variables (dependent and independent) have a long-run relationship.

Table 5

Unit rate Test

Variables	Levin, Lin, Chu	Breitung t-stat	Im, Pesaran, Shin	Fisher-PP	Fisher- ADF
ROA	69.9875 (0.0000)		-4.89666 (0.0000)	-4.85756 (0.0000)	71.9866 (0.0000)
ROE	63.9528 (0.0000)		-4.01326 (0.0000)	-4.69113 (0.0000)	66.3760 (0.0000)
Debt Ratio	-10.4645 (0.0000)		-4.38573 (0.0000)	135.048 (0.0000)	190.542 (0.0000)
Banking opportunity of growth	160.668 (0.0000)		-13.8825 (0.0000)	-13.5232 (0.0000)	198.820 (0.0000)
Bank size	-13.3824 (0.0000)	1.93963 (0.0738)	-2.04370 (0.0205)	114.378 (0.0000)	168.916 (0.0000)
Bank age	-4.78591 (0.0000)		-1.64076 (0.0504)	35.5850 (0.0336)	48.1026 (0.0011)
Inflation	-11.7620 (0.0000)		-4.75170 (0.0000)	128.683 (0.0000)	66.2718 (0.0696)
Financial Market development	-14.9430 (0.0000)		-8.21607 (0.0000)	200.904 (0.0000)	360.792 (0.0000)
Atm to asset	-4007.72 (0.0000)		-660.694 (0.0000)	100.860 (0.0002)	135.636 (0.0000)
Pinpad to asset	-15.0324 (0.0000)			216.957 (0.0000)	237.874 (0.0000)
Online to asset	-16.7194 (0.0000)			231.655 (0.0000)	240.508 (0.0000)
Card to asset	-6.99168 (0.0000)		-12.2630 (0.0000)	142.964 (0.0000)	188.848 (0.0000)
Pos to asset	-23.2209 (0.0000)			163.882 (0.0000)	175.978 (0.0000)
Atm to capital	-65.0853 (0.0000)		-21.2848 (0.0000)	114.496 (0.0000)	139.945 (0.0000)
Pinpad to capital	-1032.02		-270.782	142.631	171.755

Variables	Levin, Lin, Chu	Breitung t-stat	Im, Pesaran, Shin	Fisher-PP	Fisher- ADF
	(0.0000)		(0.0000)	(0.0000)	(0.0000)
Online to capital	-203.948 (0.0000)		-70.2653 (0.0000)	180.664 (0.0000)	186.514 (0.0000)
Card to capital	-25.0391 (0.0000)		-7.22638 (0.0000)	109.588 (0.0000)	130.253 (0.0000)
Pos to capital	-18.9982 (0.0000)			132.267 (0.0000)	148.446 (0.0000)
Atm to deposit	-624.080 (0.0000)		-110.625 (0.0000)	138.420 (0.0000)	155.638 (0.0000)
Pinpad to deposit	-71.4434 (0.0000)		-24.1566 (0.0000)	127.338 (0.0000)	170.805 (0.0000)
Card to deposit	-7027.48 (0.0000)		-1391.44 (0.0000)	163.837 (0.0000)	192.949 (0.0000)
Pos to deposit	-144.751 (0.0000)		-25.9693 (0.0000)	128.293 (0.0000)	156.747 (0.0000)

Note: Null: Unit root, Levin, Lin & Chu Test: Assumes Common Unit root Process, Im, Pesran, and Shin: Assumes individual unit root process, ADF-Fisher chi-square: Assumes individual unit root process, PP- Fisher Chi-square: Assumes individual unit root process, Probabilities for Fisher tests are computed using an asymptotic chi- Square distribution. Automatic Lag Length selection based on SIC. *Source:* Research Findings.

In table 7, we use Kao (1999) test. Kao residual co-integration test also shows us for every case of opportunity cost at 5% level of significance; we reject the null hypothesis of no co-integration, and every case P-Value is highly significant, which gives strong evidence that the variables have a long-run relationship.

