The Survey of the Relationship Between Credit Risk Management and Deferred Receivables of Mellat Bank (Case Study: Semnan Province, Mellat Bank Branches Management)

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Abstract: The aim of the current research is investigating relationship between credit risk management and deferred receivables of Mellat Bank in form of a case study in Mellat Bank Branches Management of Semnan Province. Also, the statistical sample of the research is branch management of Mellat Bank in Semnan Province in series of 2001-2012. Current research has descriptive method and it is a correlation one. The analysis method of data has been correlation and variance analysis where it tries to explain cause and effect relationship between credit risk management with deferred receivables in Mellat Bank Branch management of Semnan Province. The method as an independent variable includes: credit risk of loans received by clients individually and credit risk of portfolio which is equivalent to risk analysis of portfolio. The results of the current research show that the relationship between credit risk management with inferred receivables of Mellat Bank in Semann Province is meaningful. In error level of 5% and also in Certainty level of 95% it indicates a meaningful relationship between two variables of credit risk management with deferred receivables of Mellat Bank in Semnan Province. Therefore, according to the results of the current research we can argue that in level of 95% certainty, presence of correlation between the two variables is approved.

Key words: Credit risk management, inferred receivables, branches management of Mellat Bank in Seman Province, investigating, relationship

INTRODUCTION

Constant growth and development of every country needs correct guidance of surplus resources of those save money towards productive investing. If extra resources of those save money are lead towards investors and those with ability of optimum usage of them towards macroeconomic goals through efficient fund market, then we can be hopeful that goals of plans specified for the economy will be met. Since, the biggest size of economic transacting of Iran is met through baking system, correct function of the banking system in Iran plays a key role in improving economic activities (Asli, 2011).

Financial institutions as economic center are active in two big markets of capital and fund and providing funds they make fund and capital flow in the society. In this process, financial institution was facing different risks. Diversity of such risks and sometimes their intensities is in a level that if financial institutions cannot control them correctly, they may be devastated (Asli, 2011).

In this respect, to gain more profit, financial and credit institutions must be sure about full repayment of the facilities received by clients, since presence of asymmetric data in loan markets is definite. So in such a condition role of two topics of screening and supervision is highly significant in order to conduct processes of providing facilities (Asli, 2011).

Since, activities of insurance companies are like activities of the banks in order to manage credit risks in banks, we can model the way of protecting risks made by insurance companies. By making them aware of the risk level according to assets provided, researcher can determine interest rate of facilities. This way we can make the applicant to accept a part of the risk and this way we can reduce non-moral deeds risk (Asli, 2011).

Hence, banks as financial institution should meet credit risk of each one of debtors. This as main basis of pricing a loan specifies fine interest rate and assurance value needed in each load receiver case. At the same time, they should care about credit quality of portfolio as a set of debts, since continuity of bank activities highly depends on their performance and size of credit losses in a certain period (Pour *et al.*, 2012).

Credit risks originates from the truth that counterpart may not be able to do their commitments or maybe they don't want to do so. Traditionally, the effect of such risk

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can be measured with the Rial Fee resulting from default of contract. Losses resulting from credit risk may be established before real occurrence of default from counterpart.

Therefore, banks communicate with types of financial and fund markets due to intermediate of investors and loan receivers. So, they repeatedly face various risks so that they may face increase or reduction of one or several types of risk when they enter or exit a market.

Therefore, in the current study validation and management of credit card were discussed which are one of the key arguments in modern banking. Here, we try to investigate and test using branches of Mellat Bank of Semnan Province. Like market risk investigations of credit risk are conducted in two levels.

The relationship between credit risks of loans received by clients individually is investigated with inferred receivables of Mellat Bank in Semnan Province. The relationship between credit risks of loans received by clients non-individually is investigated with inferred receivables of Mellat Bank in Semnan Province. Finally, it tries to test general goal of the research; investigating the relationship between credit risk management with inferred receivables of Mellat Bank in form of a case study in branches management of Mellat Bank in Semnan Province.

Literature review

Bank and banking: Today, banking is one of the most significant economic sectors. Banks on one hand facilitate business and trading transactions by organizing receiving and paying and this way they make the markets improve. On the other hand, they set the stage for their economic prosperity by equipping small and large savings and leading them towards producing institutions.

Economic growth and development of every country needs right transferring of surplus financial resources of those save money for investors. So, presence of an efficient financial market where financial resources are led to the best investing positions is very important.

On one hand, most of transactions in Iran are done through banking system and correct function of the system has a key role in improving economic activities.

On the other hand, studying factors which are effective on bank profiting which began from the begging of 1979 is one of the first necessities for improvement, providing and allocation of capital and financial resources in a desirable way.

Banking necessity: Across the globe, banking industry is one of the most important economic elements of every country and due to presentation of various financial and credit services it plays a key role in economic development and growth of the countries. So, they can be mentioned as motive force, accelerator and organizer power. Having a look at the history of banks we can learn that moreover fund's role in internal and external transactions, these institutions are responsible for financial and economic transactions. Since, the beginning of their formation they have been honest with people, they made economic transactions easy and had a key role in economy. Therefore, development and improvement of banking system, especially providing facilities along with efficient system all have a key role in development of economic and baking system of the country (Asli, 2011).

Therefore, banks depend on economic development through financial services they provide. It is said that their mediating role is an organizer factor for economic growth. Effective and efficient function of banking system is a constant financial index during time to a extent that banks increase their credit for the people for productive activities which can accelerate economic growth of the country.

Performance of financial credit of the banks can raise ability of investors for exploiting fine economic activities which are profitable. Establishing financial credit is the most important income resource the banks own (Kargi, 2011).

