THE INFLUENCE OF PRODUCTIVITY GROWTH ON LIQUIDITY CHANGES IN THE BRANCHES OF TEJARAT BANK, KURDISTAN PROVINCE

Shahram Ardalani
Department of Accounting, Faculty of Humanities, Islamic Azad University, Sanandaj Branch, Iran
Parastoo Sedaghat
Assistant Professor, Department of Management, University of Kurdistan, Sanandaj, Iran
Email: Parastoo.sedaqat@gmail.com

Abstract

The aim of this research is to investigate the growth of productivity on liquidity changes in Tejarat Bank, Kurdistan province, within 2010-2014 in which 34 branches were accounted into consideration. This research is practical in terms of goal and is a descriptive-correlational research in terms of methodology. In this research, the criteria of productivity growth which include the services resulted from physical capital, the services from technology capital and the services from workforce personnel are tested as independent variable and liquidity changes are tested as dependent variable. After estimation tests, equations ARDL, OLS and Benerjee test are used for testing the assumptions of research. The findings of research represent that there is a meaningful relation between the growth of productivity, services from physical capital (number of branches) and services from workforce personnel and liquidity changes; but no meaningful relation was observed between the services from technology capital (information) and liquidity changes. The findings show that there is a meaningful relationship between productivity growth i.e. services from physical capital (number of branches) and services from workforce personnel and the changes of liquidity, and no meaningful relation exists between the services from technology capital (information) and liquidity changes. So, it can be concluded that the existence of branches and proper services of workforce personnel cause general welfare and customer attraction, and it results in positive meaningful cash flow and this issue per se causes more benefit and increase of liquidity in the branches of Tejarat bank, Kurdistan province.

Keywords: productivity, liquidity, physical capitalechnolcatal, Tejarat Ba

Introduction

Liquidity management is one of biggest challenges that banking system is facing with. Main reason of this challenge is that most of bank sources are supplied from short-term deposits. Moreover, facilities of banks are spent for investment in assets which have low liquidity degree. Main duty of bank is to create balance between financial short-term obligations and long-term investments. Preserving insufficient values of liquidity, puts ban in danger of lacking the ability to perform commitments and finally failure. Maintenance of huge values of liquidity is a specific kind of improperly allocating sources which causes the decrease of band profitability rate to deposits and finally loosing market. Liquidity management means bank's ability to perform its fiscal obligations during time. Liquidity management is performed in different levels. First type of liquidity management is performed daily and required liquidity is predicted alternatively in future days. Second type of liquidity management which is based on management of liquidity flow forecasts required liquidity for longer durations of six months to two years. Third type of liquidity

management investigates required liquidity of bank in critical situations. With regard to the deterministic role of productivity in country's economic development, preparation of efficiency indicators are attended. A simple representation of productivity scale than an index is an amount of a certain output to an index an amount of a certain data to input or a combination of multiple inputs. Many methods exist in order to measure productivity including econometrics-based methods and estimation of production function, growth accounting method and numerical index method. Each of these methods has advantages and disadvantages and the selection of method is performed in terms of limitations and intended goals. Most international organizations and statistical centers of different countries benefit from numerical index method. With regard to the benefits of numerical index method in the calculations of productivity including the possibility of comparison to other countries and ease of update, using this method and by collecting available data and statistics, temporal series of work productivity index, capital and productivity of total Iran's economy is calculated with respect to economic activities. Cashes are most liquid type of asset in economic unit which its management has high importance. Identifying input and output flow of liquidity and main factors effective on this flow is very bridging for liquidity management. By identifying input and output factors and using statistical methods such as multiple regression, system of sources and consumptions and management of liquidity can be better managed. In this research, after investigating productivity growth on liquidity changes in Tejarat Bank, identification of main effective factors on liquidity of this bank are addressed using multiple regression (Faraji, 2010).