In table 8, Different types of opportunity costs have been considered in both the case of the Fisher trace test and the Fisher Max-Eigen test; almost 1 variable has long-run relationship.

Table 6

Pedroni Residual co-integration test

Variables	within-dimension			
	V-Statistic	Rho- Statistic	**PP –Statistic**	ADF- Statistic
bank age	3.973498 (0.0000)	-4.120059 (0.0000)	-13.15165 (0.0000)	-7.978072 (0.0000)
Total market capitalization to gdp	0.346493 (0.0000)	3.911054 (0.0000)	-11.28019 (0.0000)	-6.254635 (0.0000)
Debt without deposit to liabilities	1.335792 (0.0908)	-4.358683 (0.0000)	-13.85044 (0.0000)	-8.076176 (0.0000)

Note:
Null Hypothesis: No co-integration
Trend Assumption: No deterministic intercept or trend
Automatic lag length selection based on SIC

	between-dimension		
bank age	-1.142959 (0.0000)	-16.97402 (0.0000)	-9.447299 (0.0000)
Total market capitalization to gdp	-0.871322 (0.0918)	-14.03496 (0.0000)	-6.666800 (0.0000)
Debt without deposit to liabilities	-1.271596 (0.0018)	-17.99029 (0.0000)	-9.332971 (0.0000)

Note:
Null Hypothesis: No co-integration
Trend Assumption: No deterministic intercept or trend
Automatic lag length selection based on SIC

Source: Research Findings

Table 7

Kao Co-integration test

Dependent variable	t-Statistic	Prob
bank age	-5.449510	0.0000
Total market capitalization to gdp	0.765492	0.0220
Debt without deposit to liabilities	-4.754422	0.00000

Source: Research Findings

Table 8
Johansen Fisher Panel Co-integration Test

	Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Fisher Stat.* (from max-eigen test)
bank age	None	235.1 (0.0000)	235.1 (0.0000)
	At Most 1	115.2 (0.0000)	115.2 (0.0000)
Total market capitalization to gdp	None	314.6 (0.0000)	243.1 (0.0000)
	At Most 1	217.4 (0.0000)	217.4 (0.0000)
Debt without deposit to liabilities	None	204.4 (0.0000)	194.1 (0.0000)
	At Most 1	90.69 (0.0054)	90.69 (0.0064)

* Probabilities are computed using asymptotic Chi-square distribution. *Source:* Research Findings

4.2 Estimation Results

Four models were designed in this paper in all of which the transparency dummy variable has been used as the dependent variable, and each of the explanatory variables has been considered in the different models. To build up a measure for transparency, Circular "Criteria for Minimum Standards of Transparency and Public Disclosure by Credit Institutions"(No. 93/120293) in Iran has been applied. Moreover, the control variables have been selected from the theoretical and empirical literature and the variables which were not significant have been eliminated from the model. We use F- Limer test to choose between Panel data methods and Pooled method. The null hypothesis has approved the pooled method. Results indicate that the null hypothesis is not rejected and these models need to be estimated using the Pooled method.

We investigate the effect of electronic banking capacities on transparency and the figures in table 10 indicating the results. The number in () shows t-Test as well as the number in [] indicates the significance level.

Table 9

F- Limer Test

Models	Independent Variable (Electronic banking capacities)	Cross-section F	Cross-section Chi-square
1	Inovation	0.561837 (0.9192)	12.442042 (0.8236)
2	Ebanking variables to Asset	0.664700 (0.8383)	14.758487 (0.6785)
3	Ebanking variables to Capital	0.678755 (0.8251)	15.054125 (0.6582)
4	Ebanking variables to Deposit	0.727764 (0.7758)	16.080080 (0.5870)

