Bank funding stability by non-maturing saving account Based on social banking

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Abstract
Banks and financial institutions basically make money by lending money at rates higher than the cost of the money they lend. Bank funding stability and especially by non-maturing deposits, as a main part of deposits, would be one of the main challenges for banks. The purpose of this research is to address the main important factors except for the interest rate that improves funding stability base on non-maturing deposits. In this regard, a sample of this study comprises the contract and cash flow data for non-maturing deposits of nearly 10 million transactions and customer information of the biggest private bank in Iran (Mellat bank). Since deposit interest rate incentives could be the main incentive for depositors to save their deposits, our findings show that contractual rewards such as investing customer’s deposits in the CSR projects (Donation, Environmental protection, and so on), have a significant role to save more non-maturing deposits with the completely lower cost. In addition, contractual rewards could decrease deposit withdrawal and cash flow volatility which lead to more bank funding stability. In order to compensate for the work of customers, they can receive special cards and insurance.

1 Introduction
In recent years, after economic problems and financial crises in the world, banks are faced with many problems. Also, these problems are exacerbated by a significant increase in non-maturing deposits and tendency of depositors to these kinds of deposits. After financial crisis of 2008, non-maturing deposits have become the most important funding source for banks and financial institutions. Depositors are free to withdraw their deposited cash at any time. While in bank management, deposits with agreed maturity are easier to handle and bank can control cash flow of deposits. Also, some of important indicators of the banking management like ALM (asset liability management) affected by these changes in depositor’s behavior.

Nowadays bank funding is increasing based on non-maturing deposits – such as overnight deposits or deposits redeemable at notice and short-term deposits. After exhibiting a dynamic growth in the aftermath of the financial crisis of 2008, non-maturing deposits represent the most important funding source in banks and financial institutions (Schlueter et al., 2015). Since deposit funding increasingly consists of non-maturing deposits with uncertain cash flows exposing them to asset liability (ALM) risk, banks face a depositor’s behavior of their balance sheets. For example, for all European banks, these deposits gain major shares in their funding portfolios, exposing banks to changing depositor behavior as depicted in Fig. 1:

Fig. 1. Deposit volume evolution for all European banks (acc. to ECB statistics). The graphs represent non-bank depositors and show volumes in trillion EUR.
The major challenges challenge for banks are posed from these changes in deposit portfolio composition. Since in non-maturing products depositors are both free to withdraw their deposited cash at any time or to deposit new cash on their account, banks should apply some solutions like contractual rewards to save their non-maturing deposits. In fact, deposits with agreed maturity – such as time deposits or savings bonds – are approximately easy to manage in bank management because of contractual tied saving durations, this does not hold correct for non-maturing deposits. Although the cash flows of these products are unknown, we can estimate the behavior of depositors by some rewards or models. Banks and financial institutes can apply this reward or models to manage their deposits like estimating saving duration. Since the entire bank’s cash flow profile depends on the estimated saving durations in non-maturing deposits, bank management’s key responsibilities such as asset liability management (ALM) risk are broadly affected by assumptions on non-maturing deposit behavior. Moreover, if the bank has not anticipated early deposit withdrawals by self-determinedly acting depositors, liquidity risk arises. Also, the new financial Basel III regulations requiring classification models for retail deposits (Stable or less stable deposit) explains this concept for banks.

Since in the current environment non-maturing deposit volumes are increasing rapidly, balance sheet “behavioralization” is critical for banks. In this manner, this study refers to the ways to stable deposit funding by contractual rewards (Common contractual rewards: special debit card and insurance) as being depositors providing funding for long time durations as well as that they save on a smooth and steady way that is not characterized by highly irregular cash flows. This study seeks to analyze to what extent contractual rewards guide the saving behavior of a bank’s retail customers. The best part of these solutions is that these incentives rewards have less cost for bank rather than interest rate. Will it be possible to obtain a different, stabilized portfolio behavior if a bank imposes non-pricing incentives on its depositors that still are free to move funds from one bank to another on a daily notice? To answer these questions the study is able employ a unique and well-suited dataset to analyze depositor behavior. The biggest private bank in Iran provides full access to its database covering all contract-, cash flow- and customer information for 44701 deposits nearly 11 million transactions of them since 2010 to 2015. This rich dataset is most appropriate for our analysis because the data providing bank specializes in offering retail saving contracts, whose contract terms are very stable over time by contractual rewards. To bring depositors to providing stable funding, the bank offers incentives with contractual rewards for their customers. First, a saving contract may be equipped with special debit card (i.e., using incentives, the customer will be rewarded if she saves for a longer time period). These ‘incentives on contracts’ consist of a debit card with special shape that premier customer can use it everywhere with special offers and discounts. Also, the premier customer can show it in the branches of the bank to receive special services. In some countries like Germany depositors can receive a governmental Subsidy called WOP if they save for 7 years and interest rate bonus by banks if they save for 4 years. (e.g., Schluter and Sievers, et al., 2015). It shows that stable deposit funding is so important and critical for both banks and governments. Recently some of Iranian banks doing some researches about new banking model such as “Universal Banking” and offer new services and rewards to their depositors. We consider the main and common rewards in Iranian banks. These rewards are as follows:

