Risk Management Practices in the Republic of Yemen: Are Islamic banks different?

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Abstract

The main aims of this paper are, firstly, to investigate the extent to which Yemen's banks, in particular its Islamic banks, are applying Risk Management Practices (RMPs) and related techniques to deal with various types of risk, and secondly, to compare and distinguish between the RMPs used in Islamic, national and foreign banks. Semi-structured interviews were conducted to identify the current RMPs in Yemen. The main research instrument was a questionnaire, divided into two sections. The first section covered the following five aspects: understanding risk and risk management, risk identification and analysis, risk monitoring, RMPs, and credit risk analysis. The second section consisted of four aspects: methods of risk identification, risk management, credit risk management, and types of risk. Multinomial regressions and other statistical tools were applied to determine whether there are differences between Islamic banks and other banks in Yemen. Our results revealed that there are significant differences between Islamic and national banks in terms of their understanding of risk and risk management, risk identification and analysis and credit risk analysis. However, there are no major differences found between national and Islamic banks in terms of risk management and RMPs. For Islamic and foreign banks, however, there are significant differences in terms of understanding risk and risk management and risk identification and analysis, but no differences between their risk management, RMPs and credit risk analysis.

Key wards: *Risk Management, Islamic Banking, Multinomial Regression, Yemen.*

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1. Introduction

Recently, the correlations and causalities between different types of risk, both within individual banks and throughout the banking system, have increased and become

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more complex. The continuation of the crisis in the financial markets has progressively made risk management an even more important part of a banks' decision-making than it was previously. Banks are businesses that are strongly associated with risk, due to their dealings with businesses, entrepreneurs, depositors, the economic environment, banking regulations and other factors, all of which involve uncertainties. All banks are subject to a wide range of risks in their operations, including credit risk, liquidity risk, foreign exchange risk, market risk, interest rate risk and other risks that may threaten their survival and success (Al-Tamimi and Al-Mazrooei, 2007).

Islamic banks have been operating alongside conventional banks for nearly four decades. They differ from conventional banks in several ways, including the prohibition of *Riba* (interest), *Gharar* (uncertainty), *Maysir* (gambling) and the requirement that their operations should comply with Islamic Law (*Shari'ah*). Islamic banking has grown in both scope and volume since the emergence of modern Islamic finance in the 1970s. There are currently more than 300 Islamic financial institutions, operating in more than 75 countries. Over the years, Islamic banks have been transformed into a dynamic and vibrant, competitive mode of global financial intermediation. It is estimated, according to recent reports that *Shari'ah* compliant assets worldwide have now grown to around $700 billion, with an annual growth rate in the last ten years exceeding ten percent (Muhairi, 2009).

Risk management practices (RMPs) are relevant for both conventional and Islamic banks (Iqbal and Mirakhor, 2007). However, there are some different approaches of the Islamic RMPs compared to the conventional RMPs for example: (i) Islamic RMPs should be based on real economic conditions and not speculative economic activities; (ii) Islamic risk management instruments should connect with real sector activities, (iii) Islamic finance requires high levels of interaction and cooperation between Islamic banks, enterpreneurs and depositors; (iv) all Islamic RMP processes, mechanisms and instruments must comply with *Shari'ah* principles.

The process of risk management follows two stages: firstly, to identify the sources of risk and analyse the variables causing it; and secondly, to develop and apply mathematical models to measure risks (Al-Tamimi, 2002). It is critical that Islamic banks have a comprehensive framework of RMPs and there is a growing awareness among them that sustainable growth will depend significantly on the development of such a framework.

One of the main features of Islamic banks is the connection between different types of banking products and services and the activities occurring in the real sector. In particular, Islamic banking products are based on at least two principles: Profit and

Loss Sharing (PLS) and mark-up (Hassan, 2009), which shows that Islamic banking operations deal closely with various types of risk coming from investment-based activities (the application of PLS) and trading activities (the application of mark-up). Market risk, interest rate risk, and exchange rate risk are all examples of risks caused by the former, while commodity risk, default risk, and depreciation risk are examples of risks caused by the latter.

The financial service sector in Yemen is said to be underdeveloped and currently dominated by the banking sector[4]. Unfortunately, the banking system in Yemen is inefficient and suffers from a number of issues, including poor loan collection rates, low-quality banking assets, policies which provide questionable loans to customers, and poor implementation and enforcement. Moreover, it has a weak legal system for debt collection and a general lack of public confidence in the banking system as a whole (Al-Swidi and Mahmood, 2011).

According to Mohammed Bin Hamam, Deputy Governor of the Central Bank of Yemen, when comparing the fours Islamic banks with conventional banks in Yemen, the four Islamic banks showed higher growth rates during the period 2007-2010 (Central Bank of Yemen, 2010). The Islamic banks accounted for 31 percent of the total assets held in the Yemeni banking sector in 2008. In addition, the four Islamic Banks held 40 percent of portfolio funding with the 14 commercial banks holding the remaining 60 percent share. The amount of loans granted and the financing in Rial currency in Islamic banks rose to YR198 billion in 2008 from YR162.3 billion in 2007, a growth rate of 22 percent (Darem, 2009). This remarkable growth reflects the prosperity of the Islamic banks.

The rest of this paper is organized as follows: section 2 reviews the relevant literature, section 3 discusses the research methodology, section 4 explains the results and section 5 concludes the research and suggests areas for future research.

2.   Review of relevant literature

Risk can be defined as the variability or volatility of unexpected results (Jorion and Khoury, 1996). In financial terms, risk is usually defined as the probability that the actual return may differ from the expected return (Howells and Bain, 1999). In

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[4] The Yemeni banking sector is composed of the Central Bank of Yemen, in addition to other 17 banks. The later is classified into twelve commercial banks, three Islamic banks and two specialized banks (Central Bank of Yemen, 2010; Al-Swidi and Mahmood, 2011).

particular, risk occurs when there is a possibility of more than one outcome and the outcome is unknown. Risk management is defined by Anderson and Terp (2006, p. 28) as a process that should seek to eliminate, reduce and control risks, increase profits and avoid the disadvantages of speculative exposure. Pyle (1997) defines bank risk management as a process of identifying key risks, obtaining consistent, understandable, operational risk measures, choosing which risks to reduce and which to increase and by what means, and establishing procedures to monitor the resulting risk position.

In the financial system, there are at least three broad categories of risk: (1) financial risk, (2) business risk, and (3) operational risk. Financial risk arises from the business activities of banks, while business and operational risk relate to banks' internal affairs. Islamic banks also face these risks but unlike conventional banks, Islamic banks have other risks such as *Shari'ah* compliance risk, commodity price risk, equity risk, displaced commercial risk and reputation risk. Shari'ah and reputation risks come as a result of the non Shari'ah compliance Islamic banking activities while commodity price and equity risk occur because of the real sector based Islamic finance contracts and finally displaced commercial risk happens when there are two banking systems (conventional and Islamic) that are applied within a banking industry.