Risk theory and theoretical dimensions of risk: Risk is a type of lack of certainty in the future which has the ability of calculation (Ilimiz, Chester Arthur and Hine, Richard). If level of lack of certainty in future cannot be calculated, then it is not a risk, it is merely lack of certainty. Hence, we can manage and control it due to calculation of lack of certainty in framework of risk. In Chinese Language, risk can be defined in two signs of risk and opportunity (Raei and Saeedy, 2008).

Risk includes the possibility of difference in real return from the return expected (based on Rial or percent). Also in financial management risk is a condition where occurrence of events is probable.

Risk entered literature of financial market since the beginning of the present century. Its life circle began from the theoretical basis and reached to presenting mental models which are different with risk. After these two steps, they entered objective developments and exploiting statistic and math they led to risk measurement in quantitative form (Hossainabadi, 2001).

Fig. 1: Classification of risk levels

Markowitz (1921) was an American Scientist who made risk quantitative. He announced that financial decisions must be made based on return risk; they should provide investor the lowest and highest level of risk in a certain level of return.

Risk classification: From the beginning, banks and financial institutions have faced too many risks due to the nature of their activities but due to vastness and diversity of bank activities, researchers don't have the same idea on types of bank operation risks, so that they consider credit risk, interest rate and liquidity risk main risks of banking. So we can classify the risks which influence on financial institutions into three levels (Fig. 1).

First level (risks which are not influenced by financial institutions)
Second level: Risks are influenced by financial institutions. But the level of influence is low.

Third level: Risks which are influenced by financial institutions but financial institutions can control and manage them by imposing some methods and tools.

Among risks which intimidate banks and financial institutions, credit risk is regarded as the most important risk due to centrality, operation size and sensitivity. Therefore, only in third-level risks financial institution can defeat them by methods and risk management tools. Therefore, centrality of argument is third-level risks which are brought in Fig. 2 (Asli, 2011).

Such risks influence on each other. Financial institutions have to consider reactions of such risks on each other, since one risk may have negative correlation with another risk. These two risks can cover each other or the opposite, they may have a negative or complex effect on total portfolio of financial institution. Therefore, role of integrated management in financial institution risks will be revealed.

Fig. 2: Risks of financial institutions

Risk significance: Risk is one of the most important features in formation of decision in investing field and affairs related to financial markets and various types of economic activities. In most economic books, three elements of work, land and investment are mentioned as main input of production. But we can realize that three factors are necessary condition for production. The only condition in process of production is risk agent. In other words, if there are three factors and producers don't care about probable losses of the process, then production will not be formed. Hence, in some studies risk is regarded as the forth factor in process of production.

Methods of risk calculations: There are various methods for calculating risk whose most important ones are as follows.

Method of value at risk (Var) this method was first presented by Weather Stone in 1994. In 1995, a committee called" supervisor on activities of international banks" forced banks to use such model for specifying their level of capital adequacy. This method is meeting (compensating) the maximum loss in a certain level of certainty (for example 98%) in a certain time. Using such method, current risk can be measured.

Test of acute condition this approach is a tool for estimating maximum level of potential economic losses in abnormal condition of market. The aim of the tools is effort for increasing risk transparency through marketing of potential events and they have the least probability so that such risky events are located out of statistical range used in the previous method.

Risk protection most of the companies which are active in production, retailing, wholesale or presenting

services don't have sufficient skills on predicting variables like interest rate, exchange rate and product price. So, it is logical that they try to protect (covering) risk resulting from the variables mentioned and this way companies are able to focus on their main activities.

Strategy of covering risk in buying position (Long Hedges) traders who choose buying transaction position in the future contract in order to protect risk are called to use risk protection risk in buying position. Such a strategy is suitable for a company which intends to buy a product in the future and tries to stabilize its future price at the moment.

Strategy of risk protection during selling position (Short Hedges) such a strategy is choosing selling transaction position in the future contracts and is suitable only when risk protector owns asset from before and is expected to sell part of it in a certain time in the future. For example, a farmer who owns a large portion of a product and knows that their product is ready to be sold two months later can use such a strategy.

Risk management: Generally, risk was looked upon from one dimension and qualitative point of view until fifties. The American Scientist was the first to make risk quantitative. After that by presenting more complete comments risk phenomenon could be measured and risk measuring was at the center of attention in companies, institutions and financial institutions.

From what is advised in macro level, it is somehow different while for micro units arguments such as identification, prevention from risk, reform conduct, buying protection (coverage) and threshold definition are highly significant. For macro sector, it is not that important from aspect of arranging supervision rules, presenting solutions and developing markets. In general, risk management is the process of measuring or assessing risk and then plan of strategies for running risk (Asli, 2011).

In general, strategies applied in banks and financial institutions include risk transferring, prevention from risk, reducing negative effects of risk or accepting a part of all the consequences of a certain risk. It is clear that using attitude of general director and managers helps institution and organizations find the way of effective running by replacing a comprehensive strategy instead of a single method (Ahaei, 2007).

The most important bank risks (the most significant risks facing financial institutions in which banks can be classified into three sets)
Credit risk: The risk associated with losses resulting from lack of repaying or repaying with delay. Market risk

risk related to losses imposed on bank assets based on changes in market (exchange rate, interest rate, stock price and so on).

Operational risk: The risk which is related to direct or indirect losses whose origin is insufficient or incorrect processes inside organization, people, system or events out of organization.

The need to identify and manage financial and bank risks made presence of an international center necessary, because it is the duty and responsibility of such centers to have policy-making and declare instruction regarding risk in organizations. Hence, Bank of International Settlement (BIS) set up Bassel Committee whose main duty is supervising capital condition of banks in various countries. Such a committee is also responsible for determining standards related to bank risks.