Literature Review

Liquidity management in banks is a contrast between risk and return. Liquidity shortage, in addition to impose heavy costs of resources supply (including debt from central bank with high rates), may pull banks to failure. In the other hand, liquidity maintenance more than required, vanishes the opportunities of investment and profitability. Therefore, for proper management of liquidity obtaining proper identification of effective factors in this section is necessary, to prevent occurrence of problem or even crisis and optimize bank profit as much as possible by applying control on each of these factors. One of common methods in recognizing the way of variables' influence is the use of regression analyses. This kind of analyses, in addition to clarifying direction, level and intensity of factors' effectiveness (factors) on dependent variable, determine the relation between independent and dependent variables which this issue provides the possibility of prediction for management (Akbari, 2012). Banking industry in Iran's economy, in terms of faults in capital market, has key role in equipping deposits towards consuming investment. Indeed, banking sector in Iran's economy can be known as a connection bridge between supply and demand of monetary resources; to the degree that every fault in structure of this sector and its operation inefficiency provides the contexts of disorder occurrence in other sections. The importance of operations in this industry is doubled by extending deliveries of subject clause "c" of general policies principle 44 of constitution, and the necessity of private sector empowerment. In addition, other point that must be considered is banking industry is among the industries that is near to structure change by implementing general policies of principle 44 of constitution. (Pajoyan & Shafiei, 2008). Study on the way of obtaining maximum output from limited resources is the nature of economics and optimal allocation of limited resources is the aim of this science. Efficiency in simplest expression is maximizing output with regard to certain input in micro- and macro- economic scales. Thus, research on efficiency including in institutions' level is one of the most important dimensions of research at economic study. Every kind of action for improving and promoting efficiency of banking system causes the improvement of saving flow, investment and allocation of resources, and utilization of potential, disperse and hidden facilities in country for development and general welfare. One of most important topics in banking industry is efficiency and productivity (Faghihnasiri, Oriani, Souri, & Garshasbi, 2010).

Shy & Stenbacka (2007) during a research "Prediction of liquidity supply and appropriate bank legislation" investigated narrow banking by presenting a model (is related to legislation systems that banks are required to complete return of demand deposits as short term cash assets). In summary, in this research the set of legislation tools for bank liquidity are extended by adding the ratio of full cash accounts as another regulating tool and it is shown that how the existence of this tool can induce self-selection of the investors who are categorized based on the possibility of facing cash need. This research pints the subject that: optimal policy has been clearly a function of return of banks' investments and the return of the investors who are faced with liquidity shock. Finally optimal and appropriate legislation policy is a function of 1) return of banks' investments, 2) benefit of investor from removing early deposit in order investment in another place.

nother research is performed by the title "Liquidity of bank assets and banking stability" by Wolf Vanger in 2006 that the researcher in this research investigates the effect of increasing liquidity in the bank assets on stability or failure. He investigates the state of a bank in different economic conditions by presenting a model and proves the theorem 10 which their most important ones are pointed in the following: increase of liquidity in critical conditions, increases risk-ability of bank on its balance sheet (after selling some assets in secondary market) and decreases banking stability. Increase of liquidity in critical conditions, increases predicted loss with assumption of not paying debt; increase of liquidity in ordinary situations, increases preserved risk of bank on its balance sheet, but doesn't affect stability of banking. Increase of liquidity in ordinary situations increases predicted loss by assumption of not _paying debt._

A research by the title "Bank liquidity system and last shelter (loan-giver)" was published by LevRatrnovski 2008 which attends the ways of optimal liquidity preparation via debt from central banks. The costs that this method imposes on them cause to benefit from central bank in the last step for supplying their cash. This research addresses the efficiency of this method in transparent _economies._

In the model of White and Normann, it is supposed that investment categorizations are performed in appropriate time. Input flows and cash and output flows and costs are random which oscillate according a certain probability distribution. Decision making variable in this model is the remainder of cash in beginning of period that can maximize expected wealth in the end of period (Weston & Brigham, 1996)

In Ston model, in addition to considering the situation of cash in coming days, attempt is to minimize unnecessary transactions. In this model, two controlling limits exist that determination of this limit to external parts of controlling limit which upper limit is specified by U and lower limit by L, is the commencing stage of transaction. Internal limits that are shown with U-a and L+a specify real implementation of an equation (Gallinger & Healey, 1991). Sabeti Kahnamooei (2007) in a research by the title "Designing and compiling optimal model of liquidity management in Bank of Industry and Mine" in which using ideal programming models, an optimal mathematical model is addressed for liquidity management that can in addition to optimizing the level of liquidity, make profit maximum and remain proper level of input and output variables in liquidity system on appropriate level and yet can observe effective rations on bank liquidity in standard level.