The treatment of risks should follow a causal and interactive system because the causes and impacts of one type of risk cannot be isolated from the others. All risks are correlated and influence each other. For example, market risk and credit risk might cause liquidity risk and operational risk and vice versa. Banks therefore need to be alert and anticipate the causes of financial, business, and operational risk as failure to do so could lead to an asset-liability imbalance and possible issues with liquidity. The fundamental factors of risk management, including the identification, measurement, monitoring and management of risk exposures, cannot be implemented effectively unless there is a broader system in place. The practices of risk management must be comprehensive, including all departments and sections of the institution and creating a culture of risk management (Khan and Ahmed, 2001). There has been a wide range of studies on the performance risk management within Islamic banking, but few that concentrate on the case of a specific country. Some studies in this area are summarized below:

Al-Tamimi and Al-Mazrooei (2007) conducted a study comparing the management of risks by the UAE's national and foreign banks. Their investigation found that the three most significant risks facing the UAE's commercial banks were foreign exchange risk, credit risk and operational risk. Furthermore, they found that the UAE banks understood the principles of risk management and that their RMPs mainly involved risk identification, risk assessment and analysis. Their findings also suggested that there was a significant difference between the UAE's national and foreign banks in terms of their risk assessment and analysis, and risk monitoring and control.

Hassan (2009) evaluated the level of understanding about implementing risk management in Islamic banks in Brunei Darussalam and the methods used to deal with different types of risk. His results show that banks in Brunei are subject to three major risks: credit, foreign exchange and operational. He also demonstrates that employees across Islamic banks in Brunei have a significant level of understanding of risk management. Hasan then uses a regression model to identify that risk identification, assessment, and analysis are the most influential aspects of risk management in Brunei's Islamic banks. Finally, he argues that banks need to pay more attention to risk identification, assessment, and analysis in order to efficiently manage their risks.

On a related topic, Al-Tamimi (2008) conducted a study called "Implementing Basel II: an investigation of the UAE banks' Basel II preparations", which explored the degree of readiness of UAE banks to comply with international standards and practices. The results of the study showed that UAE banks were aware of the benefits and challenges of implementing Basel II, and that they had enough resources to meet the essential requirements. Additionally, the willingness of the employees, their understanding and their levels of education, were all found to be sufficient to support the implementation of Basel II. Finally, the results found no significant differences between UAE national and foreign banks in their preparations for Basel II. In another study, Al-Tamimi (2002) discusses the topic of "Risk management practices: an empirical analysis of the UAE commercial banks", which examines how UAE commercial banks use risk management methods to deal with various types of risk. The results of the study revealed that the common methods of identifying risk were branch managers' inspections and financial statement analysis. The major risk

management techniques used by UAE commercial banks were credit scores, credit worthiness analysis, risk ratings and collateral. Finally, the study illustrated the compliance of UAE commercial banks in using the most sophisticated risk management techniques.

As no study has yet investigated RMPs in the Republic of Yemen, this paper used semi-structured interviews to gain a broad range of information about the topic. Furthermore, this research attempted to investigate, through the use of a questionnaire, whether there are significant differences between Islamic, national, and foreign banks in terms of their understanding of risk and risk management, risk identification analysis, risk monitoring, RMPs, and credit risk analysis.

3. Research Methodology and Data Collection

Both qualitative and quantitative research methodologies were applied in this work, through semi-structured interviews, a questionnaire, a regression and multinomial regression analysis. The interviews were conducted to gain a comprehensive understanding of the practice of risk management in Yemen. This was deemed necessary due to the lack of existing information and previous studies on this topic in the context of Yemen. Prior to conducting the interviews, a pilot study was carried out with three bankers who had comprehensive knowledge of banking operations in relation to risk management. Then, semi-structured interviews were carried out with branch managers from three different types of bank: Islamic, national and foreign.

The main objective of these interviews was to identify, differentiate between, analyze and compare RMPs in the three types of bank. In order to elicit full responses from the respondents and gather the required information, two of the questions were designed to be open-ended, clear, and concise, but meaningful. They avoided asking for sensitive and confidential information, which the respondents might be reluctant to provide. However, the interviewees were asked to provide examples of banking (deposit) activities or implicit indicators related to the main issues, which might help them to explain, and provide a broader range of information. The aim was that, starting from these two questions, comprehensive information on RMPs in Yemeni banks could be gained. The two questions were as follows:

Q_1: What sort of risk management approaches and methods are currently practised in Yemen?

Q_2: What are the main risks faced by banks in Yemen?

In addition, a questionnaire was drawn up, based on the work of Al-Tamimi and Al-Mazrooei (2007), with written consent, and adapted to be used in Yemen. The main purposes of using a questionnaire in this research were to (i) determine the level of awareness of RMPs across the banking sector in Yemen, (ii) examine the readiness of the Yemeni banks to use various techniques to deal with different types of risk and (iii) find ways to improve the RMPs of Yemeni banks, in particular the Islamic banks.

The research questionnaire was divided into two sections. Section 1 covered the following five aspects: Understanding Risk and Risk Management (URRM); Risk Identification and Analysis (RIA); Risk Monitoring (RM); Risk Management Practice (RMP) and Credit Risk Analysis (CRA). It comprised of 29 questions, based on a five-point Likert scale; five of the questions were related to URRM, seven to RIA, six to RMP, six to RM, and five were related to CRA. Respondents were asked to indicate their degree of agreement with each of the questions, choosing from answers on a five-point Likert scale. Section 2 was comprised of four closed-ended questions, based on ordinal scales, asking the respondents about their methods of identifying risks and the risks that their banks face. The feedback from the two sections was categorized as being from Islamic, national or foreign banks, in order to determine any differences in the RMPs of the different types of bank.

The questions in each of the two sections were as follows:

Section 1:

Q_1: Do Yemeni bank staff understand risk and risk management?

Q_2: Do Yemeni banks use RIA techniques to identify potential risks relating to their aims and objectives?

Q_3: Do Yemeni banks have efficient RM and control systems?

Q_4: Do Yemeni banks use RMPs effectively?

Q_5: How do Yemeni banks grant loans and what methods are used to analyse credit risks?

Section 2:

Q$_1$: Which methods do Yemeni banks use to identify their risks?

Q$_2$: How do Yemeni banks mitigate the risks involved in their business activities?

Q$_3$: What are the most important risks that Yemeni banks face?

Q$_4$: What are the most important methods used by Yemeni banks to reduce their level
   of risk?

Respondents answered the questions by ticking the appropriate choices (one or more
than one options) and giving additional information based on their experiences. Such
questions were constructed in order to clarify the following *hypotheses* which are:

H$_1$ There is a positive relationship between RMPs and URRM, RIA, RM and CRA.

H$_2$ There is a difference between the Yemeni Islamic and national banks in terms of
   their

   URRM, RIA, RM, RMPs and CRM.

H$_3$ There is a difference between the Yemeni Islamic and foreign banks in terms of
   their

   URRM, RIA, RM, RMPs and CRM.

H$_4$ There is a difference between the Yemeni national and foreign banks in terms of
   their

   URRM, RIA, RM, RMPs and CRM.

3.1. Statistical Tools and Techniques

Two different pieces of software, SPSS 17.00 and STATGRAPHICS 5.1, are used to
apply the regression and multinomial regression models. These models are described
below.

Regression model: A regression model is a statistical method of estimating the
relationship between a continuous dependent variable and one or more continuous
independent or predictor variables (Allison, 1999). The equation for a multiple
regression model is as follows:

$$Y = \alpha + B_1 X_1 + B_2 X_2 + B_3 X_3 + \ldots + B_n X_n + e$$

where,

Y= the dependent variable; Xs = the independent variables, X_1, X_2, X_3 … X_n; α = a constant or an intercept; e = the error or residual; B_1, B_2 … B_n = the slopes associated with each independent variable.