Based on provisions of Bassel Committee, capital adequacy is a criterion for measuring bank capital and is expressed in percentage. The minimum level of capital adequacy was considered 8% according to Bassel instruction. In its new instruction in 1992, Bassel Committee established new modifications in the way of calculation and also in the ratio of capital adequacy. Adequacy capital is defined based on provisions of Bassel Committee (1) and (2):

Credit risk definition: Credit risk is one of the most important elements in risk production in banks and financial institutions. Credit risk can be defined as an unexpected event which happens in form of modification in asset value or debts (Asli, 2011).

Such a risk originates from lack of ability or interest in paying their debts to banks (dishonor) which is synonym of credit risk. Generally following four traditional indices are considered widely in order to determine level of credit risks for banks. Its increase indicates risk and its reduction means risk reduction.

Credit risk definition: The probability of lack of meeting commitment due to certain condition of the person who committed to bank is called credit risk. This type of risk can increase in unsuitable economic condition such as downturn and economic crisis.

Effect of credit risk on bank or financial institutions: Theoretically, dishonor occurs when asset value of companies is less than debt value. Therefore, dishonor risk is of the most important risks which influence on banks and financial institutions because in this condition few clients can bring about unexpected loss in an organization.

Table 1: The research summary conducted on the research topic

Order	Researcher's name	Research title	Results
1	Mahdavi Najm Abadi	Main differences in distributing risk in two banking systems (Islamic and traditional)	The research results indicated that risk management in Islamic banking is much harder than traditional banking according to its certain features
2	Abolhassani and Moqadam (2008)	Survey on risk types and the methods of managing it in interest free banking	They considered common risk management risks suitable for applying in interest free banking such as changing assets to portfolio. And they pointed out some methods and techniques for applying in interest free banking
3	Shamsi (2004)	Designing and explaining credit risk model in banking system of Iran	The most efficiency for predicting credit risk is related to artificial neural network and logistic regression. Model of linear probability does not have sufficient efficiency for predicting credit risk of clients
4	Amel	Approach of credit ranking in trading banking	After validation of the model with regression analysis, his colleagues found out data protective analysis is able to estimate credit rankings of companies and has efficiency needed for credit scoring
5	Al-Khouri (2011)	Effect of risk features for bank and general condition of banking	The results indicated that financial credit risk, liquidity risk and capital risk are key factors which can influence on bank performance, especially when profiting is measured with asset return. While, the only risk which can influence on profiting happens only when it is measured with income return. And it is liquidity risk
6	Ipour and Lafont	Banking performance with the presence of risk for banking industry of Costa Rica during 1988-2007	The results indicate organized changes are followed by performance improvements. And the risk can justify efficiency and asset return. While level of capital adequacy has a direct and positive effect on credit margin of network profit

Every failure in repaying facilities can reduce asset value of banks and may face some problems for banks in meeting their commitments. On the other hand, it can reduce level of profit and this way banks may not achieve their first predictions. As a result, they may not be able to pay stockholders and those save money their interest and this will have a direct effect on position of bank, stockholders and those who save money.

The research background: There have been too many studies on studying the relationship between credit risk management with inferred receivables of banks. For example we can point out too many studies which have been done on risks available in Islamic Banking. Also in an article called" position of investing tools and Islamic financial institution in financial and international systems in risk management and challenges available", Sandra John and Variko dealt with complexities of financial provision through cooperative methods and risks resulting from it in Islamic Banking. Briefly, some of studies conducted on the research topic are presented in Table 1.

MATERIALS AND METHODS

The research method: Current research is an applied one, since it describes current condition it is regarded as descriptive research. Since, it investigated the relationship between credit risk management with inferred receivables of Mellat Bank in form of a case study in branch management of Mellat Bank in Semnan Province, it is correlation one.

Statistical society: Statistical society of the research is in form of a case study in branch management of Mellat Bank in Semnan Province based on time series between 2002-2012.

Sample size: To choose the sample in the current research, spatial domain and also statistical society of the current research are in form of a case study in branch management of Mellat Bank in Semnan Province based on time series during 2002-2012.

Determining sample size: In this research, to choose the sample first all the data related to facilities of branch management of Mellat Bank in Semnan Province during 2002-2012 were chosen. Then data which were not identified in time series of criteria mentioned before were removed from the society. After specifying measurable data, first a study was conducted based on the research hypothesis. Then samples needed were extracted based on Cochran sampling equation. Equation for deterring Cochran sample size:

$$n = \frac{\dfrac{z^2}{2d^2}}{1 + \dfrac{(\dfrac{z^2}{2d^2} - 1)}{N}}$$

Where:

z = Standard norm = 1.96

D = Certainty coefficient = 0/05

N = Size of statistical society = 121.039 data related to facilities of branch management of Mellat Bank of Semnan Province

Table 2: Identifying nature of inferred receivables

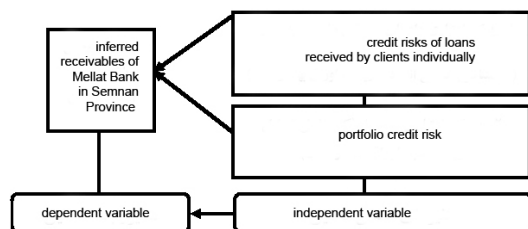| Order	Receivable class	Number of days	Penalty rate (%)
1	Document past Due Receivable (DPDR)	From 60-180 day	6
2	Document Pending Demands (DPD)	From 181-540 day	10
3	Document of Doubtful Receivables (DDR)	From 541 das to receivable receipt	14

Fig. 3: Theoretical framework of the research

Table 3: Bank interest rate

Years	Bank interest rate (%)
2002	12
2003	12
2004	12
2005	14
2006	16
2007	16
2008	17
2009	17
2010	19
2011	21
2012	22