Methodology

This research is practical in terms of goal, is descriptive-analytical in terms of inference method and is casual comparative in terms of research plan. Statistical society of this research include all branches of Tejarat Bank in Kurdistan province from the beginning of 2010 until the end of 2014 that accordingly end of month remaining cash of these factors in the time interval is considered as statistical sample; thus for each variable, data must be gathered. In terms of subject scope, it is

Main hypothesis:

There is a meaningful relation between productivity growth and its influence on liquidity changes.

Secondary hypotheses:
(1) There is a meaningful relation between services from physical capital (number of branches) and liquidity changes.
(2) There is a meaningful relation between services from technology capital (information) and liquidity changes.
(3) There is a meaningful relation between workforce personnel and liquidity changes.
In this research, criteria of productivity growth (services from physical capital, services from technology capital and services from workforce personnel) are as independent variable and liquidity changes are as dependent variable.

Research Variables
1) Independent variable; index of productivity growth
In economic and accounting studies, different criteria are used for measuring productivity growth; in this research, efficiency and effectiveness variables are used as the indices of productivity growth. These indices are extracted from profit and loss bill and are considered as independent variables of research.

Efficient and effective factors on the index of productivity growth are: (1) capital from physical services (2) capital from technology and science (3) capital from personnel services

Table 1. Measurement Method of Each Variable

Measurement Method	Variable	row
Added value from physical services such as cash deposit and withdraw divided to number of branches	Capital from Physical Services	1
Added value from electronic banking services divided by official value of the assets that present electronic banking services	Capital from Science and Technology Services	2
Productivity of workforce from dividing added value to number of staff	Capital from Personnel Services	3

2) Dependent variable; liquidity index
In this research, two variables of assets (deposits) and debts (loans) are used in order to measure liquidity as dependent variables which both of them are extracted from balance sheet. Estimation of bank output flexibility (loans and deposits) is determined by work and capital. Therefore production process which is considered for this specific case is defined as following:

$$+D=B. [\min\{q.F(N_b , IK_b)\}]L \qquad (1)$$

L: Loans
D : Deposits
B: Services from physical capital (branch)
q=quantity
N_B= services from branch staffs
IK_B= Services from information and technology of branch

As relation 1 is a linear regression equation can be defined as following:

$$L+D= [\min \{B.q,F(N,IK)\}] \qquad (2)$$

Relation 2 can be anticipated as exponential function.

$$L+D = e^{f(w)}N^{\acute{a}}IK^{1-\acute{a}} \qquad (3)$$

Test model for investigating function 3 is Olley-Pakes (OP) method (1996) which was extended by Levisohn and Petrin (2003). The final model of test is formed by making logarithmic the function 3.

$$y_{it} = \beta_0 + \beta_n n_{it} + \beta_k ik_{it} + \omega_{it} + \varepsilon_{it} \ (4)$$

β_0= constant coefficient

β_n= coefficient from personnel services

β_k= coefficient of technology capital

ω_{it}= effective coefficient on input data

$\mathfrak{C}_{it}$= random variable

In the following, OLS and GMM estimators are used.

Estimation model of bank productivity

$$\ln p_{it} = \gamma_0 + \sum_j \gamma_j x_{it}^j + \sum_j \varphi_j z_{it}^j + \sum_{t=1993}^{2007} \theta_t d_t + v_{it}, \qquad (5)$$

γ_0 = constant coefficient

$\sum_j \gamma_j x_{it}^j$ = set of coefficients and variables of productivity indices (1-human capital, 2- physical capital, 3- technology and information capital)

$\sum_j \varphi_j z_{it}^j$ = set of control coefficients and variables (growth-risk-market area et.)

$\sum_{t=1993}^{2007} \theta_t d_t$ = set of imaginary coefficients and variables (profit rate and life cycle)

Vit= random error

In this research, with regard to the type of data and methods of existing analysis, method of combined/integrated data is used. The purpose of combined/integrated data is a set of data that includes many sectional variables N which is investigated during a certain time period T. In this case, number of observations is N × T which can be estimated using different models.

