The Effects of Branch Manager's Characteristics on Micro-Lending Quality: Evidence from a Commercial Bank in Iran

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Article Info	ABSTRACT
	Based on financial literature, when information asymmetry is present, the agency problem can affect the bank's lending. In this regard, the contract between the bank and bank's agents (who are involved in lending process) and monetary incentives are very crucial. Furthermore, the career concerns and the characteristics of the bank's agents can affect the agents' performance and effectiveness of the bank's monetary incentives. This paper investigates the effects of characteristics of the branch managers on microloans quality in an Iranian commercial bank. Results show that (1) micro-lending quality of the female branch managers is better than their male counterparts; (2) the quality of micro-lending managed by older branch managers (or branch managers who are closer to retirement age) is poorer than that of their younger counterparts; (3) the higher education of the branch managers improves the quality in micro-lending.

1. Introduction

According to the financial literature, in the presence of information asymmetry, agency problem can affect the bank's lending outcomes. In other words, if the borrower's information either is "concealable" by the loan officer (or other bank agents) or is "unverifiable" by the bank, the loan officer's monitoring and screening efforts will affect the lending outcome. Therefore, on the one hand, the contract between the bank and the loan officer (or other bank agents who are involved in the lending process such as branch manager in micro lending) is very crucial; on the other hand, regardless of the specifications of this contract, the characteristics of the bank agents can affect their monitoring and screening efforts.

   Generally, the loan officer knows more about the borrower compared to any other individual in the bank, because of their critical role in the solicitation and negotiation of the loan. This gives the loan officer an advantage in assessing any information about the subsequent borrower performance. This advantage is further enhanced by the fact that the loan officer maintains personal contact with the borrower. Therefore, contracting between a bank and its loan officers may be problematic for loan officers discharging their loan monitoring responsibility. Beyond the traditional disutility of effort, the loan officers may have other incentives that exacerbate the agency problem. The loan officers may be afraid that the discovery of quality deterioration will be reflected on their original credit judgment. This may encourage the loan officer not to reveal any new credit problems in the hope that the subsequent events will produce a restoration of credit quality. In addition, the closeness of the loan officer-borrower relationship may further complicate this contracting challenge by shading the loan officer's objectivity in monitoring and evaluating borrower performance. In the worst-case scenario, integrity of the lending relationship may be vulnerable to corruption if loan officer

receives kickbacks or has an undisclosed financial interest in the borrowing concern (Udell, 1989).

Holmstrom (1979) and Shavell (1979) argued that the conventional solution to the agency problem was an employment contract that contained the interests of the bank and the loan officer as the agent by making compensation contingent on the ex-post outcome. Accordingly, some studies highlight the importance of incentives for the transmission and use of information in lending (see Hertzberg et al., 2010; Berg et al., 2013).

In this regard, some researches have been conducted on the effects of monetary incentives on the bank lending performance. Besides, these studies argued that regardless of the monetary incentives, which depended on the specifications of the contract between the bank and loan officers, the career concerns and the characteristics of loan officers could affect their performance (see Agarwal and Wang, 2008; Cole et al., 2015; Agarwal and Ben-David, 2018). Generally, the results of these studies are summarized as follows:

First, monitoring and screening efforts of loan officers are depended crucially on the strength of the monetary incentives, the information asymmetry between the bank and the loan officer, and the loan officer's career concern. Second, lending-volumes incentives lead to indiscriminate lending, low effort, and high default; by contrast, high-powered incentives (that reward profitable lending and penalize default) will result in greater screening efforts, lower default, and more conservative lending. Third, lending of "loan officers who are closer to retirement age" is higher in quantity but lower in quality compared to others; because these people, due to their lower career development prospects, have less career concern and more risk-taking compared to young people. Finally, quality of lending by female loan officers is better but they are more conservatism in lending (in comparison with their male counterparts). This is due to the lower risk-taking of women, which leads to increase in their efforts in

screening and monitoring the borrower and better aligning the lending process with the bank's credit policies and recommendations.

While previous studies have focused on the loan officers, because of the major role of branch managers in the micro-lending process in this bank, as described in section 3 of this paper, our study addresses the branch managers. In this regard, this paper investigates the effects of characteristics of the branch managers, e.g. gender, age/experience, and education, on loan quality in an Iranian commercial bank. This research could encourage banks as well as future studies on lending quality to pay more attention to factors within the bank and efficiency at the microeconomic level. On the one hand, a major problem with the Iranian banking system is the high rate of non-performing loans and on the other hand, previous internal studies have mainly examined the impact of "macroeconomic variables" and "out-of-bank factors" on the quality of loans, And have rarely studied (as far as we know) the effect of branch managers' performance on lending quality.

Therefore, the remainder of this paper is organized as follows. Section 2 reviews the theoretical foundations and previous studies. In section 3, we present the role of branch managers in the micro-lending process in the bank under review. Section 4 describes the data, variables, and methodology. In section 5, the main results are provided. Section 6 presents the discussion, and finally, Section 7 concludes the paper.

2. Theoretical Foundations and Previous Studies
2.1 Theoretical Foundations
In classical economic theory, a firm is defined as a single entity that aims to maximize the present value of its profit stream. In the new theories, an enterprise consists of a set of goals, constraints, and relationships between related parties such as shareholders, managers, and employees. Therefore, the performance of the firm is affected by the characteristics of each of the related parties (Jensen and Mackling, 1976). In this regard, management plays an important role in the

performance of the firm. This role arises from the position of management in deciding on corporate matters issues such as what, how, how much and at what price to produce and supply. Accordingly, management performance and firm performance are two closely related concepts. One of the theoretical foundations to explain this relationship is agency theory, which focuses on the role of management in firm performance. According to this theory, good firm performance requires good strategic management (Brown and Caylor, 2009). Besides, upper echelons theory, in strategic management examines the role of managers' characteristics on firm performance. According to this theory, the difference between the performance of firms in an industry is due to the difference between the performance of their managers, and this difference in the performance of managers is due to a set of differences between managers, including the characteristics of managers such as gender, experience and age, management history and education (Talke et al., 2010). Accordingly, many theoretical and empirical studies have examined the effect of different characteristics of managers on their performance. Based on the results of these studies and according to the subject of this paper, theoretical foundations related to the effect of "gender", "experience" and "education" of managers on their performance are presented:

