

# **Making the Profitability Paradox of Bad Banks: A System Dynamics Approach**

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## **Abstract**

In traditional business models of banking in developing economies, banks earn profit by attracting deposits and offering loans, facilities, and mortgages to customers. This approach has been for many years a predominant business model, while their key performance indicators (KPI) show lack of business profitability. This issue is a diversion from the primary purpose of profitability initially built in the business model, and is called the profitability paradox. In this research, the data of financial statements of a private bank in Iran between 2012 and 2016 was used to define and represent the profitability paradox problem. To find causes of this problem and provide effective solutions, a system dynamics methodology has been applied. A holistic system model of the problem is represented to depict the causal structure of behavior of the profitability paradox. The results show that a suitable strategy for profitability, would be a shift from the interest income-based structure to the service-based structure.

## **Keywords**

Profitability paradox, system dynamics, capital adequacy ratio, interest income, non-interest income, qualitative system dynamics, banking

## **1. Introduction**

Banking system is one of the important pillars of Iran's financial system which has a significant impact on its economic growth. Iranian banks play a great role in its economy by crediting services to manufacturing sections. Hence, incomes obtained from granting loans to manufacturers and other customers is the primary way of making profits for Iranian banks. On the other hand, banks as financial service institutions offer their customers many services, which brings in extra incomes called mostly fee incomes. Due to the two types of incomes in Iran's banking system, establishing and developing sustainable incomes as well as increasing the productivity are the most fundamental goals of Iranian banks. Regarding the current business model of commercial banks and their services in developing countries like Iran, banks' incomes can be classified into two general groups: 1) interest incomes and 2) non-interest incomes.

Interest income is obtained from crediting services like loans and mortgages to customers which is gained from contributing with individuals. The bank earns income through receiving term deposits from customers as resource, investing those resource in different businesses, and offering term services to customers. This income arises from a difference between deposit interest rates and committed services and also the profit of investments. This income is due to the main and vital operation of the bank, i.e. intermediation of funds.

Non-interest incomes are that parts of banks' incomes that are obtained from service fees and also from giving financial and investment consulting. This type of income is partly obtained from letter of credit, banking guarantee, online banking, foreign exchange services, maintenance fee of documents and notes payable and check collection (Bastan et al, 2016a).

In recent years, Iranian banks are interested in earning income due to a high difference between the interest rate received and the interest rate paid by them, as well as, absorbing long-term deposits and crediting loans that make an appropriate amount of profit for them. However, regarding new governmental policies on reducing interest rates, this question would arise that would banks follow their previous policy on earning the maximum income from the difference between interest rates? It can be observed that the trend of Iranian banks has been changed recently. Perhaps, an access to long-term deposits is not their main goal. Hence, they are trying to absorb affordable resource instead of valuable resources. Now, the challenges are that in this economic condition, Iranian banks cannot absorb affordable resources.

In Iran, some economists believe that the traditional banking, in which a huge part of banks' income is resulted from crediting financial services to people, is not flexible. They believe that the main task of banks is absorbing the deposit as financial resources and paying them in terms of loans, but the process of banks' earning incomes is changing. In this new vision, earning incomes from offering services like the issuance of a letter of credit, foreign exchange services, banking guarantees, online banking services as card issuance, bills, and money transfer has gained more attention as a non-interest income. Nowadays, international banks are interested in offering faster, cheaper and more accurate electronic services. These kinds of electronic banking developments significantly affect banks' functions. Earlier, the main part of banks' income was credited loans, however, in recent years, more than 50% of the US and EU banks' incomes come from banking and fee services. Banks could decrease their dependency to the interest rates which tolerate highly by the use of this new approach. On the other side, they could also reduce the gap between their paid and received interests or their marginal profits to below 2%. Some services like money transfer, withdrawing from ATMs, check collection, and foreign currency exchange, need fees. The banks' customers are satisfied with this development because putting deposits, even below a single digit number, in banks would be considered for fees. Those people who use check rarely will pay less and in turn, they will also earn profits from their deposits. After banks nationalisation and non-interest banking implementation, Iranian Central Bank was not interested in receiving fees by banks. Hence, it prohibited banks in different ways for receiving fees from their banking services. It was concerned about using these fees by banks as a banking profit or interest. As a result, banks' fee incomes have been significantly reduced in recent years, i.e. it was about 12% of their incomes. Despite a high inflation rate in recent years, Central Bank determined low tariffs and put a maximum level of fees. This policy denied banks from a considerable income which can be substituted by the banking profit and decreases its rate. At the international level, as it gets more competitive, banks managers tend to earn maximum profits from offering services. On the other side, the Basel committee's standard which puts emphasis on the observance of capital adequacy causes that banks are not interested in the sudden increase of their risk assets like offering loans. Hence, they try to take fees in different ways with respect to various kinds of risks (Bastan et al, 2016b).

The business model and the profitability structure of banks in Iran could not get them perform better, and this has caused Iranian banks not to be identified in the powerful banks of the region. The issue of creating and developing sustainable incomes and increasing productivity has always been one of the most important issues of Iranian banks. In the current model of the Iranian banking business, which has passed a long time from its implementation, banks have been earned money by deposits absorption with the same rates for all types of customers, as well as offering loans to them at fixed and higher specified rates, and also receiving fee from some services. The emphasis on earning interest incomes and receiving honorarium as profits from banking operations, which is the heart of the country's banking business model, can lead to a reduction in the profitability, loss, or even bankruptcy of the bank. The issue is called by the McKinsey consulting firm as the "profitability paradox" and it is said that banks are suffering from this paradox that

increasing the volume of banking resources which can lead to the accumulation of inadequate assets and the loss of capital adequacy, that is a result of the lack of proper response to changes (Brummer, 2015). McKinsey describes banks that fail to resolve this paradox as bad banks. According to the viewpoint of this firm, bad banks have characteristics that are included to the existence of defective loops and neglect of the holistic knowledge of the banking system.