First contractual reward is special insurance services and second reward is special card services. If average of account of one depositor in 6 months be more than 750.000.000 Rials, depositor can receive special insurance and card services. The Major part of this amount of money related to short-term account and saving account which are Non-maturing deposits.

To analyze these two rewards and their effect on saving duration and describing behavior of retail customers, volatility of the cash inflows and keeping money on deposits during 6 months were considered. The results show that these rewards keep deposits and decrease volatility of cash inflows and thus stabilize deposits. (Increasing saving persistence and decreasing cash flow volatility of deposits).

2 Literature review

The financial crisis of 2007–2008, shows the importance of maturity of loans and deposits in bank and also behavior of borrowers and depositors and the way to predict it. In recent years the main parts of deposits are Non-maturing deposits and these kinds of deposits exhibit unclear cash flow patterns. Insler et al. (2016) studied the investment decisions and borrowing constraints that is related to receive large personal loans by college students. They found that individuals with prior investment experience or who view themselves as financially literate tend to invest more and with more risk and these findings are largely consistent across students from all income levels. Also, Salinas et al. (2016) analyzed the factors of the bank customer (Dis)loyalty in portfolio choices. The aim of this study is to find statistical methods able to support and to help banks to identify their customers’ characteristics that might influence their (dis)loyalty in portfolio choices. Vazquez et al. (2015) tried to find out relationship between bank funding structures and risk with Evidence from the global financial crisis. They show which banks are riskier. In addition, Bologna et al. (2015) studied structural funding and bank failures. This paper investigates bank structural funding vis-à-vis bank failures. An empirical analysis is conducted on the defaults of commercial banks occurred in the United States between 2007 and 2009. The results highlight that structural funding position indeed plays a significant role in explaining the probability of bank defaults.

Beau et al. (2014) demonstrated that a bank needs to finance its activities, and the cost of bank funding affects a wide range of economic variables with important implications for both monetary and financial stability. The subject of their research is bank Funding Costs: What are They, What Determines Them and Why Do They Matter? King et al. (2013) analyzed relationship between the Basel III Net Stable Funding Ratio and bank net interest margins and they found that universal banks with diversified funding sources and high trading assets are penalized most by the NSFR (Net Stable Funding Ratio). Craig et al. (2013) examined relationship between Deposit market competition, wholesale funding, and bank risk and Results declared the notion of a risk-enhancing effect of deposit market competition. There are very few articles in Iranian journals about bank funding stability. For example, Haghighi et al.
(2017) studied analysis and ranking Methods of financing bank by using instrument's Capital market; By the AHP Approach. The results of the survey, according to the methods of financing the desired final weight, respectively, of certificates of deposit, purchase religion, mutual fund, sukuk bond purchases, guarantees and agency and temporary shares are the highest weight in the eyes of experts. Also, Shahcheria et al. (2017) demonstrated in a report that there is important relationship between bank funding stability and profitability.

In addition, Non-maturing deposits show stochastic cash flow patterns because in- and outflows may occur unforeseen attributable to the depositors’ self-determined behavior. These product features motivate questions regarding deposit volume predictability, however, the academic literature on deposits and depositor management is so scarce. Although there is ample evidence of macroeconomic conditions affecting interest rate pass-through and thus the manner of how banks price their retail products and services (e.g., Hofmann and Mizen, 2004; ECB, 2009), little is known about depositor reactions to price setting. Also, some studies observe changes in non-bank deposit volumes at the aggregated bank level (e.g., Gatev and Strahan, 2006). However, these studies cannot relate deposit volume changes to individual customers and depositors. For example, one could suggest that the guidance of depositor behavior could be related to relationship banking. However, this strand of literature mainly focuses on corporate credits and loans and mortgages (e.g., Agarwal and Hauswald, 2010; Ongena et al., 2011; Degryse et al., 2009). Moreover, since the major difficulties associated with observing customer reactions on the individual level, some studies analyze surveys, which address aspects, such as customer loyalty (Humphrey, 2010; Simon et al., 2010). The household finance literature considers the people’s views and questions how they can invest their capital (Bergstresser and Poterba, 2004; Campbell, 2006; Calvet et al., 2007).