Findings

Descriptive statistics of dependent and descriptive variables studied in this research are presented in table 2.

Table 2. Descriptive Statistics of Variables

Probability	Elongation	skewness	SD	Min	Max	Mid	Mean	Variable
0.27	2.26	-0.34	0.13	8.84	9.34	9.14	9.12	Liquidity Changes (LY)
0.00	6.02	-1.41	0.71	6.13	9.90	9.07	8.94	Services from Personnel (HUMPR)
0.01	3.04	-0.93	0.83	10.63	13.93	12.91	12.69	Services from Physical Capital (TECPR)
0.73	3.29	-0.20	1.08	3.25	9.12	6.36	6.44	Services from Technology Capital (TECPR)
0.01	3.04	-.092	0.83	10.65	13.95	12.93	12.72	Total Productivity (TOTPR)
0.22	2.31	-0.42	0.04	3.46	3.61	3.55	3.55	Market Size (LD)
0.29	2.01	-0.04	0.13	0.66	1.14	0.88	0.87	Liquidity Risk (RM)

Source: Researcher's Findings

Middle and mean are among central indices; for example for (LY) during a time period, middle is equal to 9.14 and mean of data is 9.12 which represents during this period, liquidity changes have been averagely 9.12; also with regard to the rete of minimum and maximum (LY), during this period it has been oscillating between 8.84 and 9.34. it is anticipated similarly for other variables.

Estimating equations of liquidity changes

Stability test and determining collective order of variables

Before investigating the results of equations' estimation, table 3 presents the results of stability for template variables separated for each equation according generalized Dickey-Fuller test. With regard to statistic quantities of test and critical values presented in above table, it can be seen that some variables are stable in the level I(0) and some other in first order difference I(1). Computer results of stability test for variables are reported in appendix. In the continuation, we address estimation of equations' coefficients and existing tests of long term balance relation for these equations.

Table 3. Stability Test of Template Variables

Result	Test Statistics	First Order Difference	Critical Quantity 5%	Test Statistics	Variable
I(1)	-6.96	D(LY)	-2.91	-0.87	Liquidity Changes (LY)
I(0)	-	-	-2.91	-4.48	Services from Personnel (HUMPR)
I(0)	-	-	-2.91	-4.52	Services from Physical Capital (TECPR)
I(0)	-	-	-2.91	-2.95	Services from Technology Capital (TECPR)
I(0)	-	-	-2.91	-4.49	Total Productivity (TOTPR)
I(1)	-6.30	D(LD)	-2.91	-2.28	Market Size (LD)
I(1)	-6.71	D(RM)	-2.91	-0.69	Liquidity Risk (RM)

Results of unit root test in table 3 show that variables of services from personnel, services from physical capital, services from technology and total efficiency rejected hypothesis H_0 based on non-stationarity and are stationary in zero level, and the variables of liquidity changes, market size and liquidity risk accepted hypothesis H_0 and are stationary at level of one. Therefore some variables are stationary in level and some of them are stationary by on time subtraction. According these tests, all variables are stationary and estimation of template parameters are addressed using ARDL without concern about the problems related to unit root.

Relying on specifying the model performed in the previous chapter, we address estimation of long-term and short term functions of liquidity changes. All equations include three equations of dynamic template, long term relation and short term equation (ECM). Since the used data are monthly, therefore in the estimation of all equations, number of considered pauses is two. Also with regard to relatively small size of sample, Schwartz Bayesian Criterion (SBC) is used as criterion for selection of optimal model.

Estimation of dynamic coefficients for equation of liquidity changes- total productivity

LY = 2.13 + 0.64*LY (-1) + 0.003*TOTPR + 0.37*LD - 0.28*RM + 0.02*D91

Statistics coefficients t   (3.35)   (-6.34)   (5.28)   1.67)   (13.41)   (5.1)

Table 4.

Test	Coefficient
R2	0.99
Durbin's H-Statistic	2.07 (0.03)
F	1556.9 (0.00)

Explanation power of model is high with regard to the value of R^2 and with regard to statistics t, all variables except the variable of total productivity are meaningful in the level of 95%. The results of F test represent that whole regression is meaningful in the intended level and D-H test results show that no correlation exist between variables.
Recognition tests

Table5.