2.1.1 The Effect of Gender Differences on Performance
The recent finance literature have pointed out that there are gender differences between men and women that affect financial decision-making and their performance. Based on these literature and studies, it can be said that the dimensions of these differences include "risk aversion", "level of compliance with regulations, credit policies, and recommendations", and "monitoring". First, there is an extended literature on behavioral differences between men and women with respect to risk. Most of the previous studies have shown that women seem to be more risk-averse compared to men (for example Byrnes et al., 1999; Croson and Gneezy, 2009; Eckel and Grossman, 2008). The

differential responses of men and women to risk can also affect the credit risk management and lending decisions. Second, studies in some fields (e.g. drivers' compliance with traffic regulations, pedestrian behavior, etc.) have indicated that women show better compliance with regulations compared to men. Finally, several types of the research argue that there are gender differences related to monitoring. Adams and Ferreira (2009) concluded that the presence of women on corporate boards strengthened monitoring. Besides, some studies concluded that female directors had been shown to improve the monitoring of executives (for example Nekhili and Gatfaoui, 2013; Triana et al., 2013).

Besides, another group of studies that studied the effect of women's presence on board performance is related to our study. In this regard, growing evidence suggests that an increase in female board representation improves board decision making and performance (for example Pearce and Zahra, 1991; Burke, 1997; Nekhili and Gatfaoui, 2013; Post and Byron, 2015).

Furthermore, it can be studied in connection with the agency problem. Agency theory is grounded in the assumption that managers may have different goals and interests from shareholders. Therefore, board directors are appointed by shareholders to ensure that the interests of shareholders are met. However, when CEOs also serve as the board chairperson, a structural board leadership arrangement known as CEO duality, the board's monitoring of top executives is impeded. Such CEOs may seek to increase their power by appointing board members who are less likely to monitor their decision making and more likely to support their decisions. In that regard, female directors have been shown to improve the monitoring of executives (Halliday et al., 2020).

According to differences between male and female and pursuant to the literature reviewed, we expect female branch managers to improve the quality of branches' micro-lending through (1) increasing the

compliance of the decision-making of the branch's credit committee and lending processes with credit guidelines and recommendations, (2) increasing the risk aversion and conservatism in lending, and (3) reducing the agency problem through increasing monitoring in the branch's credit committee.

2.1.2 The Effect of Experience on Performance

Holmstrom (1982) argued that less experienced managers, due to career concerns, outperformed the more experienced managers. On the other hand, "learning by doing process" argument provides an efficiency advantage to the experienced branch managers. In this regard, Andersson (2004) argued that age and experience might improve loan officers' performance, while the career concern view discussed in Agarwal and Wang (2008) would predict the opposite relationship. They suggested that younger and less-experienced loan officers who were concerned about their careers might be induced to avoid loan losses in order to maximize their prospects.

According to this and the relevant literature, despite limited studies, increasing experience or approaching retirement age has two different effects on the lending quality of a branch manager (or loan officer). On the one hand, reducing career concerns leads to reduced screening efforts and increased risk-taking, which leads to increase lending amount and reduce lending quality. On the other hand, through the "learning by doing process", it leads to increase efficiency in the lending process and lending quality. Thus, the sign of the effect of the branch manager's experience on lending quality is dependent on the power of each of these effects.

2.1.3 The Effect of Education Level on Performance

In association with the effects of education on efficiency, the theoretical justification comes from Becker (1962) who based on human capital theory argued that education created valuable human capital. In this regard, following human capital theory, since people

with higher education have the ability to better analyze the borrower's data and signals, higher education can lead to improve lending quality by loan officers or branch manager. Furthermore, Spence (1973) presented the signaling theory where the skilled managers acquire education to signal their type. Hence, it is expected that the branch manager's education level positively correlates with bank efficiency and lending quality.

4. Results

This section provide the empirical results and the discussion with section 4.1 providing the principal component analysis results while 4.2 section reveals the panel test of unit root concerning the variables of the study. Section 4.3 shows the test of normality and lastly 4.4 section depicts the quantile regression results together with the discussions.

2.2 Previous Studies

Based on the theoretical foundations, the role of managers' characteristics on their performance has been analyzed in a variety of fields in financial economics. While most of these studies have been done in other financial economic fields such as investment decisions, equity analyst performance, corporate executives' behavior, corporate financial decisions, etc. only a few studies assess the impact of characteristics of loan manager (or loan officer) on the lending outcome.

Carter et al. (2007), using the results of a survey of 36 loan officers of a big British bank, showed that while both male and female loan officers use similar assessment criteria for approving loan applications, there are gender-based differences in the relative importance attached by the loan officers to some of these criteria. The authors found that female loan officers tended to focus on procedural and business elements of the loan application, while male loan officers relied more heavily on individual decision-making and negotiation.

Kauko (2009) linked the cost efficiency behavior of a sample of Finnish savings and cooperative banks in 1999–2004 to specific bank manager's features. He found that mature managers mostly outperformed their young colleagues. In addition, he found that a university degree of branch manager had a positive effect on branch efficiency.

Bellucci et al. (2010) found that female loan officers were more risk-averse or less self-confident than male officers were, as they tended to restrict credit availability to new, unestablished borrowers more than their male counterparts did.

Beck et al. (2013) concluded that the default rates of loan portfolios of female loan officers in Albania exhibit were significantly lower, compared to those of male. They argued that women seemed to be better at building trust relationships and exploiting monitoring possibilities.

Cole et al. (2015) found that the screening effort of loan officers was decreasing in age or distance to retirement. They argued that even in the absence of monetary incentives, if a loan officer was motivated by career concerns, they will exert nonzero screening effort. In this regard, according to the theoretical framework presented by the authors, more screening efforts lead to improved lending quality and more conservative lending.

Agarwal and Ben-David (2018) found that applications handled by more tenured loan officers and by male loan officers were more likely to be approved. In addition, conditional on approval, they were approved for significantly larger loan amounts. They attributed these results to fewer career concerns by tenured loan officers and more competitive behavior by male loan officers.