According to data above, sample size is as follows which is equal to 383 data related to facilities of branch management of Mellat Bank of Semnan Province. Its sample size has been nearly 32%:

$$n = 0.3163729122434907 \approx 0.032 = 32\% \text{ N}$$

Tools for gathering data (the methods of gathering data in the research are generally classified into two methods of library and field)

Calculating credit risk: The most important factor for banks when they face a client who needs loan is receiving original loan and its profit which they provide and the most important factor in credit risk of clients is level of failure to pay debts (Fig. 3). Fee of punishment for each client is calculated according to price and type of loan received through following equations:

$$D = \frac{\sum_{i=1}^{n} Xi \times Ti \times (R_1 + R_2)}{365}$$

Where:

Xi = Part of loan which was paid Ti days later than specified date

Ti = Days which passes from date of paying fee Xi

R_1 = Bank interest rate related to loan received

R_2 = Rate of bank punishment (penalty) which is 6%

Credit of i times company on lack of repaying or paying debt which indicates credit risk of company can be calculated through following equation:

$$R_i = \left(1 - \frac{D_i}{M_i}\right) \times 100$$

Where:

R_i = Credit risk of i times company

D_i = Level of punishment of i times company in loan for Mi fee

M_i = Level of loan received by i times company

It is worth to mention that if punishment fee is received more than original amount, then the company credit will be considered zero. This credit value (Ri) for Mellat Bank of Islamic Republic of Iran whose clients received loan from bank is calculated and to produce estimation function, credit level of loan applicant companies was calculated using the model HHONN (Table 2 and 3).

Analysis method of data: In the current research, two statistical types of descriptive and inferential were used for analyzing data. After extracting data, abundance and percentage methods were used in order to investigate demographic factor. In this research, after gathering through financial information system of Mellat Bank of Semnan Province and extracting them, SPSS software was applied for converting primary data to usable state. Then we tried to extract descriptive statistic by classifying primary information. After that classified data turned into abundance forms, abundance percent, mean statistical and one-dimensional and two dimensional tables.

In this research sampling method was used and the results gained out of the sample studying were generalized to statistical society. Inferential statistic was used for analyzing data. To test hypotheses, inferential statistic values and inferential statistic methods were used such as K square test and Pearson correlation coefficient. To answer the research questions, mean standard deviation and middle ST were used.

RESULTS AND DISCUSSION

Data analysis: In this step, using primary data variables are first calculated and extracted and then using right tests, information processing will be formed using software related.

Statistical description of data: statistical methods in quantitative analysis are used in two descriptive and inferential ways which this process is one of the most important sections of every scientific research. In this study, statistical features of time series, indices return and shares are presented. Such features include Kurtosis, skewness, mean, number of observation and so on. As it is observed, in none of time series available in the panels, normalization hypothesis exists. Also the chart related to kurtosis core which is associated with every time series is presented in the parenthesis (Table 4-7).

Test of determining variable normality Kolmogorov-Smirnov test): For hypothesis of investigating data distribution's being normal in statistical society of the research, Kolmogorov-Smirnov test was used:

- H_0: data are normal
- H_1: data are not normal

To investigate data distribution's being normal in statistical society of the research, Kolmogorov-Smirnov test was used whose results are in Table 8-10.

As you can observe in, level of research error for each variable is more than level of research error (0.05), therefore data distribution in the statistical society was normal as a result parametric statistic will be used for analyzing data.

Test of research hypotheses
Results of the first research hypothesis test: Main and first hypothesis of the research: there is a meaningful relationship between managing credit risk of loan received by clients with deferred receivables of Mellat Bank in Semnan Province:

- H_0: there is NOT a meaningful relationship between managing credit risk of loan received by clients individually with deferred receivables of Mellat Bank in Semnan Province

Table 4: Test of describing feature of statistical sample of the research during 2002-2012

Descriptive statistics

Variables	N	Min.	Max.	Mean	SD
DPDR…AC1…Y_1	11	8.600	10.45	9.75200	0.67385
DPD…AC2…Y_2	11	8.760	11.65	9.56520	0.77340
DDR…AC3…Y_3	11	7.670	11.42	9.45020	1.61389
CRM…X_{it}	11	11.55	14.90	12.9687	1.30196
List wise (N)	11				

Rresearch findings (calculated by software SPSS, Excel)

Table 5: Test of describing features of statistical sample of the research

	Descriptive statistic					Skewness		Kurtosis	
	Statistic								
Variables	N	Range	Min.	Sum	Mean (SE)	Statistic	SE	Statistic	SE
DPDR…AC1…Y_1	11	1.85	8.60	107.27	0.20317	-0.854	0.661	-0.745	1.279
DPD…AC2…Y_2	11	2.88	8.76	105.22	0.23320	2.192	0.661	5.807	1.279
DDR…AC3…Y_3	11	3.75	7.67	103.95	0.48661	0.216	0.661	-2.324	1.279
CRM…X_{it}	11	3.34	11.55	11.55	0.39256	0.673	0.661	-1.535	1.279
List wise (N)	11	-	-	-	-	-	-	-	-

Table 6: Test of describing feature of statistical sample of research

Descriptive statistics

Variables	N	Range	Min.	Sum	Variance
DPDR…AC1…Y1	11	1.30	10.26	121.50	0.143
DPD…AC2…Y2	11	2.94	10.09	119.44	0.723
DDR…AC3…Y3	11	4.07	8.870	118.18	3.686
CRM…Xit	11	3.34	11.55	142.66	1.695
Listwise (N)	11	-	-	-	-