Test	Coefficient F	Prob
Non- Serial Correlation	0.59	0.83
Appropriate Functional Form	0.22	0.88
Normality	0.70	0.70
Similarity Variance	0.92	0.33

By the four recognition tests considering error level of 5% and its comparison with minimum meaningful level, null hypotheses are accepted based on similarity variance and non-correlation of disorder terms and its opposite hypothesis is rejected. The results of coded RESET test also show that function form has not specification problem.

In order to be sure estimated regressions are not false and emphasize long term balance relations between above template variables, we perform Benerjee, Dolado and Master's test. For performing this test, the estimated coefficients related to pauses of dependent variable must be summed and the obtained value must be subtracted by one; then by dividing the obtained value to the sum of standard deviations related to these coefficients, a statistics type t can be found. Test statistics t related to above equation is calculated as following:

Benerjee test:
$$TB = \frac{2.89 - 1}{0.58} = 3.26$$

With regard to presented critical quantity by Benerjee, Dolado and Master, a long term balance relation exists between template variable of total liquidity-productivity changes.
b) Long term relation of total liquidity-productivity changes (Table no. 2 appendix)
LY = 5.99 + 0.009TOTPR + 1.04*LD - 0.79*RM + 0.06*D91

(3.5)   (-16.34)   (5.96)   (1.67)   (9.19)   t statistic coefficients
As it can be observed, with regard to statistics t, all variables except total productivity are meaningful in confidence level of 95%. Coefficient obtained for market size shows that this variable has positive meaningful influence on liquidity changes, i.e. by increasing market size, their liquidity changes are increased.

The obtained coefficient for liquidity risk shows that liquidity risk has negative meaningful influence on liquidity changes; i.e. by increasing liquidity risk, liquidity is changed that has resulted in decrease of liquidity changes.

4-3-3 Equation of liquidity changes- services from physical capital

a) Short term template of liquidity changes- services from physical capital (table no. 3 appendix)

$LY = 2.13 + 0.64*LY(-1) + 0.003*PHYPR + 0.37*LD - 0.28*RM + 0.02*D91$
(3.35)   (-6.34)   (5.27)   (1.64)   (13.41)   (5.1)
Statistics Coefficient T

Table 6.

Test	Coefficient
R2	0.99
Durbin's H-Statistic	2.07 (0.03)
F	1554.4 (0.00)

Explanation power of model is high with regard to the value R^2 and with regard to statistic t, all variables except variable of services from physical capital are meaningful in the level 95%. The results of test F represent that whole regression is meaningful in the intended level and the result of D-H test shows no self-correlation exists between variables.

Recognition tests

Table 7.

Test	Coefficient F	Prob
Non-Serial Correlation	0.59	0.83
Appropriate Functional Form	0.01	0.88
Normality	0.70	0.70
Similarity Variance	0.90	0.34

By the four recognition tests considering error level of 5% and its comparison with minimum meaningful level, null hypotheses are accepted based on similarity variance and non-correlation of disorder terms and its opposite hypothesis is rejected. The results of coded RESET test also show that function form has not specification problem.

Benerjee test:

$$TB = \frac{3.09 - 1}{0.578} = 3.61$$

With regard to presented critical quantity by Benerjee, Dolado and Master, there is a long term balance relation between variables of the template of liquidity changes - services from physical capital.

b) Long term balance relation of liquidity changes – services from physical capital (table no. 4 appendix)

$LY = 5.99 + 0.009*PHYPR + 1.04*LD - 0.79*RM + 0.061*D91$
 (3.5)   (-16.37)   (5.96)   (1.62)   (9.19) Statistic coefficient t

As it was observed, with regard to t statistics, all variables except services from physical capital are meaningful in confidence level of 95%.

The obtained coefficient for the variable of market size shows its positive meaningful effect on liquidity changes, i.e. by the increase of market size, liquidity changes are increased. Negative relation between liquidity changes and liquidity risk in banks shows that level of changes in their liquidity is decreased by increasing liquidity risk in banks.