Divandari et al (2016) believes that the banking system of Iran faces serious and critical problems. If these problems are not addressed, it would naturally face higher systemic problems such as liquidity management and the balance between deposits and services will face a high non-performing loans (NPL) rate. He sees the improvement of the business model of the banking system as a solution to the major problems of banks. Improving the business model of Iran's banking system requires a deep understanding of its structure and its current dynamics in it. Hence, in this research, it has been tried to develop a system dynamic model for analysing the dynamics of the banking business by using a structured approach. For this purpose, after reviewing the subject literature, the processes related to the current business of the bank are identified and based on the relationship between them, the system dynamics model will be built from the banking business. To provide a dynamic definition of the problem and issue, data from a private bank in Iran, whose main purpose is profitability for shareholders, has been used during the years 2012 to 2016. After mapping the causal structure and representation of causal loops, by analysing the current feedback loops in the problem and creating appropriate recognition by examining different scenarios, a suitable and effective solution will be presented to achieve sustainable bank profitability.

## **2. Background**

After the financial crisis in 2008, many of large banks in China, Europe, and the USA set strict rules to prevent repeating such events within their banking system and financial structure. Hence, the financial structure reformation and attentions to the profitability processes of the banks have been increased. As a result, different studies and models have been carried out to investigate the banks' profitability.

Wong et al (2014) evaluated the effect of systematic decisions on the banks' profitability by a dynamic model. They investigated the effect of systematic decisions and restrictions made by governments after the 2008 financial crisis using system dynamics modelling. They considered Volcker's rule in their study, in which government officials decided to set some restrictions on the accommodation deals and hedge funds, and on the other side, they wanted to encourage the banks to focus on the fee incomes as well as offering a variety of services.

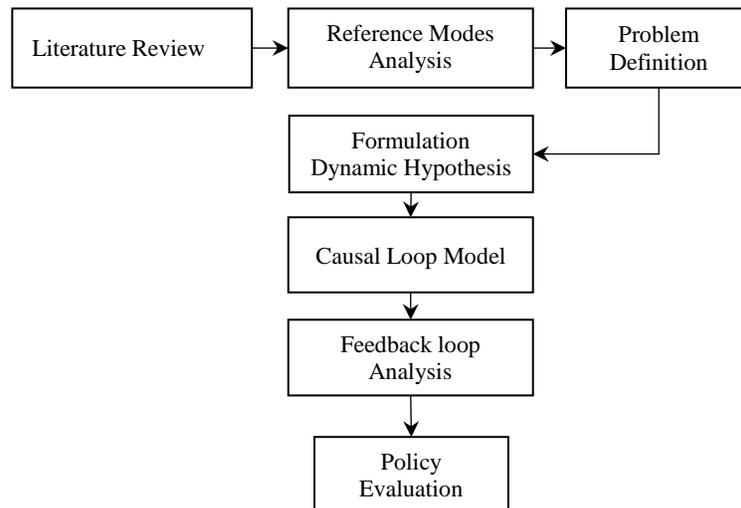
Corbae and D'erasmo (2011) presented a quantitative model of dynamics of US banking system by modelling the dynamics of banks' structure. They presented a dynamic model of banks' profitability to determine the relationship between income structure of commercial banks and available risks in loans paid by banks. They studied dominant US banks to understand how they prepare their resources for crediting their service.

Al-Tamimi and Hussein (2010) indicated that internal and external factors can affect performance of business banks. Internal factors are primarily influenced by managerial decisions like unique banks' characteristics. External factors can impact on banks' profitability including macroeconomic variables that are unmanageable by banks and usually are administrated at the governmental levels. Many studies explored relations between specific factors which rooted in either external or internal causes and overall banking performance have been carried out (Olweny and Shiphoo, 2011; Chantapong, 2005).

Naceur and Omran (2011) categorized significant factors in banks' profitability into three groups: 1) bank characteristics (bank size, risk volume, e-banking development capacity) 2) industry characteristics (market share) and 3) macroeconomic indicators (inflation and GDP variables)

### 3. Methodology

In order to represent dominated system structure on profitability paradox problem, a qualitative system dynamics methodology has been used. The system dynamics (SD) approach can be applied in both qualitative and quantitative environments. In qualitative approach, the main purpose is to identify and analyse the reinforcing and balancing feedback loops and delays. The analysis of feedback loops can lead to a proper insight from performance of a complex system. Numerous cases have been reported about the application of this method in identification and representation of a complex system structure: qualitative approach (Azizi B. et al, 2017; Tabarzan et al, 2017 and Zadfallah et al, 2017) and also quantitative approach (Abbasi et al, 2016; Abniki et al, 2017; Ahmadvand et al, 2014; Bastan et al, 2013; Bastan et al, 2017; Bastan et al, 2018a,b,c; Bastan and Shakouri, 2018; Bastan et al, 2016a,b,c; Kasiralvalad et al, 2016; Tabandeh and Bastan, 2014). However, achieving a more accurate recognition derived from interactions of loops and delays need to develop the causal qualitative model to stock and flow model, a mathematical model that using the simulation capability can display the results quantitatively. It also simulates the results of implementing various policies as a scenario in the model and provides the learning possibility from the system for decision makers. In this research, due to the objective of representing the causal structure of the formation of the profitability paradox, in order to control the complexity, a qualitative approach has been used for mapping the system. In this regard, the research methodology is designed and depicted in Figure 1.