Table 7: Test of describing feature of statistical sample of research

	Statistic				Skewness		Kurtosis	
Variables	N	Range	Sum	Mean (SE)	Statistic	SE	Statistic	SE
DPDR…AC1…Y1	11	1.30	121.50	0.11404	-1.075	0.661	0.536	1.279
DPD…AC2…Y2	11	2.94	119.44	0.25638	1.899	0.661	4.047	1.279
DDR…AC3…Y3	11	4.07	118.18	0.57886	0.235	0.661	-2.333	1.279
CRM…Xit	11	3.34	142.66	0.39256	0.637	0.661	-1.535	1.279
Listwise (N)	11							

Research findings (calculated by software SPSS, Excel)

- H_1: there is a meaningful relationship between managing credit risk of loan received by clients individually with deferred receivables of Mellat Bank in Semnan Province (Table 11)

According to Table 11 and 12 Pearson correlation coefficient between two variables of managing credit risk of loans received by clients individually with deferred receivables of Mellat Bank in Semnan Province is equals to 0.256a. The value shows a meaningful relationship in error level of 5% between two variables of managing

Table 8: Investigating being normal

Variables	One-sample Kolmogorov-Smirnov test		
	DPDR.... AC1...Y1	DPD... AC2...Y2	DDR... AC3...Y3
N	11.00000	11.00000	11.00000
Mean	9.75200	9.56520	9.45020
SD	0.67385	0.77345	1.61389
Absolute	0.20700	0.30000	0.31500
Positive	0.14900	0.30000	0.31500
Negative	-0.20700	-0.15000	-0.24400
Kolmogorov-Smirnov test	0.68800	0.99600	1.04300
Asymp Sig.	0.73100	0.67400	0.82700

Research findings (calculated by software SPSS, Excel)

Table 9: Investigating of normalization

Variables	One-sample Kolmogorov-Smirnov test		
	DPDR.... AC1...Y1	DPD... AC2...Y2	DDR... AC3...Y3
N	11.00000	11.00000	11.00000
Mean	11.04510	10.85830	10.74340
Standard deviation	0.37821	0.85033	1.91987
Absolute	0.31200	0.22800	0.30800
Positive	0.18300	0.22800	0.30800
Negative	-0.31200	-0.18300	-0.22100
Kolmogorov-Smirnov test	1.03600	0.75700	1.02100
Asymp...Sig	0.73300	0.61600	0.84900

[a]Test of distribution's being normal; [b]calculating through data; research findings (calculated by software SPSS, Excel)

Table 10: Investigating normalization

Variables	One-sample Kolmogorov-Smirnov test
	DPDR...CC1...Y4
N	11
Mean	11.0451
Standard deviation	0.37821
Absolute	0.312
Positive	0.183
Negative	-0.312
Kolmogorov-Smirnov test	1.036
Asymp...Sig.	0.733

[a]Test of distribution's being normal; [b]calculating through data

credit risk of loans received by clients individually with deferred receivables of Mellat Bank in Semnan Province. Therefore, according to SPSS outputs which are shown in tables above, we can argue that since significant level is <5%, hypothesis H_0 in error level of 5% is rejected and presence of correlation between two variables is approved. Also, moderated determination coefficient shows value -0.038 which is fine and presents a suitable fitness of variable changes of deferred receivables of Mellat Bank in Semnan Province which are gained by viable changes of managing credit risk of loans received by clients individually in Mellat Bank in Semnan Province.

Durbin Watson statistic value is equal to 1.804 according to Table 11 and 12. This indicates that errors are independent of each other and there is no correlation between errors. Also, correlation hypothesis between errors is rejected and regression can be applied.

Table 13 indicates variance analysis between two variables of managing credit risk of loans received by clients individually with in Mellat Bank in Semnan Province which is regarded as an independent variable and changes value of variable of deferred receivables in Mellat Bank of Semnan Province are regarded as dependent variable.

According to this output, regression model's general meaningfulness can be gained by ANOVA variance through following statistic hypotheses:

- H_0: there is NOT a linear relationship between the two variables
- H_1: there is a linear relationship between the two variables

Since, Sig level is <5%, assumption of the relationship's being linear between two variables is approved. Now we try to find the relationship.

Table 11: Correlation coefficient test, moderated determination coefficient and Durbin-Watson test between two variables of items of credit risk management and Document past Due Receivable (DPDR) by individual clients in Mellat Bank in Semnan Province gained from first and main hypothesis test of the research

Variables entered/removed[b]

Model	Variables entered	Method
1	Credit Risk Management...CRM...Xit	Enter

[a]All requested variables entered; [b]dependent variable: Yi.ACi

Table 12: Model summary[b]

Model	R	R^2	Adjusted R^2	SE of the estimate	Change statistics					
					R^2 change	F change	df1	df2	Sig. F change	Durbin-Watson
1	0.256[a]	0.066	-0.038	16421.364	0.066	0.631	1	9	0.007	1.804

[a]Predictors: (constant), credit risk management...CRM...Xit; [b]dependent variable: Yi.ACi; research findings (calculated by software SPSS, Excel)

In output No (8) and in column (B), constant value and independent variable coefficient are presented in regression equation, respectively and the equation is as follows:

$$Y = f(X_i) = \beta_1 + \beta_2\,(X_i) + e_{it}$$
$$Yi = AC_i = 21713.637 + (0.004)$$
$$\text{Credit Risk Management}_i\,(CRM)_{it} + e_{it}$$

According to output (8), other columns of the chart include column (B), coefficient criterion-t-student statistic (t) and Sig level of the test. To test equality assumption for each column coefficient (B), value zero is used. Now if (β) and alpha (α) are constant value and regression line steep, respectively then assumption tests for these two values can be written as follows:

$$\begin{cases} H_0: \beta = 0 \\ H_1: \beta \neq 0 \end{cases}, \quad \begin{cases} H_0: \alpha = 0 \\ H_1: \alpha \neq 0 \end{cases}$$

In this output, Sig level is 0, so equality test of regression coefficients and constant value is equal to zero and <5%. Therefore, equality assumption for the two coefficients is rejected with zero and should not be removed from regression equation (Table 14 and 15).