Multinomial regression model: A multinomial regression is a process of regression analysis, designed to interpret the responses of the dependent variable to the explanatory independent variables (Hossain et al., 2002). The equation for the multinomial regression analysis used in this paper is as follows (see, for example, Hossain et al., 2002):

$$1(\alpha, \beta) = \prod_{i=1}^{N} [P_1 \ (X_i)^{y_{1i}} \ P_2 \ (X_i)^{y_{2i}} \ P_3 \ (X_i)^{y_{3i}}$$

where,

1 is the usual indicator function; α and β are the model parameters; P_1, P_2, and P_3 are the probabilities of a bank being of type 1, 2, or 3 (i.e. Islamic, national and foreign), respectively; X_i are the covariates of the i th bank; y_{1i} is an indicator variable which is 1 if the i th bank is of type 1, or 0 otherwise, etc.

3.2. Sampling and Data Collection

The questionnaires were distributed to all banks and their branches inclusive within the largest cities in Yemen, namely, Sana'a, Aden, Al-Mukalla and Al-Hudaydah. A total of 130 questionnaires were sent out; and the final sample included branch managers, senior risk management officers and relationship officers.

The rationale behind using such a large sample was to gain a comprehensive indication of how employees deal with the risks that they face and how the understanding of risk management approaches varies across banks' operations. A total of 106 questionnaires were returned (with a response rate of 81.54%), a positive level of participation by the Yemeni bank employees. The questionnaire was designed to achieve the objectives and test the research hypotheses by determining the attitudes to risk management within the Yemeni banking sector, the behaviours of bank employees in this regard, and the banks' approaches to risk management. The

information gathered from the questionnaires provided some significant results as described below.

4.   Empirical Analysis

4.1.   Interviews

The interviews revealed that the risk management approaches practiced in Yemen were varied, due to the lack of regulations and monitoring authorities. They also showed that banks in Yemen are all subject to almost the same risks, with differences occurring only in the relative importance they assign to each risk. Furthermore, the risk management methods used were again found to be similar across all banks, but differences were observed in the level of experience and training facilities available to the risk management unit and the quality of the banks' monitoring systems.

Moreover, the interviews highlighted that those banks with an international presence tended to have a better understanding of RMPs; banks in Yemen with an international presence appear to be equipped with better training facilities, and use a higher level of risk management techniques than the local banks do. This gives foreign banks an edge in avoiding liquidity and credit risk, which is reflected in their annual performance (for more details, see Appendix A).

4.2.   Questionnaire

As stated above, the questionnaire used for this research comprised 29 questions based on a five-point Likert scale, and covered five aspects of risk management. It should be emphasised that, as this questionnaire has been used before, but in a different context, issues such as reliability are less important than they would normally be. However, Cronbach's alpha was calculated for the different subsections and for the overall questionnaire, and the minimum value was 0.72 (see Appendix B for more details).

In the following sections, we attempt to answer the research questions, using descriptive statistical analysis to measure the tendencies and variabilities of the various aspects of risk management investigated.

URRM: Table 1 indicates that positive answers were given by the respondents particularly, those who understand risk and risk management are dominant than the

others. There is evidence of statistically significant differences at the 99% confidence level between different respondents' answers (i.e. agree, neutral and disagree) for all factors, as shown by the chi^2 test. This illustrates that the Yemeni bank staff understand risk and risk management.

Also, Table 1 shows the importance of the five questions, although there is no immense difference between the highest and lowest mean scores for the five questions. The highest mean was 4.1887, for questions 1 and 2, while the lowest of 3.9811 was for question 5. Additionally, the chi^2 value shows that there is a significant understanding of risk management among the bank staff. The highest chi^2 value was 90.358 for question 1. These results show that banks in Yemen have staff with the ability to manage risk efficiently and effectively in the future.

RIA: This is the fundamental stage in the process of risk management. This part of the questionnaire contained seven questions. As shown in Table 1, the highest frequency of "agree" responses (101) and the highest mean score (4.2736) were obtained for question 1, whilst the lowest frequency of "agree" responses (67) and lowest mean score (3.7547) were obtained for question 4. The results for question 4 are supported by an interview conducted with one of the branch managers of the United Arabic Bank, who stated that "each bank has their own risk policies and procedures, which are not similar to other banks' due to the absence of any regulatory authority in the country".

In addition, the highest chi^2 value is 92.264, for question 7, shows that banks in Yemen do not engage in high risk activities, locally or globally. This argument is supported by the report *Countries of the World* (2010), which states that 'Yemen banks were protected from the effects of the global economic crisis because its financial system is underdeveloped and inefficiently integrated into the international community'. However, in the years to come, Yemeni banks will need to prepare appropriate risk management techniques and anticipate the pressures that will be put on them, both internally and externally.

RM: Monitoring is an essential step in the process of risk management. Table 1 indicates that the difference between the highest and lowest mean scores for the six questions on this topic is not large. The highest mean of 4.1792 and chi^2 value of 92.264 are for question 1. Following on from the findings relating to RIA, these

results illustrate that the banks have effective control systems and efficient risk monitoring in place, which gives an indication that there is already a strong foundation for monitoring risk in Yemeni banks that should prove useful in the future.

RMPs: These are considered to be the most important aspect of risk management. Table 1 show that the highest mean score of 4.2075 was given in response to the second question. This illustrates that Yemeni banks have efficient RMPs. However, the banks appear to have a lack of expertise in RMPs, indicated by mean score of 3.8774 given in response to question 3. Moreover, the highest chi^2 of 82.396 applies to question 4. This confirms that the RMPs in Yemeni banks are efficient.

CRA: Credit risk is one of the key types of risk banks face. Table 1 shows that Yemeni banks are conservative in granting loans. There is a significant difference between the highest and lowest mean scores given. The highest mean of 4.3585 is obtained for question 2 meaning, most of banks in Yemen conduct a specific analysis to examine the client's character, capacity, collateral capital and conditions. Meanwhile, the lowest mean is noted for question 5 meaning that they do not prefer requires collateral against some loans. On the other hand, the highest chi^2 value of 65.245 is for question 4 and the lowest is for question 3. This indicates that the employees of the Yemeni banks intensively apply specific credit proposal analysis to mitigate credit risk.