In contrast, our study takes the bank’s perspective and analyzes how a bank can influence the behavior of its own customers, regardless of what other investments and opportunities they undertake. Also, with respect to the impact of government subsidies Engelhardt (1996) documents the effects of government subsidization on saving activity in Canada. Just two studies have been conducted on the German government subsidy wop. Börsch-Supan and Stahl (1991) and Rotfuß and Westerheide (2010) analyze the results of the subsidy from a political economics perspective. Taking advantage of cross-sectional data provided by the Federal Bureau of Statistics by both studies. The researchers find that no crowding out effects emerge if the German government exclusively subsidizes specific contract types. However, whether the WOP subsidy guides behavior during the lifetime of a saving contract could not be determined by bank. In summary, no study has been able to analyze contract designs that reward a special saving behavior though being commonly offered by many banks. One of the best articles which related to our research is bank funding stability, pricing strategies and the guidance of depositors (e.g., Schlueter et al., 2015). In this research, behavior of depositors and incentives such interest rate bonus and their effect on bank funding stability has been analyzed.

3 Research methodology

There are more than 30 banks and financial institutions in Iran and most of them accept and open short- and long-term deposits for retail customers (saving account, short term account and long-term account). Operational definition of these kinds of accounts in Iran: Totally a bank account is a financial account maintained by a bank for a retail or commercial customer and divided in two main group, first saving deposit and second investment deposit. Investment accounts consist of Short-term, Special short-term and long-term and checking account is a type of saving account in Iran (there are other types of accounts which is not important). In Iranian banks, Depositors can withdraw their money in saving account and short-term account freely and we can call them non-maturing deposits but in long term account they must close their account or decrease it in new account. In addition, the small portion of bank accounts is long term account and banks always worried about their deposits and cash flow. Also e-banking services can help to customers to withdraw so fast. So banks in order to encourage customers to maintain their deposits, give them extra services and reward. This reward could be related to bank’s CSR activities. Mellat bank has a very serious policy in CSR area and there is a section in the website of bank which is related to corporate social responsibility.

Social performance: (a) cooperation in public services; (b) in addition to purposeful economic activities, Bank Mellat has taken various; (c) measures to develop public services through gratuitous payments, such as the following: 1) paying money for needy prisoners convicted to unintentional crimes in several phases; 2) cooperation in building and equipment of 63 schools, night art schools and exceptional schools; 3) cooperation of Mellat Bank in Cultural and Art Activities and actions; 4) Mellat Foundation has carried out various programs in line with performing its commitments concerning social responsibilities (CSR) and public services:

- Recognizing professional qualifications (experts) in science, culture and arts
- Establishing cultural relations with other countries
- Joint publication of cultural magazines
- Holding literature festivals
- Holding volunteer work day

Also, this bank has a section in the website which categorizes in 5 sections: education development, Health development, Environmental protection, culture development and Loan (Retail banking). Some of activities in environmental protection area: (a) environmental protection education project for students in cooperation with Mellat Bank and UNESCO; (b) appreciation of the rangers; and (c) participate in the renovation of worn-out taxis to reduce air pollution.

Since Mellat bank has a clear strategy for Bank’s CSR, this bank publishes a comprehensive report for CSR activities every year. These common rewards (except interest rate bonus) are those that related to CSR activities with special Insurance and card services in Mellat Bank. These services are for retail customers whose average of their account balance in 6 months are more than 750.000.000 Rials. Special insurance services consist of insurance Coverage up to 200.000.000Rials for Personal injury protection, Accidental death and dismemberment insurance and property insurance. Special card services consist of free debit card with special pattern which allows the card holder to receive banking services very fast and with more respect. Also,
there are more services for special customers such as special loans, safe box service, banking consultant and so on but Common services during research period include two services (special Insurance and card services).