**Figure 1.** The process of the research methodology

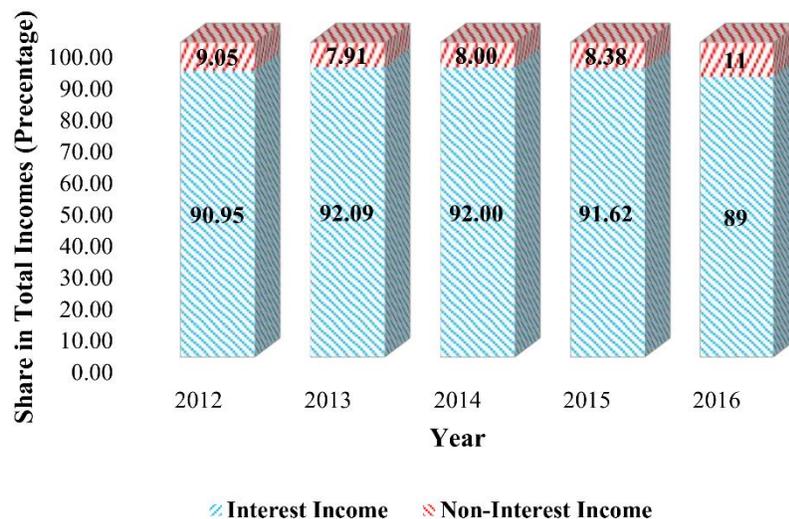
At first, by reviewing the literature and related theories to the problem, the main variables are identified as "Reference Modes" and the required data for displaying and describing the dynamics of the problem are collected and prepared. Then, by analysing the trend of reference modes, a dynamic definition of the problem is presented. In the next step, a dynamic hypothesis is formulated based on system approach for this problem. Then the causal structure of this hypothesis is represented. In the next step, the feedback loops in the causal structure are analysed in terms of their polarity and their role and effect in the problem. Now, various solutions proposed in the literature or the suggestions of managers to solve the problem are considered as a scenario for the model, and the results of its implementation on the qualitative model, are evaluated as creating positive and negative feedback loops. In the end, in terms of efficiency of scenario, a solution and problem-solving policy is considered with respect to the achieved insight of the system.

### 4. Modelling

In Iran's banking system, when a newly established credit institution wants to expand its business and turns into a bank, or if a newly established bank wants to expand its services, it needs a sufficient

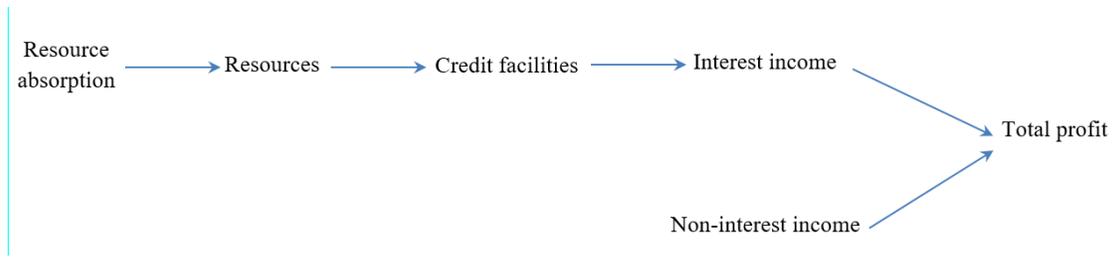
capital for business. This capital is mainly provided in two modes. In the first case, the investor, in the form of a shareholder, will provide the required capital for the establishment of the bank and the bank can invest the capital in its business. In the second case, the possibility of the required capital to establish a bank in the first stage is not feasible, the credit institution with a lower capital, obtains a license to operate more restricted than the bank to continue its business credit and profit to provide the required capital to turn into a bank. In both modes, the main goal is to gain profit and maximise the profitability. In the first mode, the bank should pay off its shareholders and investors, and in the latter case, the credit institution must obtain a good profit to raise its capital. In order to earn more profit and increase profitability, should be increased the proceeds from the business of the bank or credit institution. By considering the current types of incomes in the banking system (Bastan et al., 2016a), banks and credit institutions mainly choose to earn incomes based on providing various services and lending, this issue derived from two subjects. Firstly, in the limited space of the business of the newly established bank or a credit institution, non-interest incomes and fees cannot create a high and stable income for the bank; secondly, the acceptance of these services (electronic banking services and other fees services of the bank) has a more complex dynamic by its customers and requires the use of other mechanisms, like applying proper electronic infrastructure, branding, loyalty and development of new products and services based on customer knowledge and competing with old, dominant and with high market share, all of which are difficult and in fact impossible for a newly established bank and small credit institution.

Generally, it should be said that non-interest income, with a seemingly low income, require heavily invested in infrastructure, requiring a massive knowledge to streaming innovation and new product and service development, appropriate competitive advantage in the market, and ultimately adoption by customers. By consideration of this issue that the presentation of innovation and differentiation strategy in banking is not simple and all services are easily and with a less expense are presentable by competitors, banks naturally do not design their business models for earning such incomes, and are investing in interest incomes through grants loans to be more emphasized. In the Figure 2, the share of bank incomes has been shown in the study period.