Source: Research Findings

Table 10

Results- Effect of E-banking on Banking transparency

Indicators	Model (1)	Model(2)	Model(3)	Model(4)
Inovation	0.106357 (2.559319) [0.0569]	……….	……….	……….
atm to asset	……….	0.400917 (2.310605) [0.0190]	……….	……….
Pinpad to asset	……….	0.709060 (2.297874) [0.0263]	……….	……….
Online to asset	……….	0.154001 (2.069113) [0.0450]	……….	……….
Card to asset	……….	2.630005 (2.817967) [0.0056]	……….	……….
Pos to asset	……….	0.000147 (2.505143) [0.0135]	……….	……….
Atm to capital	……….	……….	0.112416 (1.703470) [0.0431]	……….
Pinpad to capital	……….	……….	0.351637 (2.247589) [0.0049]	……….
Online to capital	……….	……….	0.120170 (2.195734) [0.0341]	……….
Card to capital	……….	……….	2.801507 (2.810981) [0.0189]	……….
Pos to capital	……….	……….	0.365006 (2.153358)	……….

Indicators	Model (1)	Model(2)	Model(3)	Model(4)
				[0.0487]
Atm to deposit	……….	……….	……….	0.651227 (1.835289) [0.0051]
Pinpad to deposit	……….	……….	……….	0.242211 (2.211460) [0.0329]
Online to deposit	……….	……….	……….	0.912119 (2.076509) [0.0391]
Card to deposit	……….	……….	……….	0.703906 (1.66932) [0.0643]
Pos to deposit	……….	……….	……….	0.577506 (2.097122) [0.0228]
Inflation	-0.013820 (-2.286234) [0.0239]	-0.104914 (-2.505143) [0.0135]	-0.103571 (-2.193188) [0.0301]	-0.130144 (-2.184284) [0.0308]
Non-interest income to total income	0.002252 (1.6448234) [0.0462]	0.312059 (2.447423) [0.0503]	0.132537 (2.605874) [0.0457]	0.285722 (2.280871) [0.0202]
ROE*owner	0.410016 (2.203295) [0.0310]	0.254539 (2.756189) [0.0510]	0.892964 (1.793942) [0.0287]	0.368733 (2.096991) [0.0248]
number of independent directors/number of directors of the board	0.081578 (1.959188) [0.0238]	0.817076 (2.556763) [0.0221]	0.8037735 (2.597879) [0.0126]	0.898195 (1.704272) [0.0908]
Structure of ownership	0.138906 (1.857815) [0.0148]	0.117507 (2.368130) [0.0137]	0.124072 (2.433331) [0.0543]	0.159992 (1.822942) [0.0707]
shariah board size	0.093027 (1.929833) [0.0206]	0.800276 (1.954954) [0.0414]	0.890386 (2.049588) [0.0259]	0.650758 (1.784043) [0.0845]
Total Market capital to gdp*owner	0.210366 (1.808608) [0.0283]	0.205309 (2.060481) [0.0210]	0.190651 (1.981159) [0.0284]	0.1903119 (1.960991) [0.0748]
Bank size	-0.520467 (-2.248863) [0.140]	……….	……….	……….
R-Squared	0.891098	0.661597	0.813948	0.801520
D-W	2.030878	2.092114	2.069653	2.093321

Source: Research Findings

The pressure on internal affairs can be reduced by board independence to positively impact transparency. The presence of independent members will enhance the power of the Board of Directors as a control mechanism. In other words, the independence of the Board of Directors is one of the important

mechanisms of corporate governance that plays an important role in improving the quality of financial reporting and enhancing transparency. By adequately understanding their supervisory role, the Board of Directors can promote financial health and prevent conflicts of interest among corporate governance actors. It brings improved transparency. According to the results of this paper, there is a positive relationship between some independent directors and the number of directors of the board and transparency.

