

# “Performance and efficiency of risk managers in Saudi Arabia”

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## Performance and efficiency of risk managers in Saudi Arabia

### Abstract

In this paper we explore the performance and efficiency of risk managers of Saudi Arabia, based on their relative traits and their effectiveness in meeting their personal performance targets. Here we present a complementary survey evidence of 110 risk managers of Saudi Arabia, which can improve our understanding in this field. By the scope of this paper we study the capability of these managers in mitigating their previous losses and the factors which mainly affect their performance. We also study the importance given and the extent of Basel II implementation in Saudi Arabian banking sector.

**Keywords:** fund managers, investment decision process, contingency tables, graphical association models, collapsibility.

**JEL Classification:** G21, C25, C51, C52.

### Introduction

There is a large and growing literature that links the performance of fund managers to their characteristics. For example, Fama (1980), Lazear and Rosen (1981) and Holstrom (1982) emphasized agency conflicts and career concerns. Smith and Goudzwaard (1970) and Chevalier and Ellison (1999) looked at the relevance of education. Golec (1996) examined a wide range of characteristics including tenure, MBA qualification, performance, risk-taking and expenses. Other studies focus on the concept of herding borrowed from behavioral finance. Scharfstein and Stein (1990) focus on herding due to signal jamming between different types of managers, Banerjee (1992), Bikhchandani et al. (1992) and Welch (1992) on herding due to inefficient information transmission and King (1995) on herding due to free riding in information gathering. Trueman (1994), Arnsward (2001) and Zwiebel (1995) suggest that herding among managers who are evaluated relative to their peers might be a result of reputational concerns.

McNabb and Whitfield (2003) state that recent years have witnessed extensive innovations in compensation systems and, in particular, a variety of attempts to link pay to a measure of performance. Such innovations have often been related to broader initiatives to improve the performance of organizations and especially efforts to increase employee involvement in decision-making (Appelbaum and Batt, 1994; Walsh, 1993).

Most of the related empirical studies focus on industrialized countries with developed financial systems, especially the US. However, the link between performance and the characteristics of fund managers has now become a relevant concern in emerging markets due to the recent growth of fund management in these markets. Furthermore, there is ongoing

evidence that emerging market financial systems are more vulnerable to political interference, corruption and insider trading than those of developed countries (see Bouchet et al., 2003). Conditions like these could conceivably have a significant influence on fund managers characteristics and behavior.

Perhaps the lack of literature can be explained by the lack of data. Here we use data collected by questionnaire interviews from 100 different risk managers and regulators from 12 most significant banks in Saudi Arabia which work under the supervision of SAMA (Saudi Arabian Monetary Agency).

To what degree is the bonus linked with the personal performance and with the overall performance of the bank? Are they satisfied with the risk related objectives set by senior management or do they take a more personal subjective approach (Masood & Tunaru, 2006)? Is the number of clients correlated with the satisfaction of incentives provided to risk managers? More importantly, can one answer all these questions and many more in one go?

In this paper we make a first step towards studying the link between performance and risk manager characteristics in the context of an emerging GCC market, Saudi Arabia. Our study is similar in spirit to Chevalier and Ellison (1999) and Golec (1996) but differs in one important way. Rather than use aggregated, observable data across some fund industry or sub-industry, our analysis is based on the statistical information gathered by personal interviews with 110 risk managers in 12 Saudi Arabia's most significant banks. Thus, our data set contains unique information that is not publicly available.

Further in this paper we explore the experience of risk managers based on their relative traits and how their performance and efficiency are affected by investment decision-making and its important implications. The aim of this paper is to expose all risk managers to a series of questions that may help to analyze the associations between various inputs and their performance.

The paper is divided into four sections. It is not feasible to describe the comparisons without mentioning various aspects like literature review, evolution of SAMA and modern banking system of Saudi Arabia. All these features are described in section 1 of this paper. Section 2 contains our analysis on the data over various issues mentioned above. Section 3 describes the modelling of various variables underpinning the performance of risk managers. The last section summarizes our conclusions.

## 1. Theoretical background

**1.1. Literature review.** Fama (1980) and Lazear and Rosen (1981) focused on how career concerns might solve agency problems. Holmstrom (1982) analyzed the nature of career concerns which arise when a competitive labor market is trying to learn about manager's abilities despite the presence of unobserved effort and random noise. Holmstrom noted that, while career concerns can overcome agency problems in particular cases, a number of distortions typically remain. Recent literature has been lately focused, like Holmstrom (1982), on looking at the types of distortions which career concerns may induce when managers make investment decisions, select between projects, etc. Of late, particular interest has centered on whether career concerns may lead to "herd behavior" (Scharfstein and Stein, 1990; Zwiebel, 1995).