**Figure 2.** Interest and non-interest incomes share to total bank’s incomes in years 2012-2016

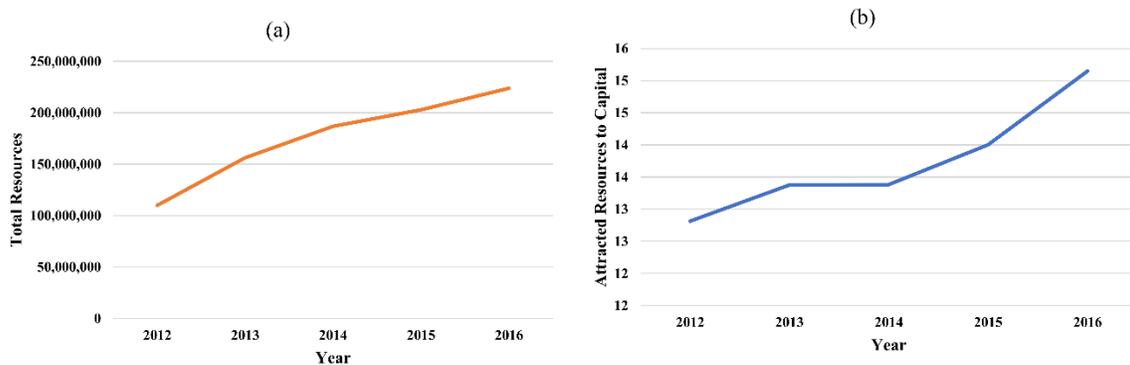
As shown, interest incomes have always taken a large part of the studied bank incomes to themselves. Banks design their business model using a linear approach to the problem of profitability which has been shown in Figure 3.



**Figure 3.** Linear approach to profitability (Bastan et al, 2016a)

In order to implement the above-mentioned approach, the bank has to offer more loans and facilities to more customers in order to earn more profit. The provision of facilities also requires proper resources, and more resources should be available in the form of investment deposits achieved from depositors to provide more facilities. The inflationary conditions of the country's economy in the period from 2011 to 2013 and the subsequent economic downturn in the 2013, along with the intense competition of the Iranian banking industry, made it difficult for banks to absorb cheap resources (deposit with low interest rate), and they had to enter the game of profit rate of deposit for a success in the resource absorption campaign. The formed intense and ominous competition for attracting more resources, in addition to increasing the cost of money by banks, also increases the resource instability and liquidity risk of the bank.

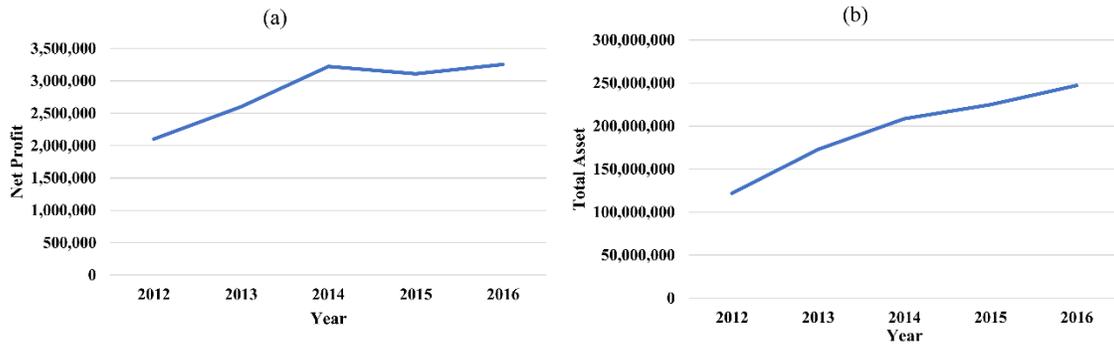
The absorption of resources with high deposit interest rate, while increasing the costs of the bank, increases the operating losses of the bank when it is accompanied by government policies to declare the instructional rate and accompany with the reduction of facilities profit rate, and the banks re-rely on the past approach to save and sustain themselves, attracting resources at higher rates than the past, and only postponing the accumulated crisis to the future with the sole purpose of purchasing time. Among the other consequences of this approach is the presence of banks in markets other than the money market, such as housing, gold and currency, as well as actively having companies, which makes the conditions harder for producers and consumers in the country. Unconventional and unplanned competition in attracting resources leads to increased resources absorbed by the bank and counts as a proper performance index in the field of resource absorption for the bank (Figure 4a).



**Figure 4.** a) The dynamic behaviour of the attracted resources (in millions of Rials); and b) The ratio of the attracted resources to the bank's capital during the research period

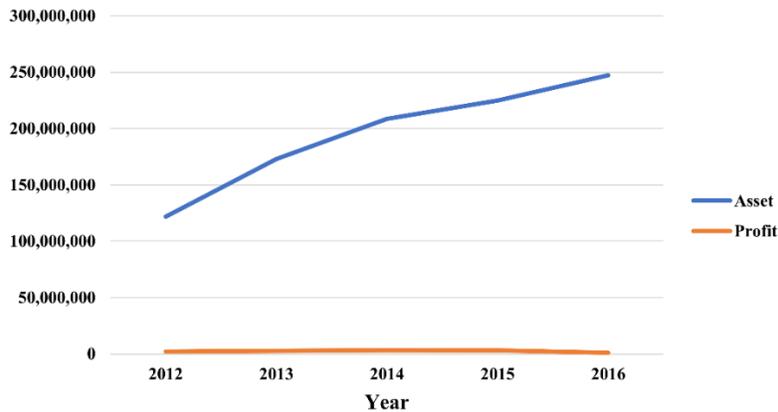
As it can be observed, in the first step, from a linear approach to profitability, the given bank appears to have succeeded in attracting deposits and resources, and by 2016 it has attracted 15 times of its capital from various types of deposits. According to the current Business Model for attracted resources after the deduction of Required Reserves and General Loan-Loss Reserves and undisclosed reserves of the Bank, the fraction of 80% of these attracted resources are spent by the provision of facilities in the

form of various contracts of participation and exchange. It should be noted that the profit from the provision of bank facilities is not a cash benefit and is considered as a profit in the financial accounting system of the bank. Granting more facilities, with the assumption of all the revenues promised, will increase the bank's profitability, but it will increase the bank's assets more rapidly, and when it is accompanied by a Basel Committee on Banking Supervision, the growth of assets is increasing and somehow the toxic asset and bank risk increases at very high rate.