Table 1: Descriptive statistics on respondents' answers to the questionnaire

Questions	Frequency						MEAN	SD	Chi² Test	
URRM	4+5	%	3	%	2+1	%			DF	Value
1. There is a common understanding of risk management across the bank.	103	97.2	3	2.8	0	0	4.1887	0.4600	2	90.36***
2. The responsibility for risk management is clearly set out and understood throughout the bank.	99	93.4	7	6.6	0	0	4.1887	0.5365	2	62.74***
3. Managing risk is important to the performance and success of the bank.	82	77.3	23	21.7	1	9	4.1604	0.7944	3	40.94***
4. It is crucial to apply the most sophisticated techniques in risk management.	81	76.4	23	21.7	2	1.9	4.0094	0.7495	3	49.70***
5. Applications of risk management techniques reduce costs or expected losses.	81	76.4	24	22.6	1	9	3.9811	0.7034	3	60.11***
RIA										
1. The bank has regularly carried out a comprehensive and systematic identification of its risks relating to each of its declared aims and objectives.	101	94.3	5	4.7	0	0	4.2736	0.5439	2	54.47***
2. The bank finds it difficult to prioritize its main risks.	80	75.5	18	17.0	8	7.5	3.9151	0.8408	3	46.38***
3. Changes in risks are recognized and identified with the bank's roles and responsibilities.	84	79.3	22	20.8	0	0	3.9340	0.5899	2	48.81***
4. The bank knows about the strengths and weaknesses of the risk management systems of other banks it works with.	67	63.2	34	32.1	5	4.7	3.7547	0.7905	3	41.40***
5. Your bank's response to analysed risks includes an evaluation of the effectiveness of existing controls and risk management responses.	80	75.5	23	21.7	3	2.8	3.8774	0.6859	3	78.53***
6. Your bank's response to analysed risks includes an assessment of the costs and benefits of addressing risks.	73	68.8	31	29.2	2	1.9	3.8302	0.7100	3	59.66***
7. Your bank's response to analysed risks includes prioritizing risk treatments where there are resource constraints on risk treatment implementation.	74	69.8	31	29.2	1	9	3.8774	0.7131	3	92.26***
RM										
1. Monitoring the effectiveness of risk management is an integral part of routine management reporting.	96	90.5	8	7.5	2	1.9	4.1792	0.6443	3	92.26***
2. The level of control by the bank is appropriate for the risks that it faces.	91	85.8	15	14.2	0	0	4.1698	0.6542	2	26.40***
3. Reporting and communication processes within your bank support the effective management of risk.	79	74.5	27	25.5	0	0	4.1038	0.7798	2	3.08*
4. The bank's response to risk includes an evaluation of the effectiveness of the existing controls and risk management responses.	80	75.5	24	22.6	2	1.9	3.9528	0.7221	3	58.45***
5. The bank's response to risk includes action plans for implementing decisions about identified risks.	74	69.8	30	28.3	2	1.9	3.9245	0.7770	3	40.57***
6. The bank's response to risk includes an assessment of the costs and benefits of addressing risks.	77	72.7	27	25.5	2	1.9	3.8491	0.6731	3	75.21***

Notes: 2+1 denotes disagree or strongly disagree; 3 denotes a neutral response and 4+5 denotes the responses agree or strongly agree. *, **, and *** indicate statistically significant differences at the 10, 5, and 1 percent levels, respectively. URRM refers to Understanding Risk and Risk Management; RIA refers to Risk Identification and Analysis and RM refers to Risk Monitoring. The sample consists of all Yemeni banks (18 banks); 106 questionnaires were finally used in the analysis and classified as follows: 34 covering national banks, 38 covering foreign banks, and 34 covering Islamic banks.

Table 1 (continued): Descriptive statistics on respondents' answers to the questionnaire

Questions	Frequency						MEAN	SD	Chi^2 Test	
RMPs	4+5	%	3	%	2+1	%			DF	Value
1. The bank's executive management regularly reviews the organization's performance in managing its business risks.	95	89.6	11	10.4	0	0	4.1729	0.5983	2	42.47***
2. The bank's risk management procedures and processes are documented and provide guidance to staff about managing risks.	92	86.8	14	13.2	0	0	4.2075	0.6578	2	24.98***
3. Your bank emphasizes the recruitment of highly qualified people in risk management.	70	66.1	32	30.2	4	3.8	3.8774	0.8361	3	30.53***
4. It is too dangerous to concentrate the bank's funds in one specific sector of the economy.	83	78.3	19	17.9	4	3.8	4.0283	0.8558	4	82.40***
5. Your bank has highly effective continuous reviews/feedback on risk management strategies and performance.	75	70.8	28	26.4	3	2.8	3.9151	0.7821	3	41.85***
6. Overall, I consider the level of risk management practices of this bank to be excellent.	81	76.5	23	21.7	2	1.9	3.9528	0.7088	3	63.74***
CRA										
1. Your bank undertakes a credit worthiness analysis before granting loans.	101	95.3	5	4.7	0	0	4.3396	0.82878	2	44.17***
2. Before granting loans, your bank undertakes a specific analysis including the client's character, capacity, collateral capital and conditions.	98	82.5	8	7.5	0	0	4.3585	0.69970	2	32.23***
3. It is essential to require sufficient collateral from small borrowers.	83	78.3	23	21.7	0	0	4.0377	0.68902	3	18.36***
4. Your bank's policy requires collateral for the granting of all loans.	77	72.7	27	25.5	2	1.9	3.8774	0.62012	3	65.25***
5. It is preferable to require collateral against some loans but not all of them.	41	38.7	45	42.5	20	18.9	3.2547	0.56714	3	33.10***

Notes: 2+1 denotes disagree or strongly disagree; 3 denotes a neutral response and 4+5 denotes the responses agree or strongly agree. *, **, and *** indicate statistically significant differences at the 10, 5, and 1 percent levels, respectively. RMP refers to Risk Management Practice and CRA refers to Credit Risk Analysis. The sample consists of all Yemeni banks (18 banks); 106 questionnaires were finally used in the analysis and classified as follows: 34 covering national banks, 38 covering foreign banks, and 34 covering Islamic banks.

Risk Identification Methods: Table 2 shows that banks in Yemen use different types of methods to identify risk. The three most commonly used methods are audits or physical inspections (95%), financial statement analysis (92%) and scenario analysis (74%). This provides evidence that the banks are aware of the need to identify risks and has combined such methods to examine risks that are based on inspections and financial report analysis. It also informs us that banks combine direct and indirect risk management analysis. Audits or physical inspections represent direct risk management analysis while financial statement analysis and scenario analysis are indirect forms.

Methods of Risk Management: Table 2 shows that Yemeni banks use various methods of risk management. The highest number of positive responses (87.7% of total respondents) was obtained for Value at Risk, followed by collateral (69.8% of total respondents), and credit worthiness analysis (61.3% of total respondents).

Type of Risks: Table 2 highlights the perceived importance of risks faced by banks in Yemen. The figures demonstrate which risks are considered most important. The most commonly-cited important risk is foreign exchange risk, with 98.1% of respondents selecting it. This could be due to several factors including economic and political characteristics. Yemen has been in political crisis for many years, particularly over the last decade and political factors are believed to have had a significant influence on the local currency exchange rate. This has resulted in a lack of trust among the public, which has influenced demand for the local currency.

Credit risk is the second most frequently selected risk, indicated by 71.7% of the respondents, whilst the third most important risk is liquidity risk (69.8% of respondents). As such, the performance of business, and specifically the performance of entrepreneurs in doing business, is very important. Banks in Yemen are aware of business failure leading to entrepreneurs' defaulting on their loans and the credit risk this presents. It also presents a liquidity risk when the business default causes the inability of Yemen's banks to fulfil their financial obligation with depositors.

Methods of Credit Risk Management: As mentioned above, credit risk is one of the major risks faced by Yemeni banks. Thus, credit risk management needs to be implemented. Table 2 illustrates that Yemeni banks use various method of credit risk management. Nevertheless, the most important are as follows: risk rating (85.8% of respondents indicated that their bank uses this method), behaviour scoring (68.9% of respondents), good/bad analysis (55.7% of respondents) and credit scoring (51.9% of respondents). These results confirm that Yemeni banks are aware of the importance of credit risk management and have implemented various methods of credit risk management.