Avery and Chevalier (1998) assert that the probability of termination decreases sharply with performance when managers have negative excess returns, but it is fairly insensitive to differences at positive excess return levels. As a result, young managers may have an incentive to avoid unsystematic risk when selecting their portfolios. Modigliani and Pogue (1975), Starks (1987), Grinblatt and Titman (1989) and Admati and Peiderer (1997) consider the incentive effects of explicit performance contracts between a mutual fund company (or manager) and mutual fund investors. Starks (1987) and Grinblatt and Titman (1989) show that mutual fund fee schedules which are nonlinear in fund performance may distort the fund's risk incentive.

Smith and Goudzwaard (1970) analyzed the relevance of education to investment management and found that education does not have a clear effect on the performance of graduates in their jobs as fund managers. Chevalier and Ellison (1999), however, using cross sectional data, find strong evidence between age and education as explanatory variables for fund performance, measured as risk-adjusted excess returns, even after adjusting for behavioral differences and selection biases.

Fama (1980) and Lazear and Rosen (1981) show that a manager's investment decision can be influenced by career concerns. Holstrom (1982) confirms their conclusion but argues that it is only one of a number of other factors that influence the investment decision process. Following this line of reasoning, Scharfstein and Stein (1990), Zwiebel (1995), Morris (1997), and Avery and Chevalier (1999) argue that the career concern factor leads to herd behavior in the fund manager community. Chevalier and Ellison (1997) emphasize that career issues of mutual fund managers play a significant role in their decisions about risk. Golec (1996) finds that the portfolio return is affected by the manager's tenure, age, and MBA status.

The subsequent academic literature (following Modigliani and Pogue, 1975) has noted that there remain a number of ways in which investment decisions may be affected both by the explicit compensation schemes of fund companies, and by implicit incentives derived from a desire to attract new customers. Chevalier and Ellison (1998) state that a manager being terminated is affected by the manager's actions, past performance; the aspects of the relationship might cause behavior to vary systematically across managers, and then examine these predictions by looking at how behavior actually differs between younger and older managers.

Starks (1987) studied the impact of performance incentive fees on portfolio investment management decisions and found that under the symmetric compensation contract the manager receives a percentage of the market value of the assets and a bonus if the portfolio return exceeds the return on the designated benchmark or incurs a penalty in the opposite case. This is much preferred to the bonus contract which enables the manager to receive a percentage of the market value of the assets and a bonus if the portfolio return is higher than the return on some benchmark index; no penalties are imposed leading to better yields for the investors.

Gibbons and Murphy (1992) provide some indirect evidence of the incentive effects of career concerns. Gompers and Lerner (1994) offer similar results for venture capitalists. In contrast to Gibbons and Murphy, Kahn and Sherer (1990) examine managers in a single industrial company and show that bonuses are more sensitive to performance evaluations for managers with lower seniority. Berkowitz and Kotowitz (1993) note that contracts which pay the fund company a fixed fraction of assets under management implicitly contain a performance compensation element which stems from the fact that new money flows into a fund when the fund does well, and money flows out of funds when the fund does

poorly. Huddart (1997) discusses the incentive effects of the flow-performance relationship theoretically. Chevalier and Ellison (1997) and Roston (1997) examine empirically how such implicit incentives may affect risk-taking by mutual fund. Lakonishok, Shleifer, Thaler and Vishny's (1991) study of window-dressing among pension fund managers is similarly motivated by the idea that an incentive to attract customers may lead managers to alter their portfolios.

Brown et al. (1996) investigated the relationship between manager's compensation and their relative performance. They found empirical evidence suggesting that mid-year "loser" managers tend to increase, in the second part of the assessment year, the volatility of the funds they manage. Chevalier and Ellison (1997) emphasized that career issues of mutual fund managers play a significant role in their decision about risk. Chevalier and Ellison (1999) explored the behavior of mutual fund managers conditioning on the assumption that the managers try to do their best to avoid losing their job. Lemmon, Schallheim, and Zender (2000) conclude that financial contracts play an important role in providing incentives and the effects of the incentives affect, in turn, the performance of the fund. Arnsward (2001) uses survey asked for fund managers' basic views and practices and for insights into their company's performance-measuring and compensation incentives. While the results suggest that professional equity investors primarily recognize underlying economic information as a source of superior value, there are also strong indications for destabilizing behavioral factors arising from the choice of information sources and investment strategies and styles.