Figure 4 investigates error's being normal as another regression assumptions. According to this hypothesis, regression equation errors should have normal distribution with mean zero. According to above chart, we have M mean = (-5.55e-17), Stad. Dev = 0.949) which is shown in the right side of the chart. Therefore, with this pre-assumption we may use regression linear equation estimated on two variables; between two variables of managing credit risks of loans received by clients

individually in Mellat Bank of Semnan Province as independent variable and changes value of deferred receivables variable in Mellat Bank of Semnan Province as a dependent variable.

Moreover scattering Fig. 5, indicates simple linear regression equation and determination coefficient of two
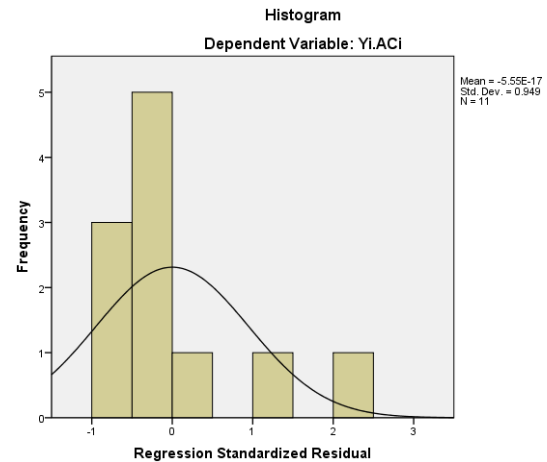

Fig. 4: Test of regression equation error's being normal-main and first hypothesis of research; research findings (calculated by software SPSS, Excel)
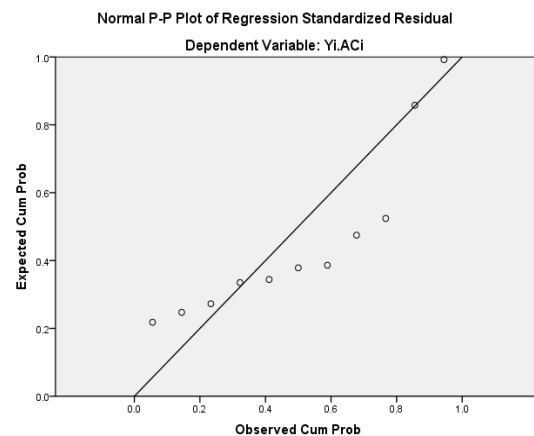

Fig. 5: Line and regression equation-main and first hypothesis of research; research findings (calculated by software SPSS, Excel)

Table 13: Regression variance analysis test (ANOVA) main and first hypothesis of research

ANOVA[b]

Model 1	Sum of squares	df	Mean square	F-value	Sig.
Regression	1.70E+08	1	1.70E+08	0.631	0.007[a]
Residual	2.43E+09	9	2.70E+08		
Total	2.60E+09	10			

[a]Predictors: (constant), Credit Risk Management...CRM...Xit; dependent variable: Yi.ACi; research findings (calculated by software SPSS, Excel)

Table 14: Regression equation coefficients test main and first hypothesis of research

Coefficients[a]

Model 1	Unstandardized coefficients		Standardized coefficients			95.0% confidence interval for B	
	B	SE	Beta	t-values	Sig.	Lower bound	Upper bound
Constant	21713.637	6508.131		3.336	0.001	6991.223	36436.051
Credit Risk Management...CRM...Xit	0.004	0.005	0.256	0.795	0.007	-0.007	0.014

[a]Dependent variable: Yi.ACi; research findings (calculated by software SPSS, Excel)

variables where managing credit risks of loans received by clients individually were independent variable and changes value in deferred receivables variables in Mellat Bank of Semnan Province were dependent variable. The results are consistent with results gained out of simple linear regression method.

Results of the main and second hypothesis test of the research: Main and second hypothesis of research: there is a meaningful relationship between credit risk management of portfolio with deferred receivables of Mellat Bank of Semnan Province (Table 16 and 17).

- H_0: there is NOT a meaningful relationship between credit risk management of portfolio with deferred receivables of Mellat Bank of Semnan Province
- H_1: there is a meaningful relationship between credit risk management of portfolio with deferred receivables of Mellat Bank of Semnan Province (Table 16 and 17)

According to Table 17 Pearson correlation coefficient between two variables of managing credit risk of loans received by clients individually with deferred receivables of Mellat Bank in Semnan Province equals to 0.545a. The value shows presence of a meaningful relationship in error

Table 15: Coefficients tests left from regression equations-main and first hypothesis of the research

Parameters	Residuals statistics[a]				
	Min.	Max.	Mean	SD	N
Predicted value	22088.137	32331.783	25070.15	4126.54601	11
Residual	-12788.925	39840.344	0.00000	15578.67413	11
Std. predicted value	-0.723	1.76	0.000	1	11
Std. residual	-0.779	2.426	0.000	0.949	11

[a]Dependent variable: Yi.ACi; research findings (calculated by software SPSS, Excel)

Table 16: Correlation coefficient test, determination coefficient, moderated determination coefficient and Durbin-Watson test between two variables of items of credit risk management and document past due receivable (DPDR) in Mellat Bank of Semnan Province, gained out of the main and second hypothesis test of the research

Variables entered/removed[b]

Model	Variables entered	Method
1	Credit Risk Management...CRM...Xit	Enter

[a]All requested variables entered; [b]dependent variable: Yi.CCi

level of 5% between two variables of managing credit risk of loans received with deferred receivables of Mellat Bank in Semnan Province.