Montalvo and Reynal-Querol (2020) analyzed the effect of loan officers' gender on the approval of loans and their subsequent performance. They showed that the female loan officers had around a 15% lower delinquency rate than the male loan officers. Moreover,

they found that the risk profile of applicants screened by male and female loan officers was very similar, but conditional on the risk score, women followed the recommendations more often than men did.

Pearce and Zahra (1991) found that boards with higher ratios of women, characterized as participative boards, were more likely to engage in debates and disagreement, and were associated with higher perceived and objective firm performance. Burke (1997) stated that women had access to more resources and expertise. Westphal and Milton (2000) argued that presence of women on the board of directors encourages multiple perspectives that are better aligned with the market. Nielsen and Hus (2010) found that an increase in female board representation improved board decision-making and attendance. Nekhili and Gatfaoui (2013) concluded that female board representation fostered ethical organizational behavior. Post and Byron (2015) argued that an increase in female board representation was positively associated with board monitoring, board strategy involvement, and firm profitability.

Finally, while so far in Iran (as far as we know) no study has been conducted on the effects of the characteristics of the branch managers on the lending quality, but some Iranian studies similar to the subject of this study are presented below:

Kordbacheh et al. (2012) investigated the effect of the managers' characteristics on the efficiency of the branches of the Eghtesad Novin Bank between 2006 and 2008. They concluded that increasing the age of managers (up to a certain point) and their experience in the bank could increase the efficiency of the branches. In addition, the higher level of education of managers as well as their relocation at the branches has an indirect effect on branch efficiency. Since, they considered operating income as an indicator of efficiency and did not consider credit quality, and given the inverse relationship between

return and risk-taking, the results of this study seem to be consistent with the related literature.

Imani Brandagh et al. (2018) examined the effect of "women's presence in the board of directors of 152 companies listed on the Tehran Stock Exchange" on the weakness of internal control of these companies using logit regression between 2011 and 2016. Their findings confirmed the negative impact of the presence of at least one female representative in the board composition on likelihood of weakness in corporate internal controls. They argued the presence of female delegate on the board is expected to create an environment in which the control and monitoring process becomes more precise.

Salehi et al. (2016) state that past research on gender diversity shows that women are more financially conservative, more morally responsible, and more risk-averse than men.

Sepasi and Abdoli (2015) showed that companies with female board members have a more conservative performance compared to companies with male senior executives. Also in another study (Sepasi and Abdoli, 2016) they stated that there is a lot of evidence that shows women compared to men are better in supervision, and based on this, the gender diversity of the board leads to improved supervision.

3. The Role of Branch Manager in Micro-Lending

The branch's credit committee members include the branch manager, branch assistant manager, and loan officer. The role of the loan officer in the micro-lending process includes "initial review of loan applications", "data collection and analysis", "offering loan approval to the branch's credit committee", "payment of approved loans," and "monitoring the borrower's performance and how to repay the installments". The role of the branch assistant manager in the micro-lending process is to review and verify the loan officer's actions. The branch manager oversees the entire micro-lending process from

submitting a request by the borrower to approving and paying off the loan and how to repay the installments.

Usually, except credit customers, other customers request for a microloan from loan officer in coordination with the branch manager when they are marketing and offering a banking service package to them. Therefore, the customer relationship with the branch manager plays a key role in the process of approval of micro-loans. Besides, the requisite for approval of micro loans in the branch's credit committee is the agreement of the branch manager and one of the two other members, namely the branch assistant manager or loan officer. Thus, in the bank under review, the branch manager plays the main role in marketing and approving micro-loans.

Therefore, the characteristics of the branch manager, such as gender, age or experience and education level, trough effect on the risk-taking level, career promotion prospect and concerns, the degree of compliance with credit instructions and policies, the ability to analyze data, and so on, can significantly affect the quality of bank micro lending. For these reasons, in this paper we study the effects of the branch manager's characteristics on the quality of micro lending in branches of the studied bank.

4. Data, Variables, and Methodology
4.1 Data
In this paper, in order to analyze the effects of the branch manager's characteristics on loan quality, we used the data of 145,709 microloans, which were approved by branches of a commercial bank in Iran. These loans were paid by the banks' branches in 5 years from 2014 to 2018.

4.2 The Dependent Variable
The dependent variable is the loan quality, which is an ordinal variable with five levels (0=loans without overdue; 1= up to 2 months overdue; 2= 2 to 6 months overdue; 3= 6 to 18 months overdue; and

4= more than 18 months overdue). These five loan quality domains are hierarchically structured. It is a standard classification of loans in the Iranian banking system, and is used in the instructions for collecting overdue loans, calculating the overdue loans' penalty, calculating risk-weighted assets (for calculating capital adequacy), and setting financial statements.

4.3 Explanatory Variables

According to the data that the bank made available to us, our explanatory variables include three groups of variables: (1) loan specifications including amount, maturity, and interest rate, (2) borrower specifications including customer type, relationship history, type and value of collateral and income, and (3) characteristics of the branches' managers, including gender, age, and education.

Since on the one hand, data of the branch manager experience are not available and on the other hand, their age difference almost indicates the difference in their work experience, the branch managers' age has been used rather than their experience.

Table 1 describes the dependent variable and the explanatory variables, and Table 2 shows the statistical summary of the variables.

Table 1. Description of Variables

Type of Variable		Label	Variable Name	Description
Dependent Variable		**LQ**	Loan Quality	0=loans without overdue; 1 = up to 2 months overdue; 2= 2 to 6 months overdue; 3= 6 to 18 months overdue and 4= more than 18 months overdue
Explanatory Variables	**Loan Specifications**	**LA**	Loan Amount	The amount of each loan (million Rials)
		Mat	Loan Maturity	The maturity of each loan (month)
		LI	Loan Interest Rate	The interest rate of each loan (percentage)
	Borrower Specifications	**BT**	Borrower Type	0= Legal Entity and 1= Individuals
		Coll	Collateral Type	0= low liquidity and 1= high liquidity [a]
		CtL	Collateral to Loan	$CtL = \dfrac{Collateral\ Value}{Loan\ Amount + Loan\ Interest}$
		ItL	Borrower Income to	$ItL = \dfrac{Borrower\ Income\ ^{b}}{Loan\ Amount + Loan\ Interest}$

Type of Variable		Label	Variable Name	Description
Explanatory Variables			Loan	
		RH	Relationship History	The number of years in which the borrower has been in contact with the bank.
	Characteristics of branch manager	**Msex**	Manager Gender	0= Female and 1= Male
		Mage	Manager Age	Age of branch manager
		Medu	Manager Education	1=bachelor's degree or higher and 0= others

Source: Research finding.