**Figure 5.** a) The net profit of the bank (in million Rials); and b) The total assets of the bank at the time period of research

However, with a unilateral view at the profit, the bank has a gain in profit during the research period, as shown in Figure 5a, but the pace of further growth in the production of risk assets will have feedback consequences for the bank. In Figure 5b, the dynamical behaviour of assets added to the bank has been shown, indicating a rapid increase in bank assets.



**Figure 6.** Trend of changes in net incomes and assets added by the bank (in millions of Rials) during the time period of research

In fact, considering the growth in achieved profit and growth in the amount of produced risk assets, as shown in Figure 6, is observable. One can say that there is a significant difference between the volume of profits earned and the assets added to the bank during these years, and this could have another meaning of performance. That the bank did not succeed in terms of return on assets.

Return on assets (ROA) is a profitability evaluation indicator for an organization, as follows:

$$ROA = \frac{Net\ Income}{Total\ Assets}$$

Return on assets gives us an idea of an efficient management of using the assets to generate earnings (productive assets). This measure determines how much profits obtained from the investments.

As shown in Figure 7a, the return on assets of the bank is subject to a descended trend.

It is obvious although profit is increased, but the bank's profitability decreased. Other efficiency evaluation indicators (like ROE and ROI) also show similar behaviours on the attenuation of the profit generator system.

$$ROE = \frac{Net\ Income}{Shareholders'\ Equity}$$

This trend is for the return on equity (ROE) or shareholders' equity of return, which can be observed in Figure 7b.

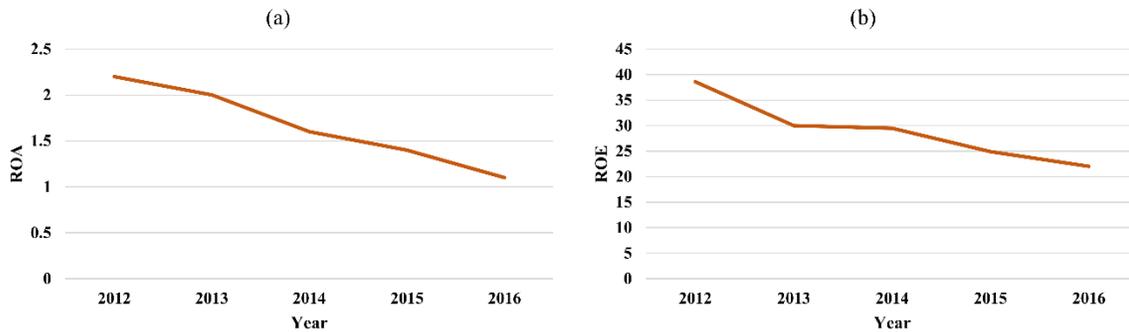


Figure 7. a) Dynamic behaviour ROA and b) Dynamic behaviour of the ROE of the studied bank in the research period

The descend trend in ROA and ROE will reduce the value of the stock market, which will cause loss to shareholders, which is a breach of the initial purpose for banking business starting. On the other hand, the continuation of this trend and the granting of more facilities to generate more interest incomes, although increasing the capital from the side of reserves; however, leads to more growth in risk-weighted assets and so reduce in capital adequacy ratio (CAR).

$$Capital\ Adequacy\ Ratio\ (CAR) = \frac{Tier\ 1\ Capital + Tier\ 2\ Capital}{Risk\ Weighted\ Assets\ (RWA)}$$

As absorbed resources increase, bank's debts increase resulting in an increase in the low-quality asset. As a result, the risk-weighted asset would be increased and so capital adequacy ratio will decrease.

By reducing the capital adequacy ratio of the bank, it must ask its shareholders to raise capital, which will result in a reduction in stock value and shareholder's profits. Also, the excessive loss of capital adequacy ratio leads to a bankruptcy and a greater loss of shareholders' equity.

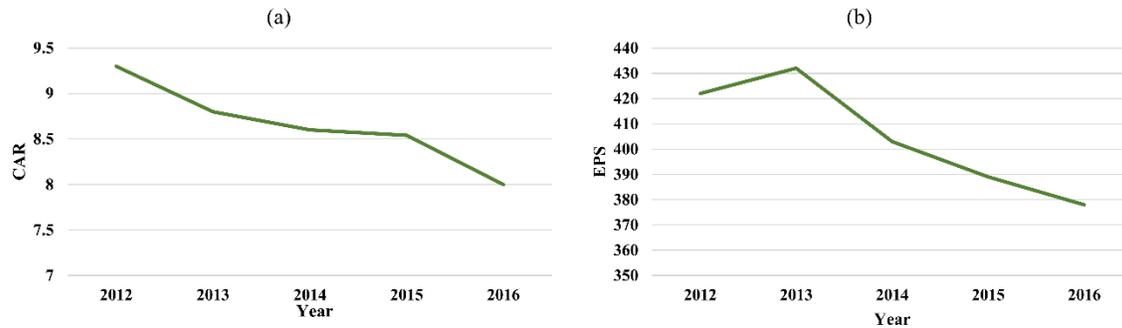


Figure 8. a) The trend of capital adequacy ratios and b) Earnings per share index (EPS) of the bank examined during the research period

As it can be observed, the current business model of Iranian banks cannot, at any rate, have sustainable profits for its shareholders, and by acquiring such performance indicators, it cannot create a bank with the minimum international financial standards. This process, which has begun by absorbing resources in the form of deposits and in order to earn profits and eventually leading to declines in Earnings per share (EPS), Capital Adequacy Ratio and equity share values, is a paradox for these banks' profitability. Analysis of this phenomenon is the main purpose of this research.