4-3-4 a) Estimation of dynamic coefficients of the equation of liquidity changes-services from technology capital (Table No. 5 Appendix)

$$LY = 2.04 + 0.61*LY (-1) + 0.009*TECPR + 0.44*LD - 0.24*RM + 0.02*D91$$

Statistics Coefficient T (3.75)   (-5.86)   (6.74)   (3.84)   (14.04)   (5.4)

Table 8.

Test	Coefficient
R2	0.99
Durbin's H-Statistic	1.38 (0.16)
F	1894.2 (0.00)

Explanation power of model is high with regard to R^2 and with regard to statistics t, all variables are meaningful in the level of 95%. Results of F test represent that whole regression in the intended level is meaningful and the result of D-H test shows that no self-correlation exists between variables.

Recognition tests

Table 9.

Test	Coefficient F	Prob
Non-Serial Correlation	0.46	0.92
Appropriate Functional Form	0.04	0.83
Normality	0.07	0.96
Similarity Variance	0.75	0.38

By the four recognition tests, considering error level of 5% and its comparison with minimum meaningful level, null hypotheses are accepted based on similarity variance and non-correlation of disorder terms and its opposite hypothesis is rejected. The results of coded RESET test also show that function form has not specification problem.

Benerjee test:

$$TB = \frac{2.89 - 1}{0.53} = 3.58$$

With regard to presented critical quantity by Benerjee, Dolado and Master, there is a long term balance relation in the confidence level of 95% between variables of the template of liquidity changes - services from technology capital.

b) Long term balance relation liquidity changes-services from technology capital (table no. 6 appendix)

$$LY = 5.36 + 0.02*TECPR + 1.17*LD - 0.64*RM + 0.057*D91$$
 (3.94)   (-10.46)   (7.63)   (3.75)   (8.99)   statistics coefficients t

As it can be observed, with regard to t statistics, the variables are meaningful in an acceptable level. Variable coefficient of services from technology capital shows that 1 unit increase in mentioned

variable causes liquidity changes to increase in short term and long term 0.009 and 0.02 respectively.

The obtained coefficient for market size shows that this variable has positive meaningful effect on liquidity changes i.e. liquidity changes are increased by increasing the market size of banks.

Negative relation between liquidity changes and liquidity risk in banks shows that their liquidity changes are decreased by increasing level of liquidity risk.

4-3-5 Equation of liquidity changes-services from personnel

a) Short term template of liquidity changes-services from personnel (table no. 7 appendix)

LY = 2.19 + 0.63*LY (-1) + 0.006*HUMPR + 0.38*LD - 0.28*RM + 0.02*D91

 (3.29)   (-6.42)   (5.6)   (2.26)   (13.2)   (5.42) statistic coefficients t

Table 10.

Test	Coefficient
R2	0.99
Durbin's h-statistic	2.156 (0.03)
F	1622.8 (0.00)

Explanation power of model is high with regard to R^2 value and with regard to t statistics all variables are meaningful in the level of 95%. The results of F test represents whole regression in the intended level are meaningful and the result of D-H test shows that no self-correlation exists between variables.

Recognition Tests

Table 11.

Test	Coefficient F	Prob
Non-Serial Correlation	0.64	0.78
Appropriate Functional Form	0.40	0.52
Normality	0.66	0.7
Similarity Variance	1.44	0.23

By the four recognition tests, considering error level of 5% and its comparison with minimum meaningful level, null hypotheses are accepted based on similarity variance and non-correlation of disorder terms and its opposite hypothesis is rejected. The results of coded RESET test also show that function form has not specification problem.

Benerjee test:

$$TB = \frac{2.895 - 1}{0.57} = 3.42$$

With regard to critical quantity presented by Benerjee, Dolado and Master, there is a long term balance relation in the confidence level of 95% between variables of the template of liquidity changes - services from personnel.

b) Long term balance relation of liquidity changes- services from personnel (table no. 8 appendix)

LY = 5.91 + 0.018*HUMPR + 1.04*LD - 0.76*RM + 0.05*D91

 (3.45)   (-15.09)   (6.33)   (2.27)   (9.55)   statistics coefficient t

It is observed that with regard to statistic t, all variables are meaningful in an acceptable level. Coefficient of human productivity variable shows that 1 unit increase in services from personnel

causes the increase in liquidity changes of banks in short term and long term 0.006 and 0.018 respectively.