Note: [a]. Low liquidity collaterals include real estate, equipment, and machinery while high liquidity collaterals include deposits, stocks and bank securities; [b]. Both the borrower's income and the principal and interest of the loan are calculated in terms of months. Our limitation on data is that the borrower's income is based on the borrower's self-declaration, most of which may not have been approved by the bank.

Table 2. The Statistical Summary of the Variables

Variable		Obs	Mean	Std. Dev.	Min	Max	Weighted Mean [a]
Label	Name						
LQ	Loan Quality	145709	0.8416433	1.187162	0	4	0.771364
LA	Loan Amount	145709	1685.584	6210.352	1	80.000	24566.79
Mat	Loan Maturity	145709	16.5869	15.3673	1	60	9.028564
LI	Loan Interest Rate	145709	22.08909	5.568862	4	28	21.96785
BT	Borrower Type	145709	0.8809545	0.3238431	0	1	0.3100749
Coll	Collateral Type	145709	0.4029607	0.4904947	0	1	0.3770796
CtL	Collateral to Loan	145709	1.085854	0.461795	0.3	9.972446	0.8866969
ItL	Borrower Income to Loan	145709	4.730028	12.32373	0.0000483	431.7521	9.285011
RH	Relationship History	145709	5.523922	3.693188	0	14.00274	6.585129
Msex	Manager Gender	145709	0.8582517	0.348793	0	1	0.827854
Mage	Manager Age	145709	49.61071	11.00631	27.73699	69.76438	50.39279
Medu	Manager Education	145709	0.5401108	0.4983902	0	1	0.5318759

Source: Research finding.

Note: [a]. Weights are loan amounts (LA).

4.4 Methodology

The dependent variable, loan quality, is an ordinal variable. The most well-known model for estimating an ordinal outcome variable is the ordered logistic regression or proportional odds (PO) model[1].

The PO model is used to estimate the cumulative probability of being at or below a particular level of a response variable or being beyond a particular level, which is the complementary direction. In this model, the effect of each predictor is assumed the same across the categories of the ordinal dependent variable. That is, for each predictor, the effect on the odds of being at or below any category remains the same within the model. This restriction is referred to as the proportional odds or the parallel lines assumption. This assumption is often violated. It is misleading and invalid to interpret results if this assumption is not tenable (Liu and Koirala, 2012). As in our analysis the proportional odds assumption is violated.

To address this issue, Fu (1998) and William (2006) developed the generalized ordinal logit model. This model relaxes the PO assumption by allowing the effect of each explanatory variable to vary across different cut points of the ordinal outcome variable.

The generalized ordered logit model, for an ordinal dependent variable Y with M categories, as proposed by Fu (1998) and Williams (2006), can be written as Equations 1 and 2.

$$P(Y_i > j) = g(X_i\beta_j) = \frac{exp(\alpha_j + X_i\beta_j)}{1 + exp(\alpha_j + X_i\beta_j)}, \quad j = 1, \dots, M-1, \ i = 1, \dots, n \ (1)$$

with

$$P(Y_i = 1) = 1 - g(X_i\beta_j)$$
$$(2)$$

$$P(Y_i = j) = g(X_i\beta_{j-1}) - g(X_i\beta_j), \qquad j = 2, \dots, M-1$$
$$P(Y_i = M) = g(X_i\beta_{M-1})$$

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[1]. Current general-purpose statistical software packages, such as SAS, SPSS, and Stata use this model as the default for ordinal regression analysis.

where M is the number of categories of the ordinal dependent variable (loan quality), i is the loan, X_i is the vector of predictors (Explanatory Variables) for the ith loan, and β_j is the vector of parameters to be estimated.

5. Main Results

Results of the ordered logistic regression or proportional odds (PO) model and Brant test are shown in the Appendix (Table I). The Brant test showed that the proportional odds assumption across the different categories of loan quality (cut offs) was significantly violated (P<0.001). Therefore, it is misleading and invalid to interpret the results of the PO model.

Therefore, we estimated generalized logistic regression models using gologit2[1] in Stata. The results of this estimation are shown in Table 3. Since the PO assumption violated, generalized ordered logit model relaxes the PO assumption allowing the logit effects of all predictor variables to vary across cut points, which dichotomize the loan quality outcome. Therefore, the logit effects and corresponding odds ratios (OR) of all 11 variables are different across all four models comparing the probabilities of being beyond category j versus at or below that category. For example, the sign of coefficients of CtL variable (collateral value) is different at different levels of loan quality (LQ). Furthermore, the coefficients values of the Msex variable increase as the level of LQ variable increases. Accordingly, the main results of this estimation are as follows:

The **Msex** variable (branch manager gender) is significant (at 0.001 level) in all models and its coefficients (OR) are +0.411 (1.508), +0.468 (1.597), +0.552 (1.737) and +0.807 (2.242), respectively. Sign of the coefficients indicate that microloans managed by male branch managers have been transferred to higher non-current categories

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1. Gologit2 is a user-written program that estimates the generalized logistic regression models for ordinal dependent variables.

compared to that of managed by female branch managers. In addition, odds ratio values show that microloans managed by male branch managers, have 1.5 to 2.2 times the odds of transferring to higher non-current categories (from LQ=0 to LQ=1, 2, 3, and 4). Another point is that the effects became much stronger when loan quality level moved from low to high, so that the largest effect was identified among the last comparison (loan quality level 4 versus from 0 to 3). Furthermore, the marginal effects of the branch managers' gender (Msex variable) on loan quality (first and second rows of Table 4) indicate that replacement of a man with a woman in the position of branch manager, reduces the probability of loans being placed in the category without overdue (LQ= 0) and increases the probability of placing loans in the categories with overdue (LQ> 0). Besides, using the Stata Long and Freese's Mtable command (Williams 2020), Figure 1 more clearly show the effects of the branch managers' gender on the probability of placing loans in different quality categories. The results show that under the management of men in the branch (Msex= 1), the probability of placing loans in the without overdue category (LQ=0) and categories with overdue (LQ>0) equal 57% and 43%, respectively. However, under the management of women in the branch (Msex= 0), these percentages are 65% and 35%, respectively.