Increasing the availability of new banking services and providing efficient information is caused by the development of Electronic banking as well as the ownership structure is defined as a virtual variable in this paper that if the share of the institutional shareholder is greater than the family shareholder and the shareholder of the nongovernmental legal entity, figure 1 is allocated otherwise, Zero. If institutional shareholders own a large portion of a bank's shares, they have the opportunities and ability to supervise executives and can influence management decisions and encourage them to improve profitability and require transparency principles. Because institutional shareholders have the incentive to oversee, they promote transparency by avoiding conflicts of interest between managers and stakeholders. Results also indicate that Electronic Banking capacities including the pin-pad, ATM, online branches, card services, and P.O.S volumes have positively and significantly influenced transparency because scales of these innovative capacities have expanded relative to the banks' assets and capital due to their contributions in the velocity and disclosure of data collection and analysis potentials. Results also lack a positive relationship between ownership structure and transparency. Because Iran is an Islamic country; therefore, it is essential to examine the effect of board size on transparency. The existence of members of the Sharia law mandates that banks are required to disclose information to ensure compliance of bank activities with the law. Thus, the greater the number of religious members on the board of directors, the better the banks' transparency. Banks and financial markets play an important role in financing the economy. In underdeveloped financial markets, they have a greater and more important role to play in financing the economy. The more developed a financial market economy is, the more banks are encouraged to improve transparency. Iran as an underdeveloped with its underdeveloped financial markets owns banks that are primarily responsible for financing the economy. But under Iranian law, private banks are members of the stock market and are required to report to the stock market, thus enhancing the transparency of the financial market in Iran. The effect bank ownership type on the ratio of capital to GDP is positive

on transparency. To define the bank's ownership type, a virtual variable is defined that if the bank is private, the number will be one, otherwise zero.

The inflationary situation in the Iranian economy, on the one hand, increases the return in financial markets and credit recipients decide not to reimburse the credit back to the banks which causes higher nonperforming loans which can extend the loans to new loans which will lead to the lack of transparency in the banking system. On the other hand; therefore, the impact of inflation on transparency and in the case of high-inflation countries, regulators will print too much money and as a result, cannot guarantee the stability of prices. This situation would be favorable for a climate of capacity in the banking system as a whole. Banks would not be strict in terms of lending policies, which may increase default risks and could lead to reducing the bank risk rating. Consequently, banks would be more opaque. Bank transparency has been lowered in this group of countries which might consequently increase inflation.

On the contrary, regulators in low inflation countries are led to adopt a monetary policy that can guarantee the stability of prices. The adopted monetary policy allows sending a strong message to banks related to borrowers' quality. Banks would be more selective in lending, which helps to take a balanced strategy of risk-taking. This healthy climate would favor bank transparency and its extroversion towards the public.

5 Conclusions

New banking services emerge that can improve customer service while identifying and understanding customer needs, which requires the development of information technology and information infrastructure. Information security is one of the infrastructures with regard to the type of information and communication that governs this type of service as these factors can help improve the transparency of banks' performance while assisting the development of e-banking services. Results indicate that since the effect of equity returns on transparency varies by type of bank ownership; hence, private banks that have non-state-owned shareholders should be more accountable to shareholders, more transparent than state-owned banks. The return on equity in the form of bank ownership is multiplied, and results indicate that the productivity of equity returns has a positive effect on transparency. The ratio of non-interest income to total income also has a positive impact on transparency. The larger a bank, the better the transparency based on the existing literature. However, the big banks in Iran are state-owned or formerly state-owned and are now private. So they have government

infrastructure. State-owned banks in Iran are less transparent than private banks. For this reason, the size of the bank hurts transparency.

Banks are supposed to be required to provide transparent information on fee-based services to develop non-interest income. Therefore, the development of fee-based and non-profit-based services are required to improve transparency. Part of inflation in Iran is derived from the lack of transparency and balance sheet controls in the Iranian banking system. Moreover, analysis depicts that transparency is deteriorated by inflation as results of a decrease that the inflation might cause on the real value of assets and the bank profitability, but banks disguise this by not disclosing the information. The relationship between inflation and transparency is mutually specified. The Iranian economy is facing high inflation which has led the economy to volatility. Since Iranian banks are the most important part of financing the economy, their health is affected by inflation and reduced transparency in the country's banking network. The relationship between inflation and transparency is negative. As new banking and e-banking services improve customer accountability and reliability, it enhances transparency where there is a positive relationship between e-banking development criteria and transparency.

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