In order to analyze deposits, every 6-month deposits rechecked by bank and if withdrawals are more than usual and the average of account balance in 6 months is less than 750,000,000 Rails or account closed by customer, special services are interrupted. So, there are two groups of retail customers in Mellat Bank. In first group, they receive contractual reward and their average of account balance in 6 months is more than 750,000,000 Rails and second group who don’t receive these kinds of reward because of two main reasons. First reason is that their average of their account balance in 6 months is less than 750,000,000 Rails or account closed by customer. Second reason is that they don’t want these contractual rewards and they don’t want recognize as a premier customer. So, they don’t accept this contract. The sample of research consists of 44701 customer accounts (two groups of retail customers) and their cash flow (10,897,124 transactions).

Also, in this paper we have three kinds of variables. First, dependent variables are duration and cash flow volatility. Second, independent variable is contractual services (special insurance and card). Third, Covariate variables which are in two categories:

Micro level: LC (Letter of Credit), Personal loan, Guarantee, Age, Interest of loan
Macro level: Stock market index, GDP, Gini

Then research hypothesis which related to two main factors considered. Two factors are saving persistence or saving duration (duration) and volatility of cash flow (Volatility), because these factors are so important for deposit stability. So, in this research, research hypotheses are related to saving persistence and volatility.

3.1. Research hypothesis

The dependent variables, respectively, are duration and volatility and the independent variables are special Insurance and card services (contractual rewards).

First research hypothesis emphasizes saving persistence and it implies to duration of deposit:

H1: special Insurance and card services lead to maintenance of deposits.

The main question in this hypothesis is: Are these kinds of rewards influence depositor’s behavior to keep their deposits? Because of inconsistent choices (principal of behavioral finance) the answers to this question are not obvious. So, we search to confirm this relationship, between special Insurance and card services and saving persistence which it implies to duration of deposit. We analyzed duration of deposits and saving persistence of two groups of customers. The first group which received these kinds of rewards and the group without these rewards and then compare them. We calculate saving duration (duration) as follow:

\[
\text{saving duration} = \text{sign contract} - \text{terminate contract}
\]

For all contract, calculations are based on years.

H2: special Insurance and card services lead to reduction in cash flow volatility of deposits.

Similar to the previous hypothesis the main question in this hypothesis is: Are these kinds of rewards influence depositor’s behavior to reduce their deposit cash flow volatility? Volatility of deposits is so important for financial institute and if they can reduce volatility of deposits, it leads to stabilization of bank funding. So similar to the previous hypothesis we analyzed volatility of deposits of two groups of customers. The first group which received these kinds of rewards and the group without these rewards and then compare them. We calculate volatility as follow:

\[
\text{volatility} = \frac{\text{standard deviation of cash inflows}}{\text{sum of cash inflows}}
\]

This variable shows that depositor provides funding on a regular and without volatile or volatile and irregular basis. We calculate volatility as the standard deviation of cash inflows which normalized by the total cash inflows for each contract. (Where \(i\) refer to the number of each contract)

3.2. Estimation model

In Estimation model we define dependent and independent variables and also Covariate variables. To analyze duration of deposits and saving persistence, we use saving duration and cash flow of deposits to analyze volatility (Dependent Variables: DV).

Also, the research model consists of micro and macro level of information and is structured as follows:

\[
\text{D.V} = \beta_0 + \beta_1 \text{Special insurance and card services} + \beta_2 \text{LC} + \beta_3 \text{Loan} + \beta_4 \text{Guarantee} + \beta_5 \text{Stock market index} + \beta_6 \text{GDP} + \beta_7 \text{Gini} + \beta_8 \text{Interest of loan} + \beta_9 \text{Account type} + \beta_{10} \text{Age} + \epsilon
\]

In this model the dependent variables, respectively, are duration and volatility. Duration which shows during the period of deposit (maintenance of deposit) and Volatility which shows fluctuations in cash flow deposit (table 2).

The independent variable is special Insurance/card: To receive or not to receive special insurance and card services respectively get 1 and 0. In these models, the covariate variables divided in two section micro and macro level. Micro level is related to personal decisions and economic indicators and financial markets show macro level (Table 1).
In this section Inferential Findings and results of the statistical analysis offered to verify the hypotheses of research. Also, we show Descriptive statistics of dependent variables (Table 3). Our sample comprises deposits and cash flow data for 44701 accounts of customers (Table 2) and their transaction (10,897,124 transactions) from 2010 to 2016. In this research the main question is that How increase deposit stability in banking system. To answer this question special services and their effect on deposit stability were considered. Regression model for hypothesis 1 is as follows:

\[ \text{Duration} = \beta_0 + \beta_1 \text{Special insurance and card services} + \beta_2 \text{LC} + \beta_3 \text{Loan} + \beta_4 \text{Guarantee} + \beta_5 \text{Stock market index} + \beta_6 \text{GDP} + \beta_7 \text{Gini} + \beta_8 \text{Interest of loan} + \beta_9 \text{Account type} + \beta_{10} \text{Age} + \epsilon \]