The **Medu** variable (branch manager education) is significant (at 0.001 level) all loan quality levels and its coefficients (OR) are - 0.548 (0.578), - 0.452 (0.637), - 0.527 (0.590) and - 0.811 (0.444) respectively. These results show that more education has led to better lending quality. In addition, Table 4 (third and fourth rows) and Figure 1 indicate that replacement of an educated manager (i.e., a manager with a bachelor degree or higher) with an uneducated manager (i.e., a manager with less than a bachelor degree education), increases the probability of loans being placed in the category without overdue (LQ=0) and reduces the probability of placing loans in the categories with overdue (LQ>0).

The **Mage** variable (branch manager age) is significant (at 0.001 level) in all models and its coefficients (OR) are + 0.027 (1.027), + 0.014 (1.014), + 0.023 (1.023) and +0.059 (1.061) respectively. The positive coefficients indicate that the older is the branch manager, the worse is the loan quality. In addition, Table 4 (fifth to ninth rows) and Figure 1 show that increasing the age of branch managers, reduces the probability of loans being placed in the category without overdue (LQ=0) and increases the probability of placing loans in the categories with overdue (LQ>0). Following the relevant literature, this result shows that the negative effect of increasing the branch manager age or experience on lending quality has been stronger than the positive effect of this on lending quality. Therefore, as in Cole et al. (2015), there is a negative relationship between the age or experience of branch managers and lending quality in the bank under review, which is due to less screening effort of older branch managers because of their lower career concerns.

Table 3. Results of the Generalized Ordinal Logit Model Using Stata *gologit2* (Y > cat. j vs. Y ≤ cat. j)

		Y > 0 vs. Y ≤ 0 (LQ= 0 vs. LQ > 0)		Y > 1 vs. Y ≤ 1 (LQ≤ 1 vs. LQ > 1)		Y > 2 vs. Y ≤ 2 (LQ≤ 2 vs. LQ > 2)		Y > 3 vs. Y ≤ 3 (LQ≤ 3 vs. LQ = 4)	
Variable		β	OR	B	OR	β	OR	β	OR
Label	**Name**	(S.E (β))		(S.E (β))		(S.E (β))		(S.E (β))	
LA	Loan Amount	-0.000 (0.000)***	1.000	-0.000 (0.000)***	1.000	-0.000 (0.000)***	1.000	-0.000 (0.000)**	1.000
Mat	Loan Maturity	0.004 (0.000)***	1.004	0.003 (0.001)***	1.003	0.002 (0.001)*	1.002	-0.005 (0.001)***	0.995
LI	Loan Interest Rate	0.032 (0.001)***	1.033	0.074 (0.002)***	1.077	0.074 (0.002)***	1.077	0.087 (0.004)***	1.091
BT	Borrower Type	0.116 (0.021)***	1.123	0.048 (0.023)*	1.049	-0.049 (0.026)	0.952	-0.103 (0.039)**	0.902
Coll	Collateral Type	-0.287 (0.012)***	0.751	-0.225 (0.015)***	0.799	-0.403 (0.020)***	0.668	-0.749 (0.036)***	0.473
CtL	Collateral to Loan	0.045 (0.013)**	1.046	0.020 (0.017)	1.020	-0.025 (0.023)	0.975	-0.584 (0.049)***	0.558
ItL	Borrower Income to Loan	-0.001 (0.000)	0.999	0.001 (0.001)	1.001	0.000 (0.001)	1.000	-0.008 (0.002)***	0.992
RH	Relationship History	0.103 (.002)***	1.109	0.152 (0.002)***	1.164	0.167 (0.002)***	1.182	0.153 (0.004)***	1.165
Msex	Manager Gender	0.411 (0.020)***	1.508	0.468 (0.024)***	1.597	0.552 (0.035)***	1.737	0.807 (0.073)***	2.242
Mage	Manager Age	0.027 (0.001)***	1.027	0.014 (0.001)***	1.014	0.023 (0.001)***	1.023	0.059 (0.002)***	1.061
Medu	Manager Education	-0.548 (0.015)***	0.578	-0.452 (0.017)***	0.637	-0.527 (0.021)***	0.590	-0.811 (0.037)***	0.444
Constant (α_j)		α_1= -3.125 ***		α_2= -4.693 ***		α_3= -5.946 ***		α_4= -8.780 ***	
Measures of Fit		Log-likelihood		Model: -163351.178 , Intercept-only: -178150.321					
		Chi-square		Deviance (df=145661): 326702.357 LR (df=44): 29598.285 ; p-value: 0.000					

		Y > 0 vs. Y ≤ 0 (LQ= 0 vs. LQ > 0)		Y > 1 vs. Y ≤ 1 (LQ≤ 1 vs. LQ > 1)		Y > 2 vs. Y ≤ 2 (LQ≤ 2 vs. LQ > 2)		Y > 3 vs. Y ≤ 3 (LQ≤ 3 vs. LQ = 4)	
Variable		β	OR	B	OR	β	OR	β	OR
Label	**Name**	(S.E (β))		(S.E (β))		(S.E (β))		(S.E (β))	
	R2	McFadden: 0.083 ; McFadden (adjusted): 0.083 Cox-Snell/ML: 0.184 ; Cragg-Uhler/Nagelkerke: 0.201 Count: 0.578 ; Count (adjusted): 0.007							
	IC	AIC: 326798.357 ; AIC divided by N: 2.243 BIC (df=48): 327273.046							

Source: Research finding.

Note: * P< 0.05; ** P< 0.01; *** P< 0.001; S.E (β) = Standard Error of β

The RH variable (relationship history) is significant (at 0.001 level) in all models and its coefficients (OR) are +0.103 (1.109), +0.152 (1.164), +0.167 (1.182) and +0.153 (1.165) respectively. These results show that there is a negative relationship between "years of customer relationship with the bank" and "loan quality". This may be due to less screening and monitoring efforts of branches about the loan application of borrowers with more relationship history. It is probably due to some of the communications between the borrower and branch manager or reduced branch sensitivity about these borrowers. In this regard, one of the solutions to reduce its negative effects on banks is to move the branch managers periodically between different branches (see Hertzberg et al., 2010). Although our under review bank has been doing this more regularly in recent years, its data is not available for the empirical review.