Therefore, according to SPSS outputs which are shown in tables above, we can argue that since significant level is <5%, hypothesis H_0 in error level of 5% is rejected and presence of correlation between two variables is approved. Also, moderated determination coefficient shows value 0.219 which is fine and presents a suitable fitness of variable changes of deferred receivables of Mellat Bank in Semnan Province. Durbin-Watson statistic value is equal to 1.781 according to Table 16. This value indicates that errors are independent from each other and there is no auto-correlation error. Correlation assumption between errors is rejected and regression can be applied.

Table 18 indicates variance analysis between two variables of managing credit risk of loans received by clients individually with in Mellat Bank in Semnan Province which is regarded as an independent variable and changes value of variable of deferred receivables in Mellat Bank of Semnan Province are regarded as dependent variable. According to this output, general significance of regression model by ANOVA variance analysis through following statistical hypothesis is as follows:

- H_0: there is NOT a linear relationship between the two variables
- H_1: there is a linear relationship between the two variables

Since, Sig level is <5%, liner hypothesis of the relationship between two variables is approved. Now we seek to find the relationship (Table 19).

In output No 12 and in column B, constant value and independent variable coefficient are presented in regression equation, respectively and this equation is as follows:

$$Y = f(X_i) = \beta 1 + \beta 2 (X_i) + e_{it}$$
$$Yi = CC_i = 69112.188 + (0.039)$$
$$\text{Credit Risk Management }_i (CRM)_{it} + e_{it}$$

According to output No. (12), other columns of the chart include column (B), coefficient criterion-t-student statistic (t) and Sig level of the test. To test equality

Table 17: Model summary[b]

Model	R	R^2	Adjusted R^2	SE of the estimate	Change statistics					
					R^2 change	F change	df1	df2	Sig. F change	Durbin-Watson
1	0.545[a]	0.297	0.219	71723.22658	0.297	3.800	1	9	0.003	1.895

[a]Predictors: (constant), Credit Risk Management...CRM...Xit; [b]Dependent Variable: Yi.CCi; research findings (calculated by software SPSS, Excel)
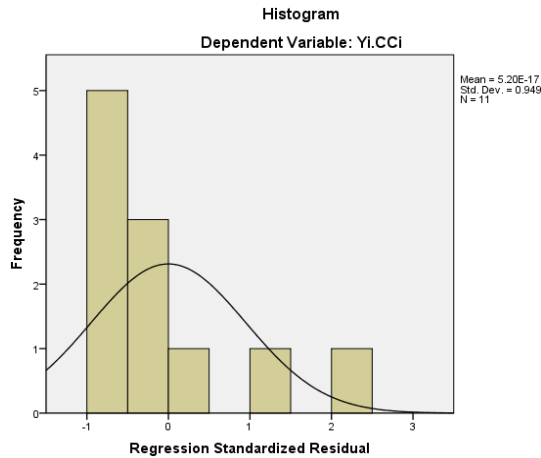
Fig. 6: Test of regression equitation errors' being normal-main and second hypothesis of research; research findings (calculated by software SPSS, Excel)

Table 18: Regression variance analysis test (ANOVA), main and second hypothesis of research

ANOVA[b]

Model 1	Sum of squares	df	Mean square	F-value	Sig.
Regression	1.96E+10	1	1.96E+10	3.8	0.003[a]
Residual	4.63E+10	9	5.14E+09		
Total	6.59E+10	10			

[a]Predictors: (constant), Credit Risk Management...CRM...Xit; ᵇDependent variable: Yi.CCi; research findings (calculated by software SPSS, Excel)

assumption for each column coefficient (B), value zero is used. Now if (β) and alpha (α)) are constant value and regression line steep, respectively then assumption tests for these two values can be written as follows:

$$\begin{cases} H_0 : \beta = 0 \\ H_1 : \beta \neq 0 \end{cases}, \begin{cases} H_0 : \alpha = 0 \\ H_1 : \alpha \neq 0 \end{cases}$$

Since in this output, Sig is equal to 0, equality test of regression coefficient and constant value are equal to zero and <5%. Therefore, equality assumption of the two coefficients with zero is rejected and they should not be removed from the regression equation (Table 20).

Figure 6 deals with normalization of errors as another regression assumption. According to this hypothesis, regression equation errors should have normal distribution with mean zero and Mean = (5.20e-16), Stad. Dev = (0.949) and they are shown on the right side of the chart. Hence, with such a pre-assumption we may apply regression linear equation estimated regarding two variables' between two variables of managing portfolio credit risk in Mellat Bank of Semnan Province as an
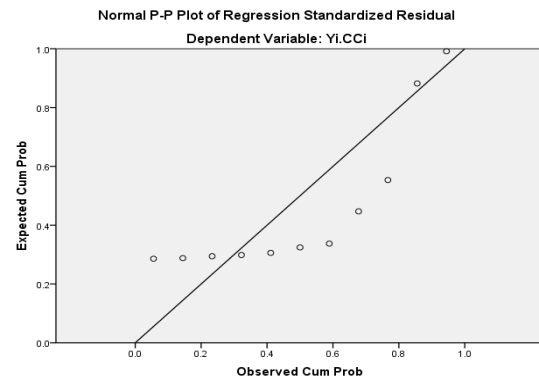

Fig. 7: Line and regression equation-main and secodnray hypothesis of research; research findings (calculated by software SPSS, Excel)

independent variable and changes value of deferred receivables of Mellat Bank of Semnan Province as dependent variable.

Moreover scattering, Fig. 7 indicates simple linear regression equation and determination coefficient of two variables where managing credit risks of loans received by clients individually were independent variable and changes value in deferred receivables variables in Mellat Bank of Semnan Province were dependent variable. The results are consistent with results gained out of simple linear regression method.