Regression model for hypothesis 2 is as follows:

\[ \text{Volatility} = \beta_0 + \beta_1 \text{Special insurance and card services} + \beta_2 \text{LC} + \beta_3 \text{Loan} + \beta_4 \text{Guarantee} + \beta_5 \text{Stock market index} + \beta_6 \text{GDP} + \beta_7 \text{Gini} + \beta_8 \text{Interest of loan} + \beta_9 \text{Account type} + \beta_{10} \text{Age} + \epsilon \]

In Table 4, P value of special insurance and card services is 0.025 and it is less than 0.05, so these services have a significant effect on the length of the deposit period. Also, estimated coefficient of this variable is 1.08, so it shows special insurance and card services increase deposit stability. Also, covariate variables such as LC, Loan, and Guarantee have not a significant effect on the length of the deposit period but Gini coefficient has no significant effect on it. It shows that when stock market index increased, deposit stability decreased and when GDP increased, deposit stability increased. Also, interest rate of loan and age of depositors have a significant and direct effect on the length of the deposit period.
(Reference level: 0)

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<th>Standard error</th>
<th>T value</th>
<th>P</th>
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Table 4. The result of fitting regression model by OLS method for hypothesis 1

In Table 5, P value of special insurance and card services is around zero and it is less than 0.05, so these services have a significant effect on the length of the deposit period. Also estimated coefficient of this variable is -0.003 so it shows these special banking services decrease volatility. Finally, it shows that special insurance and card services increase deposit stability.

Also, covariate variables LC, and Guarantee have not a significant effect on volatility but loan has significant and direct effect on it. Macroeconomic indexes show that Gini coefficient and GDP have a significant and direct effect on volatility. It shows that when Gini coefficient and GDP increased, volatility increased but stock market index has not a significant effect on volatility. Also interest of loan and age of depositors have a significant and direct effect on the length of the deposit period. Result of Nominal variables (Account type) show that saving and short-term deposits are more stable than long term deposits.

Table 5. Result of fitting regression model by OLS method for hypothesis 2

5 Conclusion

Nowadays one of main problems of banks in all over the worlds is Non-maturing deposit and its influence on bank funding stability. In fact, uncertain cash flows of Non-maturing deposits, exposing banks to asset liability (ALM) risk. Also, after the financial crisis of 2007–2008, Base on Liquidity Coverage Ratio (LCR) of the Basel III capital framework,
banks should have sufficient adequacy cash coverage for 30 days but deposit funding increasingly consists of Non-maturing deposits and it's hard to control by banks.

There are four main sources for bank funding in Iran consist of deposits, capital, borrowing from central bank and other banks. So one of the main resources is deposits and the main part of these kinds of deposits is Non-maturing deposits. Our main question in this research is how banks stabilize their funding by these kinds of deposits. To answer this question we study behavior of depositors who preserved their non-maturing deposits and the impact of special rewards (such as special card and insurance) on customers who preserved their non-maturing deposits and, its influence on bank funding stability has been investigated. Our sample comprises the cash flow and contract data of Mellat Bank for nearly 11 million transactions of 44701 of non-maturing deposits, since 2010 to 2015. This sample consists of two groups of depositors. In one group customers who received contractual rewards based on bank’s CSR activities (such as special insurance and card services, which is the most common incentive for depositors except interest rate bonus in Iranian banks) we found that stability of deposits increased. In fact, this group of depositors preserved their deposits and early deposit withdrawal and volatility of cash flow decreases during our research period. But second group of depositors who didn’t receive these kinds of incentives, show different behavior. So the results show that these kind of contractual or special rewards effectively stabilize saving behavior and thus bank funding. We know that, Non-maturing deposits gain major shares in Iranian banks funding portfolios and depositors are free to withdraw their deposited cash at any time, so banks should encourage depositors to increase saving duration and decrease volatility of cash flow. Some banks may be suggesting interest rate bonus to their depositors but it is against the regulations of central bank of Iran and also it increases interest expense. So Iranian bank can use contractual or special incentives, such as financial and non-financial services to stabilize their deposits and they should change their approach about pay extra interest rate to their depositors.

References:

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