Based on the estimation results, the change in the sign of coefficients of BT variable (borrower type) indicate that at lower levels of LQ, the loans paid to individuals were of poorer quality, but at higher LQ levels, the loans paid to legal entities were of poorer quality. It shows that although individuals pay their loan installments late, the loans they receive are less likely to be transferred to the higher non-current level than that paid to legal entities. This result, considering the conditions of Iran's economy, on the one hand indicates the bankruptcy of legal entities during the periods of economic recession and on the other hand may be due to the exploitation of legal loopholes related to bankruptcy and non-repayment of loans by legal entities.

The CtL (collateral to loan) variable is significant at first and last levels of LQ, and its coefficients (OR) in LQ levels are +0.045 (1.046), +0.020 (1.020), -0.025 (0.975) and -0.584 (0.558) respectively. The change in coefficients sign and stronger effects at higher LQ levels can be interpreted. This is due to the increased sensitivity of the bank at higher LQ levels, which is more likely to

default, leading to a more serious pursuit of the branch to collecting overdue loans from the customer's collateral. This indicates that if there is sufficient collateral, bank are reluctant to pursue overdue loans through legal channels too soon. This reluctance is probably due to the negative atmosphere against the legal actions of banks or the high problems and bureaucracy in the legal action process in the Iranian judicial system.

The Coll variable (type of collateral) estimation results indicate that the quality of loans with high liquidity collateral is better than other loans. It is consistent with the related theoretical literature that based on them collateral, a screening and signaling device can mitigate adverse selection and moral hazard problems (see Ioannidou et al., 2019). Besides, the effects became much stronger when LQ variable level moved from low to high, and the largest effect was identified among the final comparison (LQ level 4 versus from 0 to 3), which can be interpreted as explained for CtL variable.

Finally, it is worth noting that in the bank under study, the male branch managers are older and more experienced, and also have a lower level of education than their female counterparts; because this bank has been active for nearly 20 years, starting the banking business by employing the retirees (and experienced people) from older Iranian banks for important positions such as "branch manager" and "assistant branch manager". These individuals, who are mostly men, have more experience, are older, and have a lower level of education; although most of them have been currently dismissed by the bank. To be sure that this feature does not affect the estimation results, the appendix (Tables 6, 7, and 8) present the marginal effects of one of the characteristics of the branches' managers (Msex, Medu, and Mage variables) on loan quality at different levels of two other characteristics of branch managers. These results indicate that the different characteristics of branch managers do not have a significant effect on the estimation results. For example, Table II in the appendix

shows the results of the effect of branch managers' gender on the quality of lending at different levels of other characteristics of branch managers (Mage and Medu Variables). The comparison of the results of the marginal effects of branch managers' gender (Msex variable) at two different levels of the Medu variable and five levels of the Mage variable in this table does not show a significant difference. In fact, these results indicate that the replacement of men with women in the position of branch manager (with any level of education and age) reduces the probability of loans being placed in the category without overdue (LQ=0), and increases the probability of placing loans in the categories with overdue (LQ>0).

Table 4. Marginal Effects of Branch Managers` Characteristics (Msex, Mage, and Medu Variables) on Loan Quality (LQ) in the Generalized Ordinal Logit Model

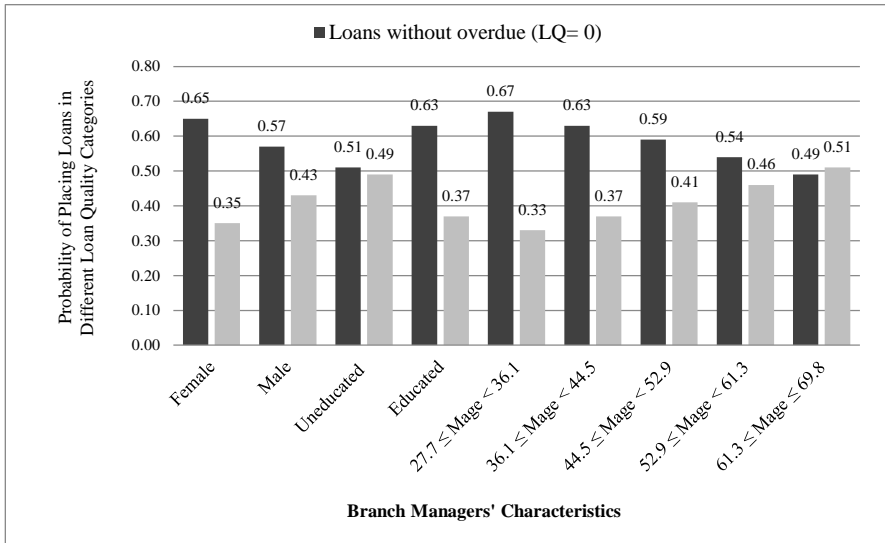| Predict		Loans without overdue (LQ= 0)		Up to 2 months overdue (LQ= 1)		2 to 6 months overdue (LQ=2)		6 to 18 months overdue (LQ= 3)		More than 18 months overdue (LQ=4)	
at		dy/dx	p-value	dy/dx	p-value	dy/dx	p-value	dy/dx	p-value	dy/dx	p-value
Manager Gender	Female (Msex= 0)	-0.091	0.000	0.032	0.000	0.028	0.000	0.024	0.000	0.007	0.000
	Male (Msex= 1)	-0.100	0.000	0.021	0.000	0.030	0.000	0.033	0.000	0.016	0.000
Manager Education	Medu=0	0.137	0.000	-0.053	0.000	-0.028	0.000	-0.034	0.000	-0.022	0.000
	Medu=1	0.125	0.000	-0.060	0.000	-0.028	0.000	-0.026	0.000	-0.010	0.000
Categories of Manager Age	$27.7 \leq \text{Mage} < 36.1$	-0.005	0.000	0.003	0.000	0.001	0.000	0.001	0.000	0.000	0.000
	$36.1 \leq \text{Mage} < 44.5$	-0.006	0.000	0.004	0.000	0.000	0.000	0.001	0.000	0.001	0.000
	$44.5 \leq \text{Mage} < 52.9$	-0.006	0.000	0.004	0.000	0.000	0.000	0.001	0.000	0.001	0.000
	$52.9 \leq \text{Mage} < 61.3$	-0.006	0.000	0.004	0.000	0.000	0.065	0.001	0.000	0.001	0.000
	$61.3 \leq \text{Mage} \leq 69.8$	-0.006	0.000	0.004	0.000	0.000	0.896	0.000	0.004	0.002	0.000

Source: Research finding.