In this chapter we seek to present test results gained out of studying the relationship between credit risk management and deferred receivables of in Mellat Bank Branches Management of Semnan Province. Therefore, tests in chapter four (chapter related to data analysis) were given. In this chapter of the research a summary of the test results of hypothesis will be dealt.

Result summary of research hypotheses test (discussion on the research findings) hypotheses with which we dealt are as follows

Summary of test results of the main and first research: Interpreting results of the main and first research: according to Table 11 which was presented in chart four of the current research we can argue that Pearson correlation coefficient between two variables of managing credit risk of loans received by clients individually with deferred receivables of Mellat Bank in Semnan Province is equal to 0.256a. The value shows a meaningful relationship between two variables; between credit risks of loans received by clients individually with deferred receivables of Mellat Bank of Semnan Province in error level of 5%. Therefore, according to outputs of SPSS software which are shown in tables above we can

Table 19: Regression equation coefficients test main and second hypothesis of research

Coefficients[a]

Model 1	Unstandardized coefficients		Standardized coefficients			95.0% confidence interval for B	
	B	SE	Beta	t-values	Sig.	Lower bound	Upper bound
Constant	69112.188	28425.416		2.431	0.001	4809.429	133414.947
Credit Risk Management (CRM) Xit	0.039	0.020	0.545	1.949	0.003	-0.006	0.083

[a]Dependent variable: Yi.CCi; research findings (calculated by software SPSS, Excel)

Table 20: Test of coefficients left from regression equation main and second hypothesis of research

Residuals statistics[a]

	Min.	Max.	Mean	SD	N
Predicted value	73124.8828	182883.5781	105076.5755	44215.13972	11
Residual	-40526.46094	171448.51563	0.00000	68042.62714	11
Std. predicted value	-0.723	1.760	0.000	1.000	11
Std. residual	-0.565	2.390	0.000	0.949	11

[a]Dependent Variable: Yi.CCi; research findings (calculated by software SPSS, Excel)

Table 21: Summary of results of research hypothesis with separation

Order 1 (co coefficient)	R	R^2	Adjusted R^2	Durbin-Watson	t-test	Beta coefficient	95.0% confidence interval for B (%)	5.0% un confidence interval for B (%)	Hypothesis condition	
									Accepted	Rejected
Hypothesis title										
1st hypothesis: also there is a significant relationship between two variables of credit risk management with deferred receivables of Mellat Bank of Semnan Province	0.256[a]	0.066	-0.038	1.804	0.795	0.004	95.0	5.0	H_1	H_0
Main hypothesis										
2nd hypothesis: also there is not a significant relationship between two variables of credit risk management with deferred receivables of Mellat Bank of Semnan Province	0.545[a]	0.297	0.219	1.895	1.949	0.039	95.0	5.0	H_1	H_0

Research findings (calculated by software SPSS, Excel)

suggest that since Sig level is<5%, hypothesis H_0 in five error level is rejected and presence of a correlation between two variables is rejected. Meantime, calculated moderated determination coefficient shows -0.038 which is fine and presents a suitable fitness of variable changes of deferred receivables of Mellat Bank in Semnan Province which are gained by viable changes of managing credit risk of loans received by clients individually in Mellat Bank in Semnan Province.

Durbin-Watson statistic value is equal to 1.804 according to Table 12. This indicates that error is independent of each other and there is no correlation between errors. Also correlation hypothesis between errors is rejected and regression can be applied.

Summary of results of main and second hypothesis test of the research: Interpreting results of the main and first

research: according to Table 15 which was presented in chart four of the current research we can argue that Pearson correlation coefficient between two variables of managing credit risk of loans received by clients individually with deferred receivables of Mellat Bank in Semnan Province is equal to 0.545a. The value in error level of 5% indicates a meaningful relationship between the two variables of managing portfolio credit risk with deferred receivables of Mellat Bank in Semnan Province. Therefore, according to SPSS software outputs which are shown in table above, we can argue that since Sig level is <5% assumption H_0 is rejected in 5% error level and presence of correlation between the two variables is approved. Also, moderated determination coefficient shows value 0.219 which is fine and presents a suitable fitness of variable changes of deferred receivables of Mellat Bank in Semnan Province. On the other hand, one

of the regression hypotheses is error independence. If error independence hypothesis is rejected and errors are correlated to each other, then regression cannot be exploited. Durbin-Watson statistic value is equal to 1.781 according to Table 15. This value demonstrates that errors are independent from each other and there exists no auto-correlation between errors. So, correlation hypothesis between errors is rejected and regression can be used. Finally, constant value and independent variable coefficient in regression equation are provided for main and second hypothesis of the current research. The equation is as follows (Table 21)

CONCLUSION

The research results indicate that the relationship between credit risk management with deferred receivables of Mellat Bank was meaningful in form of a case study in management of Mellat Bank Branches of Semnan Province. Also, there is a significant relationship between two variables of credit risk management with deferred receivables of Mellat Bank in form of a case study in error level of 5% and in certainty level of 95%. According to outputs of software SPSS shown in tables above, we can suggest that since Sig level is <5%, hypothesis H_0 is rejected in error level of 5% and presence of correlation between the two variables is approved. The results can be generalized to total statistical society of the research; Mellat Bank.

SUGGESTIONS

Research suggestion for future studies
According to the research results, some suggestions are provided which are as follows: It is suggested to study "effects of credit risk management and return of banks which are active in stock market of stock market". Meantime, their research result should be compared with the results of the current research.

It is suggested to study "effects of bank performance in spite of risk presence for banking industry". Meantime, their research result should be compared with the results of the current research.

It is suggested to study "effects of financial credit risk management on profitability of trading banks". Meantime, their research result should be compared to the results of the current research.

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