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Table 2: Frequency distributions based on the answers to section 2 of the questionnaire

Questions	Ticked	%	Not-ticked	%	DF	Value
			Frequencies		**Chi² Test**	
Risk Identification Methods						
Audits or physical inspection	101	95.3	5	4.7	1	86.943***
Financial statement analysis	98	92.5	8	7.5	1	76.415***
Scenario analysis	79	74.5	27	25.5	1	25.509***
Risk survey	65	61.3	41	38.7	1	5.434***
SWOT analysis	65	61.3	41	38.7	1	5.434***
Process analysis	61	57.5	45	42.5	1	2.415*
Inspection by the bank's risk manager	57	53.8	49	46.2	1	0.604*
Inspection by outside expert	38	35.8	106	64.2	1	8.491***
Internal communication, such as internal conversation with employees	20	18.9	86	81.1	1	41.094***
Benchmarking	13	12.3	93	87.7	1	60.377***
Risk Management Methods						
Value at risk (VAR)	93	87.7	13	12.3	1	60.377***
Collateral	74	69.8	32	30.2	1	16.642***
Credit worthiness analysis	65	61.3	41	38.7	1	5.434***
Hedging	46	43.4	60	56.6	1	1.849*
Establishing standards (e.g. credit limits)	40	37.7	66	62.3	1	6.377***
Duration (average life) analysis	35	33.0	71	67.0	1	12.226***
Statistical methods in risk measurement	35	33.0	71	67.0	1	12.226***
Comprehensive risk management	25	23.6	81	76.4	1	29.585***
Periodical reports	18	17.0	88	83.0	1	46.226***
Asset diversification	17	16.0	89	84.0	1	48.906***
Gap analysis	11	10.4	95	88.7	1	66.566***
Instructions	32	9.4	74	69.8	1	16.642***
Pricing the loan	10	9.4	96	90.6	1	69.774***
Derivatives (i.e. forwards, futures, options, and swaps)	2	1.9	104	98.1	1	98.151***
Types of Risk						
Foreign exchange risk	104	98.1	2	1.9	1	98.151***
Credit risk	76	71.7	30	28.3	1	19.962***
Liquidity risk	74	69.8	32	30.2	1	16.642***
Interest rate risk	41	38.7	65	61.3	1	5.434***
Counterparty risk	34	32.1	72	67.9	1	13.623***
Operating risk	34	32.1	72	67.9	1	13.623***
Solvency risk	28	26.4	78	73.6	1	25.585***
Reputation risk	25	23.6	81	76.4	1	29.585***
Legal risk	22	20.8	84	79.2	1	36.264***
Price risk	16	15.1	90	84.9	1	51.660***
Strategic risk	7	6.6	99	93.4	1	79.849***
Credit Risk Methods						
Risk Ratings	91	85.8	15	14.2	1	54.491***
Behaviour Scoring	73	68.9	33	31.1	1	15.094***
Good/Bad Analysis	59	55.7	47	44.3	!	1.358*
Credit Score	55	51.9	51	48.9	1	0.151*
Bankruptcy Modeling	37	34.9	69	65.1	1	9.660***
Line Increase/Decrease Matrices	36	34.0	70	66.0	1	10.906***
Sensitivity Analysis (Stress Testing)	30	28.3	76	71.7	1	19.962***
Roll Rates (a method of measuring expected delinquency)	25	23.6	81	76.4	1	29.585***
Portfolio Stratification	20	18.9	86	81.1	1	41.906***
Vintage Analysis	16	15.1	90	84.9	1	51.660***

Note: *, **, and *** denote statistically significant differences at the 10, 5, and 1 percent levels, respectively. The sample consists of all Yemeni banks (18 banks); 106 questionnaires were finally used in the analysis and classified as follows: 34 covering national banks, 38 covering foreign banks, and 34 covering Islamic banks.

4.3. Testing the Hypotheses

4.3.1. Regression Model

This section presents the results of testing H_1[5]. The following regression model was applied:

RMPs= function (*URRM, RIA, RM, CRA*)

where,

RMPs is the dependent variable and *URRM, RIA, RM* and *CRA* are the independent variables. The series of independent variables are taken from the result of the questionnaire survey. The results of the regression[6], as shown in Table 3, partially confirm H_1, in that URRM, RM, and CRA all have a significant impact on RMPs. RIA, however, has an insignificant relationship with RMPs. Therefore, in order to become more efficient and effective in their practice of risk management in the future, Yemeni banks have to increase their concern on URRM, RM and CRA.

Table 3 also shows that R^2 is 0.591, which indicates that 59.1% of the changes in RMPs are due to variations in the four independent variables (the adjusted R^2 (adj.) is equal to 57.50%).The overall model *F*-value is 36.526 and is statistically significant at 99% confidence level. This indicates that the predictors significantly combine together to predict RMPs.

Table 3: Regression model

	Beta	T	Sig.	Model *F*-value
(constant)	-1.191	-2.670	0.009	36.526
URRM	0.394	4.225	0.000	
RIA	0.003	0.023	0.982	
RM	0.447	3.958	0.000	
CRA	0.450	4.286	0.000	
Model			0.000	
R^2				0.591

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[5] H_1 stated "There is a positive relationship between the RMPs and URRM, RIA, RM and CRA".

[6] The correlations between the independent variables were calculated, and all were within an acceptable range (for details, see Appendix C).

R^2 Adj.	0.575

Notes: The sample consists of all Yemeni banks (18 banks); 106 questionnaires were finally used in the analysis and classified as follows: 34 covering national banks, 38 covering foreign banks, and 34 covering Islamic banks. The Table shows the results of estimating:

RMPs= function (URRM, RIA, RM, CRA)

The dependent Variable is risk management practices (RMPs). The independent variables are: understanding risk and risk management (URRM), risk identification and analysis (RIA), risk monitoring (RM) and credit risk analysis.

4.3.2. *Multinomial Regression Models*

Multinomial regression[7] is used to examine the correlations between the three categories of bank (Islamic, national and foreign). The approach used was to nominate one of the responses, and then use the reference category of the dependent variable as the comparison category. The results have complied with classic regression assumptions such as normality condition, stationarity of variables, heteroskadasticity, no multicollinearity and no autocorrelation and are shown in Tables 4 and 5.

Table 4a: Multinomial regression model: Comparative analysis of the three categories of bank

Type of bank*		B	Std. Error	DF	Sig
National banks	Intercept	72.437	16.382	1	0.000
	URRM	-3.896	1.373	1	0.005
	RIA	-9.440	2.642	1	0.000
	RM	.457	1.721	1	0.791
	RMPs	-.714	1.316	1	0.587
	CRA	-4.630	1.863	1	0.013
Foreign banks	Intercept	21.378	8.243	1	0.010
	URRM	-2.025	1.027	1	0.049
	RIA	-3.789	1.223	1	0.002
	RM	.075	1.088	1	0.945
	RMPs	1.015	.882	1	0.250

[7] It should be emphasized that the one-way ANOVA procedure has been applied to investigate whether it produces different results (see Appendix D for more details). Multinomial regression has the advantage that it allows the effects of the different covariates to be unscrambled, whilst ANOVA investigates each of the variables individually.