Figure 1. Probability of Placing Loans in Different Loan Quality Categories at Levels of
the Branch Managers' Characteristics (Msex, Mage, and Medu Variables)
Source: Research finding.

6. Discussion

Our results indicated that the micro-lending quality of female branch managers is better than that of their male counterparts. While the results of marginal effects indicate that the different characteristics of male and female branch managers do not have a significant effect on the estimation results, we believe this result is due to that the female branch managers are more risk averse, which leads them to becoming more conservative in lending and granting loans than the male branch managers become. Besides, other reasons for this result are that the female branch managers increase the compliance of the decision-making of the branch's credit committee and lending processes with credit guidelines and recommendations, and they reduce agency problem through increasing monitoring in the branch's credit committee. Considering these reasons, probably female branch managers, because of less risk-taking, are more conservative in lending, which can affect the profitability of the branches and the bank. In this regard, considering their own strategies related to income

and profit, asset portfolio management, risk appetite, and characteristics of each branch, banks can determine the optimal composition of men or women to manage their branches. For example, if the bank's risk appetite increases, the bank can choose men to manage branches with high lending potential.

We found that the lending quality of the older branch managers (or branch managers who are closer to retirement age) has been poorer than that of their younger counterparts. Based on related studies, e.g. Cole et al. (2015), this is because of the higher level of screening efforts and lower risk-taking level of young people than people who are close to retirement age, which is due to their different career concerns and career advancements prospects. In this regard, banks can determine the impact factor of the lending performance of the branch managers on their promotion and compensation system by considering their strategies. Furthermore, we recommend that the bank's jobs be classified in such a way that it is always possible to promote the bank's human capital.

Higher education of the branch manager leads to the better quality of lending. In accordance with human capital theory and related literature, it is because people with more education have a higher ability to analyze the data and signals received from the loan applicants. Therefore, improving the education and knowledge of the branch managers in the fields related to lending and data analysis can have a positive effect on the branches' lending performance.

These results are very important for the Iranian banking network and economy. Because, on the one hand, on average, the NPL rate of micro-loans is lower than large loans, and on the other hand, pay small and medium loans to SMEs can quickly contribute to Iran's economic growth. Therefore, banks through more attention to microeconomic level's factors affecting the loan quality (such as the profile of the branch managers) can improve the quality of their micro-loans and increase the share of micro-loans in their credit portfolio. These

results can increase profitability of banks and contribute to Iran's economic growth.

7. Conclusion

Based on the financial literature, when the information asymmetry is present, agency problem can affect banks' lending. Accordingly, the contract between the bank and the loan officer (or other bank agents who are involved in the lending process such as branch manager in micro lending) is very important, which can reduce the negative consequences of this problem. In this regard, based on the empirical and theoretical studies, the performance-based incentives or rewards (as opposed to lending-based incentives) leads to an increase in the quality of lending, albeit by reducing risk-taking leads to reduction in the lending measure (profitability) of the bank. In addition, some studies argue that regardless of the monetary incentives that depend on the specifications of the contract between the bank and loan officers, the career concerns and the characteristics of loan officers can affect their performance. Besides, some of them believe that the characteristics of loan officers influence on the effectiveness of monetary incentives.

Although the previous research has focused on the loan officers, because of the major role of branch managers in the micro-lending process in the bank under review, as described in section 3 of this paper, our paper studied the branch managers. In this regard, this paper investigated the effects of the branch managers' characteristics, e.g. gender, age, and education, on loan quality in an Iranian commercial bank over the period from 2014–2018.

Since on the one hand, the dependent variable (loan quality) is a discrete ordinal variable and on the other hand, based on the Brant test's result the proportional odds assumption was violated, the generalized ordinal logit model was used. According to this model estimation results, our main findings are as follows:

First, the lending quality of female branch managers has been stronger than that of their male counterparts. While the results of marginal effects indicate that the different characteristics of male and female branch managers do not have a significant effect on the estimation results, a potential explanation for these results is that the female branch managers are more conservative in lending, because they are more risk averse than the male branch managers. Besides, female branch managers increase the compliance of the decision-making of the branch's credit committee and lending processes with credit guidelines and recommendations, and they reduce the agency problems through increasing monitoring in the branch's credit committee.

Second, the quality of lending by older branch managers (or branch managers who are closer to retirement age) has been poorer than that of their younger counterparts. Based on the related studies, this is due to the differences between young people and people who are close to retirement age in their career concerns and career advancement prospects, which leads to a higher level of screening efforts and lower risk-taking levels of young people.

Third, higher education of the branch managers improves the lending quality, which in accordance with human capital theory and related literature can be because branch managers with higher education have better ability to analyze the data, and signals received from the loan applicants.

Finally, there is a negative relationship between "years of customer relationship with the bank" and "loan quality", and loans with high liquidity collateral are of better quality.

In the end, according to the results of this study, we recommend that banks, (1) considering their own strategies related to income and profit, asset portfolio management, risk appetite, and characteristics of each branch, arrange the optimal composition of men or women to manage their branches, (2) classify the bank's jobs in such a way that

it is always possible to promote the bank's human capital, (3) determine the impact factor of the lending performance of the branch managers on their promotion and compensation system by considering their strategies, (4) improving the education and knowledge of the branch managers in the fields related to lending and data analysis, (5) move the branch managers periodically between different branches, and (6) determine the liquidity of the loan collateral according to the credit rating result and their strategies.