The obtained coefficient for market size shows that this variable has positive meaningful effect on liquidity changes, i.e. their liquidity changes are increased by increasing market size.

The obtained coefficient for liquidity risk shows that liquidity risk has negative meaningful effect on liquidity changes, i.e. liquidity is changed by increasing liquidity risk which results in the decrease of liquidity changes.

Conclusion

In this research, the influence of efficiency growth on liquidity changes in Tejarat Bank of Kurdistan province was investigated. Here, referring the previous section, data analysis is addressed. First, descriptive statistics of research variables, then normalization of research data and finally the test of research hypotheses are discussed. Generally the following results are obtained:

The findings show that there is a meaningful relation between services from workforce personnel and services from technology capital (information) and liquidity changes, and no meaningful relation exists between productivity growth and services from physical capital (number of branches) and liquidity changes. Other results represent that liquidity management is one of the biggest challenges banking system is facing. The main reason of this challenge is that most of banks' resources are supplied from short term deposits. In addition, banks' facilities are spent on the assets that have relatively low liquidity. Insufficient value of liquidity pushes bank into the danger of inability to perform obligations and consequently bank is faced with failure. Also, preserving more liquidity, while causes the decrease of risk, but takes investment opportunities from bank and causes the decrease of efficiency in bank sources. Liquidity management includes prediction of bank needs in different sections and supplying these needs with minimum cost. Maintaining the liquidized assets in order to obtain confidence from the existence of financial flows for addressing customers cause the decrease of investment opportunities in bank. In addition, intelligent management of liquidity makes bank able to respond the clients on time and without fault. This issue causes the increase of validity to clients and society. In the situations with liquidity deficit, using central bank sources as the last shelter in the form of long term because of their high interest rate decreases the power of bank profitability. Therefore, by on-time estimation of cash needs of depositors and borrowers, bank profitability can be saved via managing liquidity and creating a liquidity safe range by spending lowest cost; and no bank is able to predict accurate value of liquidity in the future. Therefore, banks must be always liquidity control tools. Therefore, by recognition of main liquidity flow, banks must implement a system for their cash planning. Using these plans, liquidity can be decreased and ordinary operation of bank can be managed using lower values of liquidity.

Table 12. Summary of the Results of Hypotheses Test

Row	Hypothesis	Result
1	There is a meaningful relation between productivity growth and its effect on liquidity changes	Rejected
2	There is a meaningful relation between services from physical capital (number of branches) and liquidity changes	Rejected
3	There is a meaningful relation between services from technology (information) capital and liquidity changes	Confirmed
4	There is a meaningful relation between services from workforce personnel and liquidity changes	Confirmed

References

Akbari, F. (2012). *Analysis of Financial Statements* (16 ed.). Tehran: Accounting and Auditing Research Center Publication.

Faghihnasiri, M., Oriani, B., Souri, A., & Garshasbi, A. (2010). Comparison of Efficiency of the Supervision of the Post Bank of Iran Using non-Parametric and Parametric Methods. *Scientific Journal Management System, 10.1*(39), 151-174. Retrieved from http://jes.journals.umz.ac.ir/article_80_14.html

Faraji, Y. (2010). *Learn about the Tools and Financial Monetary Institutions.* Tehran: Iranian Banking Institution, Central Bank of Iran.

Gallinger, G., & Healey, B. (1991). *Liquidity Analysis and Management* (Second ed.). McGraw-Hill International Editions.

Pajoyan, J., & Shafiei, A. (2008). Analysis of the Structure of the Banking Industry: an Empirical Application Index U Davis. *Journal of Quantitative Economics (Journal of Economic Studies), 5*(4), 81-105.

Sabeti Kahnamooei, M. (2007). *Design and Development Optimize Liquidity Management in the Banking Industry and Mining Models. (Master's Thesis).* Tarbiat Modares University.

Shy, O., & Stenbacka, R. (2007). Liquidity Provision and Optimal Bank Regulation. *International Journal of Economic Theory, 3*(3), 219-233. doi:10.1111/j.1742-7363.2007.00057.x

Weston, J. F., & Brigham, E. F. (1996). *Essentials of Managerial Finance (The Dryden Press Series in Finance).* South-Western.