CRA	-.381	1.134	1	0.737

Model	Fitting Criteria (-2 Log Likelihood)		
Intercept only	232.608		
Final	113.676	10	0.000
Pseudo R^2	75.90%		
Overall classification accuracy	81.10%		

Notes: *Islamic banks used as a reference. The sample consists of all Yemeni banks (18 banks); 106 questionnaires were finally used in the analysis and classified as follows: 34 covering national banks, 38 covering foreign banks, and 34 covering Islamic banks. The Table shows the results of estimating:

$$1(\alpha, \beta) = \prod_{i=1}^{N} [P_1 (X_i)^{y_{1i}} P_2 (X_i)^{y_{2i}} P_3 (X_i)^{y_{3i}}$$

1 is the usual indicator function; α and β are the model parameters; P_1, P_2, and P_3 are the probabilities of a bank being of type 1, 2, or 3 (i.e. Islamic, national and foreign), respectively; X_i are the covariates of the i th bank; y_{1i} is an indicator variable which is 1 if the i th bank is of type 1, or 0 otherwise, etc. The dependent Variable is the categories of bank (Islamic, national and foreign). The independent variables are: understanding risk and risk management (URRM), risk identification and analysis (RIA), risk monitoring (RM), risk management practices (RMPs) and credit risk analysis.

Table 4a indicates that there are insignificant differences between Islamic and national banks' RM and RMPs. However, there are significant differences between their URRM, RIA and CRA. Thus, H_2[8] can be accepted for URRM, RIA and CRA but is rejected for RM and RMPs. This is because the structure of funds in the balance sheets of Islamic and conventional banks is different.

On the liability side of Islamic banks, funds are divided into (1) trustworthy (*Wadiah*) funds, which banks have to guarantee they will repay but they are not obligated to pay any return and (2) investment funds, which Islamic banks may use for real projects and must then share any profits they make from them. Meanwhile, on the asset side, funds can take the form of (1) trade-based financing, which produces a fixed and pre-determined return, (2) investment-based financing, which does not guarantee any return or (3) service-based financing, which again requires a fixed return.

Table 4b: Multinomial regression model: Comparative analysis of the three categories of bank

Type of bank*	B	Std. Error	DF	Sig

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[8] H_2 stated "There is a difference between the Yemeni Islamic and national banks in terms of their URRM, RIA, RM, RMPs and CRM".

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Foreign banks	Intercept	-51.059	14.523	1	0.000
	URRM	1.871	1.073	1	0.081
	RIA	5.651	2.426	1	0.020
	RM	-.382	1.480	1	0.796
	RMPs	1.729	1.103	1	0.117
	CRA	4.249	1.630	1	0.009
Islamic banks	Intercept	-72.437	16.382	1	0.000
	URRM	3.896	1.373	1	0.005
	RIA	9.440	2.642	1	0.000
	RM	-.457	1.721	1	0.791
	RMPs	.714	1.316	1	0.587
	CRA	4.630	1.863	1	0.013
Model		Fitting Criteria (-2 Log Likelihood)			
Intercept only		232.608			
Final		113.676		10	0.000
Pseudo R^2		75.90%			
Overall classification accuracy		81.10%			

Notes: *National banks used as reference. The sample consists of all Yemeni banks (18 banks); 106 questionnaires were finally used in the analysis and classified as follows: 34 covering national banks, 38 covering foreign banks, and 34 covering Islamic banks. The Table shows the results of estimating:

$$1(\alpha, \beta) = \prod_{i=1}^{N} [P_1 (X_i)^{y_{1i}} P_2 (X_i)^{y_{2i}} P_3 (X_i)^{y_{3i}}$$

1 is the usual indicator function; α and β are the model parameters; P_1, P_2, and P_3 are the probabilities of a bank being of type 1, 2, or 3 (i.e. Islamic, national and foreign), respectively; X_i are the covariates of the i th bank; y_{1i} is an indicator variable which is 1 if the i th bank is of type 1, or 0 otherwise, etc. The dependent Variable is the categories of bank (Islamic, national and foreign). The independent variables are: understanding risk and risk management (URRM), risk identification and analysis (RIA), risk monitoring (RM), risk management practices (RMPs) and credit risk analysis.

As conventional banks use interest-based banking, all of their returns from financing (credit) are fixed and pre-determined. As a result, the probability of incurring credit risk is higher in Islamic banks than in conventional banks. Islamic banks are also very sensitive to market risk as their banking performance relies on economic and business conditions. Furthermore, operational risks are also highly likely to appear in Islamic banks, due to the improper management of funds, internally. Although Islamic and conventional banks may face different risks, they may use the same RMPs, such as (1) employing the same risk mitigation methods, (2) requiring third-party guarantees to mitigate certain risks, such as credit or default risk and (3) keeping reserve funds in case of unanticipated withdrawals by depositors.

Turning to H_3[9], the results show that there are differences between Islamic and foreign banks' URRM and RIA (hypothesis accepted) but there are no differences between their RM, RMPs and CRA (H_3 rejected).

As Table 4b shows, there are significant differences between national and foreign banks' URRM, RIA and CRA, so H_4[10] can be accepted for these aspects of risk management. However, the differences between national and foreign banks' RM and RMPs are insignificant, and so H_4 is rejected for them.

5.   Conclusion and areas for future research

It can be concluded that positive responses were given about banks' RMPs in Yemen, and that there is a common understanding of the practices across all banks. This result gives an indication of the willingness of Yemeni banks to use RMPs, but it must also be acknowledged that they have a lack of expertise in conducting robust risk management. The semi-structured interviews confirm the results from the questionnaire that there is a good understanding of RMPs amongst Yemeni banking staff. However, the practice of risk management may differ from bank to bank, depending on their institutional characteristics. Value at risk is found to be the most commonly-used method in Yemeni banks (87.7% of respondents indicated that their bank used it). Additionally, the semi-structured interviews show that almost all banks in Yemen use similar risk management methods, differing only in terms of the level of experience of their staff, the training facilities provided for the risk management unit and the monitoring systems used.

Furthermore, the findings reveal that staff in Yemeni bank are aware of the methods used in risk management; however, this does not necessarily mean that they are efficient and effective at carrying out the methods investigated here. Our results in some ways contrast with the fact that Yemeni banking system is inefficient and weak. This apparent contradiction may be due to the fact that Yemeni banks do not face

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[9] H_3 stated "There is a difference between the Yemeni Islamic and foreign banks in terms of their URRM, RIA, RM, RMPs and CRM".

[10] H_4 stated "There is a difference between the Yemeni national and foreign banks in terms of their URRM, RIA, RM, RMPs and CRM".

much risk compared to banks in other countries, and thus carry out only simple banking activities. The banking industry in Yemen is still underdeveloped but ideally they need to understand the process of risk management in order to prepare for the future performance of the industry.

In terms of distinguishing Islamic banks from other banks, the main results of this paper are as follows: (1) There are significant differences between Islamic and national banks' URRM, RIA and CRA but no significant differences between their RM and RMPs. (2) There are significant differences between Islamic and foreign banks' URRM and RIA but no significant differences between their RM, RMPs and CRA. (3) There are significant differences between national and foreign banks' URRM, RIA and CRA but no significant differences between their RM and RMPs. Moreover, this paper has shown that: (1) the three methods most commonly used by Yemen's banks for identifying risk are audits or physical inspections, financial statement analysis, and scenario analysis; (2) Value at Risk, collateral, and credit worthiness analysis are the RMPs that are used most by Yemeni banks; (3) the most important types of risk facing the banks are foreign exchange risk, credit risk and liquidity risk; and (4) the four methods of credit risk management used most frequently are risk ratings, behaviour scoring, good/bad analysis, and credit scoring.