#### **4.1. Dynamic hypothesis and Causal Model**

The bank will have two sources to start its own credit business; one is the shareholders' equity and base capital, which is referred to as Shareholders' Equity, and the other resources that attract customers in the form of Deposits. By receiving resources in the form of deposits, the bank creates debt for itself and thus provides its asset by debt and share. There are two main mechanisms for absorbed resources. Banks spend less than 1.5% of attracted resources on advertising and costs to encourage customers to attract low-cost (by low interest rate) deposits and receive up to 2.5% fee for their loan deposits (a total of 4%), in order to attract low-cost and mainly free-borrowed resources. The second mechanism for attracting resources is using the interest rate as a leverage for attracting resources and increasing the deposit interest rate is higher than the central bank's regulatory rate and expected in the banking market. Thus, even if there is a one percent difference in the interest rate, there are many sources in the form of investment deposits of bank attraction. By increasing the attracted resources, the direct and indirect costs of resource attraction increase. The cost increase, will be an adjusting factor to attracting more resources. There is another adjusting factor in attracting resources in banks that is related to compliance with the capital adequacy ratio, which applies a limit to attract resources and generate debt to the bank.

The bank treats with attracted resources in this way that it deposits 11% of the attracted resources in the form of required reserves investigated at the Central Bank, which is included in the balance sheet under the title of account receivable from the central bank in the bank's assets section. Approximately three to five percent of the attracted resources are kept in the backbone to support the liquidity risk of the bank. Approximately four to six percent of the attracted resources by the bank are spent on purchasing fixed assets, such as land and housing, and so on. By considering the above deductions, the bank uses 80% of the attracted resources in the form of customer's deposits to the fixed profit rate contract that called exchange contract and also in the form of expected-profit rate contract as a contribution contract (Joint Venture). By this loans, the banks system identifies income in your accounting. Of course, it should be noted that this incomes is not cash income and is an income that is committed to be realized, and may be caused by non-repayment of facilities and not only incomes cannot be realized, but also caused losses due to the liquidation of the primary amount of money.

This issue is one of the major problems in the accounting system of Iran's banking system. In the past, many banks have identified such incomes as profits and distributed among their shareholders at the end of the year, after a period when incomes were not realized, with late payment and fines and extension, re-

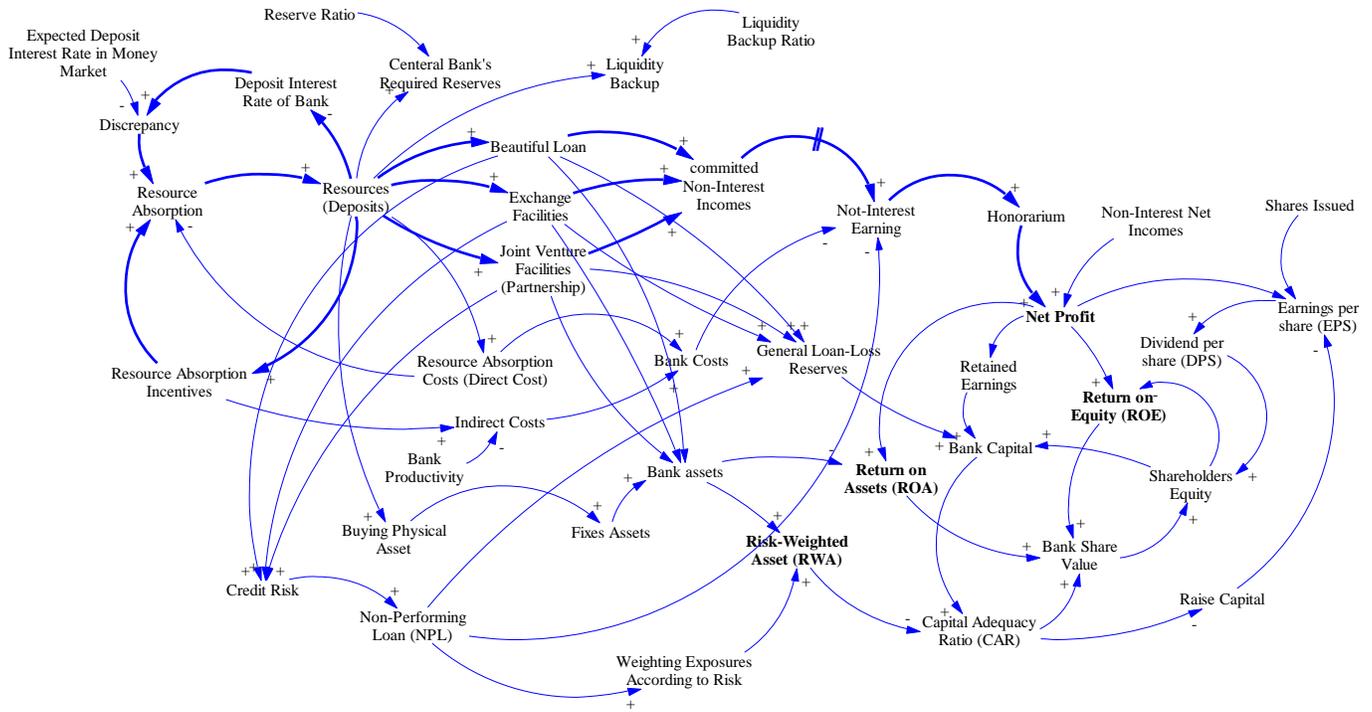
identify another income, repeats the wrong Loop. Recently, with the requirement to prepare accounting reports based on International Financial Reporting Standards (IFRS), this problem is being resolved for these banks.