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Appendix

Table I. Results of the Ordered Logistic Regression or Proportional Odds (PO) Model and Brant Test

Variable		β	Odds ratio	Brant Test
Label	Name	(Std. Error of β)	(OR)	Chi-Square (df)
LA	Loan Amount	-0.000 (0.000) ***	1.000	51.67 (3)***
Mat	Loan Maturity	0.004 (0.000) ***	1.004	7 (3)***
LI	Loan Interest Rate	0.044 (0.001) ***	1.045	1279.43 (3)***
BT	Borrower Type	0.056 (0.020) **	1.057	58.65 (3)***
Coll	Collateral Type	-0.314 (0.012) ***	0.730	237.13 (3)***
CtL	Collateral to Loan	0.030 (0.012) *	1.031	92.80 (3)***
ItL	Borrower Income to Loan	-0.001 (0.000)	0.999	59.80 (3)***
RH	Relationship History	0.125 (.002) ***	1.133	1821.38 (3)***
Msex	Manager Gender	0.432 (0.019) ***	1.541	15.66 (3)**
Mage	Manager Age	0.024 (0.001) ***	1.024	887.33 (3)***
Medu	Manager Education	-0.534 (0.014) ***	0.586	159.10 (3)***
/cut1		3.282 (0.057)		NA
/cut2		4.241 (0.057)		NA
/cut3		5.053 (0.058)		NA
/cut4		6.289 (0.059)		NA
All		NA		5198.44 (33)***
Number of Cases		145.709		
Likelihood Ratio Chi-Square (df)		24356.30 (11) ***		
Wald Chi-Square (df)		22588.75 (11) ***		
Pseudo R2		0.0684		

Source: Research finding.
Note: * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

Table II. Marginal Effects of Branch Managers' Gender (Msex) Variable on Loan Quality (LQ) at Different Levels of other Characteristics of Branch Managers (Mage and Medu Variables)

Predict		Loans without overdue (LQ= 0)		Up to 2 months overdue (LQ= 1)		2 to 6 months overdue (LQ=2)		6 to 18 months overdue (LQ= 3)		More than 18 months overdue (LQ=4)	
at		dy/dx	p-value	dy/dx	p-value	dy/dx	p-value	dy/dx	p-value	dy/dx	p-value
Manager Education	Medu=0	-0.103	0.000	0.016	0.000	0.029	0.000	0.036	0.000	0.022	0.000
	Medu=1	-0.094	0.000	0.027	0.000	0.029	0.000	0.028	0.000	0.010	0.000
Categories of Manager Age	27.7 ≤ Mage < 36.1	-0.088	0.000	0.025	0.000	0.031	0.000	0.026	0.000	0.006	0.000
	36.1 ≤ Mage < 44.5	-0.095	0.000	0.027	0.000	0.030	0.000	0.029	0.000	0.010	0.000
	44.5 ≤ Mage < 52.9	-0.100	0.000	0.026	0.000	0.029	0.000	0.030	0.000	0.014	0.000
	52.9 ≤ Mage < 61.3	-0.102	0.000	0.024	0.000	0.026	0.000	0.030	0.000	0.021	0.000
	61.3 ≤ Mage ≤ 69.8	-0.103	0.000	0.020	0.000	0.023	0.000	0.027	0.000	0.032	0.000

Source: Research finding.

Table III. Marginal Effects of Branch Managers' Education (Medu) Variable on Loan Quality (LQ) at Different Levels of other Characteristics of Branch Managers (Msex and Mage Variables)

Predict		Loans without overdue (LQ= 0)		Up to 2 months overdue (LQ= 1)		2 to 6 months overdue (LQ=2)		6 to 18 months overdue (LQ= 3)		More than 18 months overdue (LQ=4)	
at		dy/dx	p-value	dy/dx	p-value	dy/dx	p-value	dy/dx	p-value	dy/dx	p-value
Manager Gender	Female (Msex= 0)	0.121	0.000	-0.064	0.000	-0.027	0.000	-0.022	0.000	-0.007	0.000
	Male (Msex= 1)	0.134	0.000	-0.058	0.000	-0.029	0.000	-0.031	0.000	-0.016	0.000
Categories of Manager Age	27.7 ≤ Mage < 36.1	0.122	0.000	-0.059	0.000	-0.032	0.000	-0.025	0.000	-0.006	0.000
	36.1 ≤ Mage < 44.5	0.131	0.000	-0.063	0.000	-0.031	0.000	-0.027	0.000	-0.009	0.000
	44.5 ≤ Mage < 52.9	0.137	0.000	-0.065	0.000	-0.030	0.000	-0.029	0.000	-0.014	0.000
	52.9 ≤ Mage < 61.3	0.141	0.000	-0.064	0.000	-0.028	0.000	-0.028	0.000	-0.022	0.000
	61.3 ≤ Mage ≤ 69.8	0.142	0.000	-0.060	0.000	-0.025	0.000	-0.025	0.000	-0.033	0.000

Source: Research finding.

Table IV. Marginal Effects of Branch Managers' age (Magecat) Variable on Loan Quality (LQ) at Different Levels of other Characteristics of Branch Managers (Msex and Medu Variables)

Predict		Loans without overdue (LQ= 0)		Up to 2 months overdue (LQ= 1)		2 to 6 months overdue (LQ=2)		6 to 18 months overdue (LQ= 3)		More than 18 months overdue (LQ=4)	
at		dy/dx	p-value	dy/dx	p-value	dy/dx	p-value	dy/dx	p-value	dy/dx	p-value
Manager Gender	Female (Msex= 0)	-0.005	0.000	0.004	0.000	0.000	0.000	0.001	0.000	0.000	0.000
	Male (Msex= 1)	-0.006	0.000	0.004	0.000	0.000	0.002	0.001	0.000	0.001	0.000

Predict		Loans without overdue (LQ= 0)		Up to 2 months overdue (LQ= 1)		2 to 6 months overdue (LQ=2)		6 to 18 months overdue (LQ= 3)		More than 18 months overdue (LQ=4)	
Manager	**Medu=0**	-0.006	0.000	0.004	0.000	0.000	0.065	0.001	0.000	0.001	0.000
Education	**Medu=1**	-0.006	0.000	0.004	0.000	0.000	0.000	0.001	0.000	0.001	0.000

Source: Research finding.

Note: Magecat variable= Mage (managers' age) variable which is categorized into 5 levels (i.e., $27.7 \leq Mage < 36.1$; $36.1 \leq Mage < 44.5$; $44.5 \leq Mage < 52.9$; $52.9 \leq Mage < 61.3$; $61.3 \leq Mage \leq 69.8$).