The findings of this paper could be used by banking regulators to improve the performance of the banking industry in Yemen. For example: (1) the central bank should have a specific means of valuing RMPs in Islamic banks; (2) it should consider the understanding of risk management, risk analysis and credit risk analysis in Islamic banks when regulating their risk management; and (3) it should prepare Islamic monetary instruments, such as Islamic liquidity instruments, which comply with the characteristics of Islamic banks. Future research should ideally involve other parties dealing with risk management in Yemeni banks. For example: (1) the banking regulators (the government and the central bank), depositors and entrepreneurs, and market players (money and capital market players); (2) a larger sample of respondents, drawn from various financial market players (capital market, money market, stock market, etc), to obtain a wider view on the issue, given that the financial markets are interlinked these days; and (3) other middle eastern countries, whose RMPs should be compared to those of Yemeni Islamic banks.

References

Allison, D. P. (1999), *Multiple Regression – A Primer*. Pine Forge press, Inc.

Al-Swidi, A. K. and Mahmood, R. (2011), "Yemeni banking system: critical issues and future recommended strategies", *European Journal of Social Sciences*, Vol. 20, No. 4, pp. 637-655.

Al-Tamimi, H. (2002), "Risk management practices: an empirical analysis of the UAE commercial banks", *Finance India*, Vol. 16, No. 3, pp. 1045-1057.

Alm, L. (1998), *Linear Correlation and Regression*, in Miler, G. & Whicker, M. (eds.),

Handbook of Research Methods in Public Administration, Taylor and Francis.

Al-Tamimi, H. and Al-Mazrooei, F. (2007), "Banks' Risk Management: A Comparison Study of UAE National and Foreign Banks", *The Journal of Risk Finance*, Vol. 8, No. 4, pp. 394 – 409.

Al-Tamimi, H. (2008), "Implementing Basel II: An investigation of the UAE Banks' Basel II preparations", *Journal of Financial Regulations and Compliance,* Vol. 16, No. 2, pp. 173-187.

Anderson, K. and Terp, A. (2006), "Risk Management, Perspectives on Strategic Risk Management", Copenhagen, Denmark: CBS Press, pp. 27 – 45.

Anderson, R.A., Sweeney, D.J. and Williams, T.A. (1990), "Statistics for Business and Economics", West Publishing Company, St. Paul, MN. Available at: http://rbidocs.rbi.org.in/rdocs/PressRelease/PDFs/3206.pdf (Accessed July 2010).

Central Bank of Yemen (2010), *Annual Report*. Available at: http://www.centralbank.gov.ye/newslettar.aspx?keyid=47&pid=46&lang=1&cattype=6 (Accessed January 2011).

Darem, F. (2009), "Yemen Observer- Islamic banks account for 31 % of assets in Yemeni banking". Available at: http://www.yobserver.com/business-and-economy/10016156.html (Accessed December 2010).

Gujarati, D. (2003), *Basic Econometrics*. New York: The McGraw-Hill Companies, Inc.

Hassan, A. (2009), "Risk Management Practices of Islamic Banks of Brunei Darussalam", *The Journal of Risk Finance*, Vol. 10, No. 1, pp. 23-37.

Hossain, M., Wright, S. and Petersen, L. (2002), "Comparing performance of multinomial logistic regression and discriminant analysis for monitoring access to care for acute myocardial infarction", *Journal of Clinical Epidemiology*, Vol. 55, pp. 400-406

Howells, P. and Bain, K. (1999), *The Economics of Money, Banking and Finance, a European Text.* Essex CM20 2JE, England: Pearson Education Limited, Edinburgh Gate, Harlow.

Iqbal, Z. and Mirakhor, A. (2007), *An Introduction to Islamic Finance: Theory and Practice*, John Wiley & Son (Asia) Pte Ltd.

Jorion, P. and Khoury, S.J. (1996), *Financial Risk Management Domestic and International Dimensions*, Blackwell Publishers, Cambridge, Massachusetts.

Khan, T. and Ahmed, H. (2001), "Risk Management: An Analysis of Issues in Islamic Financial Industry". Available at: http://www.sbp.org.pk/departments/ibd/Risk_Management.pdf   (Accessed December 2010).

Kim J.H. and Kim M. (2011), "Two-stage multinomial logit model", *Expert Systems with Applications*, Vol. 38, No. 6, pp. 6439-6446.

Library of Congress (2008), *Federal Research Division, Country profile: Yemen.* Available at: http://memory.loc.gov/frd/cs/profiles/Yemen.pdf (Accessed July 2010).

Morgan, A. G., Leech, L. N., Gloeckner, W. G. and Barrett, C. K. (2004), *SPSS for introductory statistics: use and interpretation.* Second edition. Lawernce Erlbaum Associates, Inc.

Muhairi, H. (2009), "Islamic bank assets and deposits expected to reach $1 trillion in 2012". Available   at: http://al-shorfa.com/cocoon/meii/xhtml/en_GB/features/meii/features/business/2010/10/29/feature-03 (Accessed December 2010).

Nunnally, C.J. (1978), *Psychometric Theory*, McGraw-Hill, New York, NY.

Pyle, D. H. (1997), *Bank Risk Management: Theory*. Available at: http://www.haas.berkeley.edu/groups/finance/WP/rpf272.pdf (Accessed July 2010).

Selltiz, C., Wrightsman, L.S. and Cook, W. (1976), *Research Methods in Social Relations*, Holt, Rinehart and Winston, New York, NY.

APPENDICES

Appendix A: Interview details

In order to identify the current RMPs in Yemen, three interviews were conducted. The first interviewee was a branch manager from the foreign bank, United Arab Bank. His comment regarding risk management approaches was that "*each bank has their own risk policies and procedures, which are not similar to other banks' due to the absence of any regulatory authority in the country. We have clear sets of instructions and policies for every kind of risk, which is implemented by our Central Risk Management Unit*". On the same issue, a branch manager from the International Bank of Yemen (a conventional national bank), commented that "*banks in Yemen generally use effective risk practices and risk management. In this society/country, however, this doesn't always work smoothly due to a lack of regulations and weakness of the local authority*". In another interview conducted with a vice branch manager of an Islamic bank (The Saba Bank of Yemen) the interviewee highlighted that there is a common understanding of the risk management approach across all banks in Yemen. Based on the above investigation, it appears that the RMPs implemented across different banks, differ because of the lack of regulations in Yemen.

Interviews showed that each bank identified different risks as being the main ones they faced. For instance, according to the branch manager of the foreign bank (United Arab Bank), "*the exchange rate and the foreign exchange rate are the most crucial risks due to the weakness of the Yemen currency, which mostly depends on the US dollar, which is fluctuating heavily against the Yemen currency*". For the International Bank of Yemen, liquidity risk and credit risk are also listed alongside foreign exchange risk as the most common risks faced. The Islamic bank's vice branch manager reported that "*the main risks faced by our banks are liquidity risk, legal risk and credit risk*".

Finally, the interviews showed that there are significant differences between the risk management methods used by the three banks to reduce their level of risk. Each bank has its own methods in dealing with the various risks, although some methods appear to be used by all of them based on the result of the survey, such as credit worthiness analysis, collateral and establishing standards (credit limits). Despite these common methods, there are still some differences in the use of risk management techniques. The branch manager of the United Arab Bank (the foreign bank) commented with regard to the methods used by his bank that "*our systems, policies and procedures are our strength. From identification till disbursement, our team is dedicated and continuously monitoring the risks as per SOP's (Standard Operating Procedures) which were set by our Risk Management Unit*". Meanwhile, the branch manager of the International Bank of Yemen revealed that "*the methods that we use are adequate sensitivity, additional collateral and proper analysis of financial statements*". The vice branch manager of the Saba Bank of Yemen (the Islamic bank) described the methods his bank uses as follows: "*(a) Before granting any loans our bank undertakes a specific analysis about the client's character, capacity, collateral capital and conditions. (b) Our bank policy never grants loans without holding proper collateral*".