The facility provided by the bank generates interest income for the bank due to the time and time spent on obtaining it. The bank should deduct three percent of its operating expenses as interest income from its financial intermediation with the funds of the people as a benefit, after deducting the direct costs of attracting resources, which is the same as the deposit profits for the attraction of the source (for an average of 15 percent). It should three percent of operational expenses be withdrawal as honorarium of finance intermediation with people's accounts as its own profit and there were a rate, they would pay them for the definitive profits to the depositary. It should be noted, however, that for reasons such as attracting resources with a high interest rate of deposit and an inappropriate use of expenses, the amount of honorarium may be zero and even minus and the bank may even bear losses. By consideration this kind of profit, as well as the benefits from providing services and fees received from customers, will benefit the bank. After identifying the profit from the bank's credit and service business, earnings per share (EPS) is determined by dividing the earnings per share. In the bank, about 40 to 60 percent of it is paid under dividend per share (DPS) to the shareholder, and the remainder is called "accumulated profit" reserves to increase capital and business development.

After that, by providing more facilities, the bank's credit risks are increased and the banks' current demands to the past, late, and suspicious ends tend to be lowered, which will result in a reduction in the realized income and result in profits. Also, the bank should save 1.5% of its last year net assets after deducting collateral as General Loan-Loss Reserves in order to cover facility deferral. Also the rates of 10, 20, and 50 to 100 percent respectively for different classes of liabilities in past, deferred, and suspect categories should save stocks of undisclosed reserves. The total of General Loan-Loss Reserves and undisclosed reserves are considered as supplementary capital to bank capital in the balance sheet of the bank.

The problem starts here: loans and facilities that are in fact bank assets, in the process of weighting assets in terms of risk have the coefficient of 100%, and risk assets increase at high rate. The capital adequacy ratio, which is based on capital and risk weighted assets, increases with increasing capital through reserves, but with a more rapid increase in risk assets, it will decrease more sharply. Reducing the capital adequacy ratio can lead to a bank failure, and in order to avoid this, the bank must increase its capital, and then the shareholder's Earnings per share (EPS) should be reduced, and this is a violation of the primary purpose of increasing shareholders' profits. This loop is an ominous positive loop that dynamically reduces the sufficiency of capital and requires a steady increase in capital. Delayed facilities, which is one of the consequences of providing more facilities, exacerbate the risk of asset rises and add to the problem. After that, with the faster increase of the bank's assets, relative to the growth of profit and capital, the performance indicators of the return on assets and the efficiency of the shareholders' equity, which are the most important criteria for the profitability of the bank, will decrease and reduce the value of the bank's shares and, as a result will cause the loss for shareholders of the bank. Reducing the proportion of capital adequacy also exacerbates the decline in the value of shareholders' equity value.

The dynamic hypothesis can be summarized as follows:



**Figure 9.** The Causal Model of Problem

#### 4.2. Feedback loop analysis

By simplifying the above causal model, the following model can be used to analyze the feedback loops.

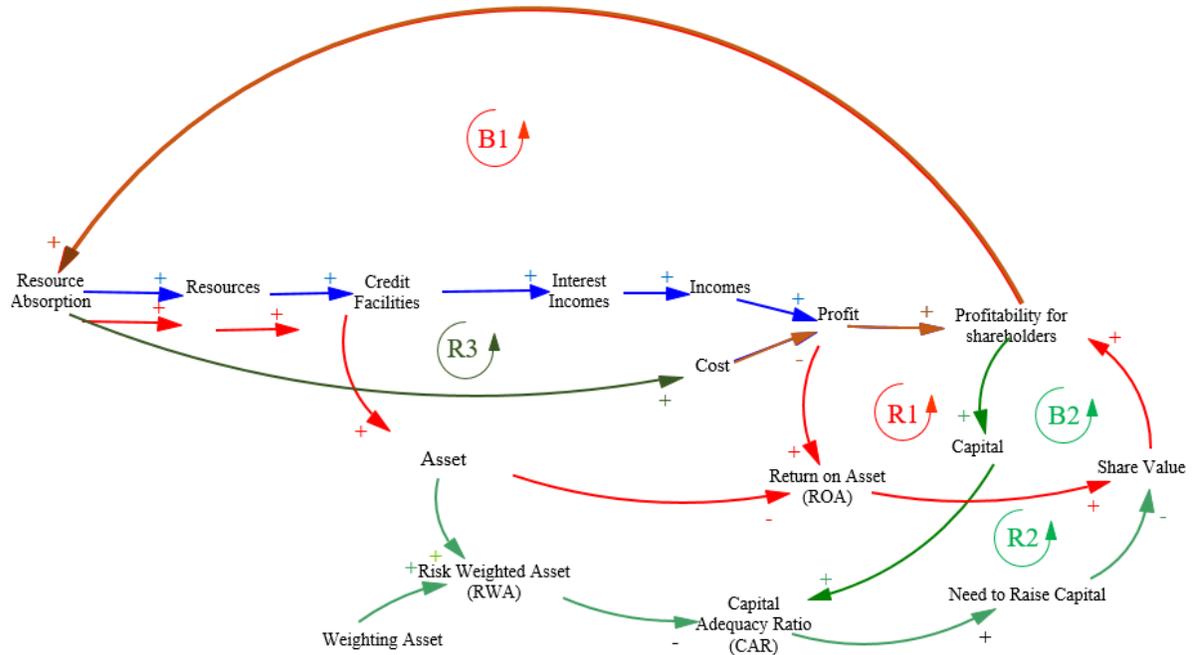


Figure 10. Major Causal Loops

As it can be observed, the Loop R1 is the same as the basic approach to designing a business model for banks. However, with a recursive and repeating look, the above linear approach can be considered as a positive feedback loop, but it can be observed that this loop is not the only effective loop in profitability, and in addition, the profit is not only intensified in no Loop feedback, but surrounded by numerous balancing loop or limiting to growth structures. Also, an important indicator of capital adequacy in a loop is a declining view that over time will decrease significantly. The types of loops in the simplified model are presented in the Table 1.

Table 1. The Major Causal Loops Description

| Loop | Loop Function                                  | Consequences                                                                                                                                                    | Loop type   |
|------|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| R1   | absorption resources in order to earn profit   | The increase in resources will increase the facilities and the bank's earnings and, as a result, profits                                                        | Reinforcing |
| B1   | Impact of resource absorption costs on profits | Increasing the costs of absorbing is a limit to mechanism to absorb resources and thereby profitability                                                         | Balancing   |
| B2   | Impact of asset ups on share value             | Increasing assets and decreasing the share value will reduce profitability for shareholders.                                                                    | Balancing   |
| B3   | ROA Impact on Profitability                    | Reducing ROA reduces profits, reduces stock values, and decreases profitability for shareholders.                                                               | Balancing   |
| B4   | Impact of capital adequacy on share value      | Increasing risk assets leads to a reduction in the capital adequacy ratio and a drop in share value and profitability.                                          | Balancing   |
| R2   | The Impact of Assets on CWR                    | Increasing assets led to an increase in Risk-Weighted Assets (RWA) and a reduction in the Capital Adequacy Ratio (CWR), resulting in a drop in the share value. | Reinforcing |

As it can be observed, the main loops of profit-making shareholders are balanced and limiting feedback loops. Of course, in the macro model, the final profit variable within the 41 feedback Loops, the value of the equity within the 43 Loop and the Capital Adequacy Ratio in the 7 Loops are different, the interaction of these loops due to the existence of time delays among a number of them, in the qualitative analysis mode is not feasible and requires the presentation of a mathematical model with the ability to simulate the results. Considering that the only representation of the constructive structure of bankruptcy behaviour is the main objective of this study, the stock and flow model from the problem is beyond the scope of the present research.

## **5. Conclusions**

In this paper, business structures of banks have been investigated. On the other hand, we came up with this question that whether increasing of profits is sufficient for the growth of the financial indicators of a bank or profits should be seen as a profitability system comprising of components and relationships. Thus, the profitability of the bank was drawn a dynamic system including feedback structure, using a system dynamics approach. As mentioned in previous sections, one of the main problems with banks is that unlike their net income and profit have been increased in years, but other indicators of banks, including ROA, ROE and CAR, have been decreased. This is an alarm for the system which shows that there are some gray functional loops within the system. These loops have been activated through implementing specific policies and introducing some dynamics of the system.

Based on this study, it could be said that absorbing deposits as resources or focusing only on the profits and their growth would lead to a reduction in profitability and public interests of the bank shares in the stock market in the long term. This means that the bank should absorb more resources to credit more facilities. So these resources have been allocated to crediting facilities, contributions, and similar functions. Finally, the bank would have an income through the difference between fee incomes after clearing the debts. But this resource allocation would increase the bank's risk-weighted assets, which would decrease its capital adequacy ratio. Since banks cannot have a capital adequacy ratio below 8%, according to Central Bank's policies, they would increase their capital. Increasing capitals would decrease the EPS and ROE. So the rate of profit growth of the bank would decrease in the long term, leading to a reduction in public interests for investment in banks and for buying shares. Then the bank would run into trouble for absorbing resources in the long term.

This situation would occur if the bank focuses on absorbing more resources to increase interest Incomes. In fact, as shown in the model, if the bank allocates huge amounts of its resources on non-interest incomes such as fee Incomes, it is not necessary to evaluate weighted assets and capital adequacy. This part of incomes would increase total profit and profitability ratios, then the growth rate of shares and public interests for investing in banks would increase. Based on a recognition obtained from feedback loops of business and profitability structure of Iranian banks, it could be said that activating the loops related to the establishment and development of fee incomes would not have the consequences of negative feedbacks due to the continuation and development of interest incomes. According to this systemic view, it could be explained that developing fee incomes and abandoning incomes increasing capital and facility-related incomes, are appropriate approaches for resolving profitability paradox, in which those banks could not resolve this paradox were defined as bad banks.

It should be remembered that the main problem in creating a profitability paradox is the growth of assets over profits, due to the emphasis on earning interest incomes in the business model and the provision of facilities and loans for getting profit. The provision of facilities and loans has led to an increase in risk-weighted assets (RWA) and a reduction in the Bank's capital adequacy ratio (CAR), which could push the bank to a state of bankruptcy. The drop in the capital adequacy index as a result of the increase in risk weighted assets will also result in a decrease in share value in stock market and the profitability of shareholders on the other hand. Hence, it could be say that the main solution to exit this paradox is to earn profit without increasing assets, especially without increasing the amount of risk

weighted assets and so without increasing the denominator of capital adequacy ratio. It can be said that earning profit from the side of providing various services and obtaining service fees from customers can lead to earning profit without increasing assets in the bank. This policy is introduced as the main way to exit of the paradox of profitability. Banks have to design a wide range of services at both branch offices and E-banking and mobile-banking, offering innovations in providing new products, deploying appropriate infrastructure to provide faster services, required support, and marketing target customers increase level of service acceptance and add it to their fee incomes and in this way earning a sustainable profit to their shareholders by achieving profits without increasing toxic and risk assets.

It is suggested to develop a quantitative model from available dynamics in the profitability structure of the bank. This could be an appropriate tool for comparison of what-if analysis to make more efficient policies for improving system functions. In future, dynamics of non-interest Incomes could also be discussed in detail and their impacts on the bank's profitability could be analyzed accurately.

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