Based on these findings, the following comments can be made:

➤ Risk management approaches currently practised in Yemen are different in different banks, due to the lack of regulations and monitoring by the authorities.

➤ All banks in Yemen are subject to similar risks, but there are differences in the relative importance banks place on each risk.

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➢ The risk management methods used are similar across all banks, differing only in the level of experience of the staff, the training facilities provided to the risk management unit and the monitoring systems used.

➢ Banks with an international presence have a better understanding of RMPs; therefore, these banks are equipped with better training facilities, and the use of more sophisticated risk management techniques than the local banks. This gives them an edge in avoiding liquidity and credit risk that is reflected in their annual performance.

Appendix B: Cronbach's Alpha for the Five Aspects of Risk Management

Risk Management Aspect	Cronbach's Alpha
URRM	0.732
RIA	0.764
RM	0.761
RMP	0.843
CRA	0.724
Overall	0.904

Notes: Cronbach's alpha measures the reliability of different variables. It estimates how much the variation in the scores of different variables is attributable to chance or random error (Al-Tamimi & Al-Mazrooei, 2007, citing Selltiz et al., 1976). A value greater than or equal to 0.70 is usually assumed to provide good support for internal consistency and reliability (Morgan et al., 2004). In this table the values of Cronbach's alpha are marginal in terms of showing acceptable reliability, as they are only just higher than 0.70.

Appendix C: The Correlation Coefficients between the Independent Variables

		URRM	RIA	RM	CRA
URRM	Pearson Correlation	1.000			
	Sig.	-			
RIA	Pearson Correlation	0.526	1.000		
	Sig.	0.000	-		
RM	Pearson Correlation	0.274	0.687	1.000	
	Sig.	0.005	0.000		-
CRA	Pearson Correlation	0.250	0.312	0.482	1.000
	Sig.	0.010	0.001	0.000	-

Notes: Pearson's correlation was used to analyse the correlations between the independent variables. As shown in the table, the highest correlation coefficient was 0.687, between RIA and RM. Nevertheless, it can be concluded that there is no problem with multicollinearity between the independent variables [Gujarati (2003, p. 359) stated that only correlations over 0.80 cause a serious problem. Furthermore, Alm (1998, p. 268) also stated that, as a general rule for inspecting a correlation, multicollinearity problems pertain to high values, usually larger than 0.7, for example. Finally, Anderson et al. (1990) stated that a correlation greater than 70% indicates a potential problem].

Appendix D: One-way ANOVA analysis
The results in Table D_1 show that the ANOVA *F*-ratios for URRM, RIA, RM and CRA are 29.50, 57.15, 24.00 and 24.23, respectively. This indicates that there is a statistically

significant difference between the means of URRM, RIA, RM and CRA for different categories of bank at the 99% confidence level. Fisher's least significant difference test reveals that Islamic, national and foreign banks have statistically significant differences at the 95% confidence level for all four of the aspects of risk management. Additionally, Cochran's C and Bartlett's test indicate that there is no statistically significant difference in their standard deviations at the prescribed confidence level. Finally, the Kruskal-Wallis test was applied to test the null hypothesis that the medians of the four aspects were different (or the same) for each of the three categories of bank. The test statistic shows that there is a statistically significant difference at the 99% confidence level.

Furthermore, the ANOVA *F*-ratio for RMPs is 34.48. This result indicates that there is a statistically significant difference between the mean RMPs of Islamic, national and foreign banks at the 99% confidence level. Additionally, Fisher's least significant difference test shows that there is a statistical difference between Islamic and national banks' RMPs, and between those of national and foreign banks at the 95% confidence level and between those of Islamic and foreign banks at the 90% confidence level. The Cochran's C test revealed unequal variances (there were statistically significant differences in variances between the neural net models). Consequently, Tamhane's test was applied to examine the differences in the means for each pair; a statistically significant difference at the 99% confidence level was found between national and foreign banks and between Islamic and foreign banks, while, for Islamic and national banks, the difference was significant at the 90% confidence level. Finally, the Kruskal-Wallis median test statistic for RMPs is 38.54. This shows that there are significant differences amongst the medians at the 99% confidence level.

Table D₁: A comparative statistical evaluation of the one-way ANOVA analysis

	Risk Management Aspects				
	URRM	RIA	RM	RMPs	CRA
Count	106	106	106	106	106
Average (Mean)	4.10566	3.92318	4.02987	4.02673	3.97358
Standard deviation	0.459571	0.452259	0.479637	0.558312	0.39238
ANOVA F-Ratio	29.50***	57.15***	24.00***	34.48***	24.23***
Fisher's least significant difference test:					
National banks – foreign banks	-0.422601**	-0.415966**	-0.475232**	-0.748452**	-0.514861**
National banks – Islamic banks	-0.682353**	-0.815126**	-0.647059**	-0.759804**	-0.405882**
Foreign banks – Islamic banks	-0.259752**	-0.39916**	-0.171826**	-0.011352*	0.108978**

Cochran's C Test:	0.423334	0.376139	0.42574	0.47213*	0.432649
Bartlett's Test:	1.02424	1.31502	1.02582	1.81552	1.02088
Tamhane test [1]:					
National banks – foreign banks	-	-	-	-0.75980***	-
National bank – Islamic banks	-	-	-	-0.74845*	-
Foreign banks – Islamic banks	-	-	-	0.74845***	-
Kruskal-Wallis Median Test Statistic:					
Test Statistic	36.2859***	56.0237***	30.9526***	38.54***	30.5367***

Note: *, **, and *** denote statistically significant differences at the 10, 5, and 1 percent levels, respectively. [1]Tamhane Test assumes unequal variances; while the Fisher's least significant difference test assumes equal variances.

Table D_2 shows that there are statistically significant differences between Islamic, national and foreign banks for different risk management aspects at the 99% confidence level. Based on these results, it can be concluded that the banking industry in Yemen is under-regulated and that there is an urgent need to strengthen its rules and regulations. As for individual risk management aspects, different banks use different URRM, RIA, RM, RMPs and CRA. In contrast, different banks are different in some of these aspects, as per the multinomial regression which considered all different risk management aspects together in one model. Therefore, it is believed that the multinomial results are more accurate.

Table D_2: One-way ANOVA Analysis

Sources		Sum of Square	DF	Mean Square	*F*-Value	Sig.
URRM	Between Groups	8.077	2	4.038	29.501	0.000
	Within Groups	14.100	103	0.137		
	Total	22.177	105			
RIA	Between Groups	11.297	2	5.649	57.154	0.000
	Within Groups	10.179	103	0.099		
	Total	21.477	105			
RM	Between Groups	7.679	2	3.839	24.001	0.000
	Within Groups	16.477	103	0.160		
	Total	24.155	105			
RMPs	Between Groups	13.125	2	6.563	34.479	0.000
	Within Groups	19.605	103	0.190		
	Total	32.730	105			
CRA	Between Groups	5.172	2	2.586	24.230	0.000
	Within Groups	10.994	103	0.107		
	Total	16.166	105			