All previous research used the information about risk managers from the outside, without specific questioning of the managers under the analysis. Here, we attempt to break this barrier and reveal the inside story. For example, it is not the actual level of incentives provided to the risk managers that is contributing to our analysis but their opinion whether they are satisfied with those incentives.

**1.2. SAMA and the development of commercial banking.** The Saudi Arabian Monetary Agency was established by a Royal Decree issued on October, 4 1952 with the objects of issuing and strengthening the Saudi currency and stabilizing its internal and external value, and dealing with the banking affairs of the government. A subsequent Royal Decree in 1957 extended SAMA's objectives to regulating exchange dealers and managing the country's official foreign exchange reserves. In 1959 a Currency Law was issued which conferred on SAMA the sole privilege of minting, printing and issuing of Saudi

currency as determined by the Council of Ministers and made it mandatory for SAMA to maintain full cover in gold and convertible foreign currencies for currency issued.

Under Article 3.7 of SAMA's charter, all paying or receiving of interest was prohibited as was the issue of currency notes. However, during the period from 1950 to 1956, there was the partial introduction of paper money in the form of Pilgrim Receipts which were supported by precious metals and foreign currencies. The banking difficulties led to a new Banking Control Law in 1966 which provided SAMA broad with powers to regulate and supervise Saudi banks and to safeguard the banking system. It defined "banking business", conferred licensing powers, determined capital adequacy, prescribed reserve requirements, granted authority to formulate credit policy and dealt with the usual banking supervisory issues. These included conferment of enabling powers to issue rules and guidelines to banks and to lay down conditions for certain actions and transactions. Such conditions included laws which precluded banks from lending to their own directors or auditors or from investing directly in company stock in excess of 10% of the total shareholding.

There was a potential conflict between these provisions and the Islamic concept of "*musharakah*" financing whereby a financier is able to form a partnership with an entrepreneur; but as neither the National Commercial nor the Riyadh Banks offered such Islamic facilities in any case, this legal safeguard was of no significance. Of greater significance for the banks was the requirement that they should deposit 15% of their deposit liabilities with SAMA, funds on which would earn no interest<sup>1</sup>. This provision was made in the interests of depositor protection rather than because of any Islamic considerations.

The total number of branches of the twelve commercial banks in the Kingdom of Saudi Arabia (including Al-Rajhi Banking and Investment Corporation, which was incorporated in May 1988) rose from 617 to 1,007 during the Fourth Plan period. Total customer deposits also rose from SR 131.59 bn to SR 196.88 bn, loans and advances rose from SR 61.73 bn to SR 90.15 bn during this period. However, while the ratio of loans and advances as a percentage of total deposits fell from 51.48% at the beginning of the Plan period to 38.95% by the end of 1987 (but rose to 45.79% by 1990), the ratio of deposits abroad as a percentage of total customer deposits rose from 50.59% to 59.05% by the end of 1987, but dropped to 49.64% by the end of 1989.

<sup>1</sup> Ibid, article 6.

However, in 1990 during the Gulf Crisis the entire focus of the country shifted to meet the exigencies arising out of the crisis. Its immediate effect was on the morale of the citizens and their confidence in the defence capabilities of the Kingdom against outside threat. The initial brunt of this confusion was squarely reflected in the heavy withdrawal of deposits from the commercial banks immediately after the Iraq occupation of Kuwait. There was a perceptible drop in total deposits by the end of August 1990, when the commercial banks' deposits fell by SR 11.4 bn in a span of one month, and this fall accounted for a 6.55% overall drop in the deposits base. SAMA's banking statistics for the month of October 1990 indicates that the release of funds by the government to meet its commitments in the economy resulted in the rise in deposits in the banking system

The Gulf crisis adversely affected the total balance sheet size of most of the banks in the Kingdom. However, it also proved to be the real trial of strength for the Saudi banking system in stepping into the new era of the 1990s. The favorable outcome to crisis resulted in a significant revival in economic activity in the Kingdom and brought a new lease of life to banking activities in 1991. This was reflected in the overall financial performance of the banks during the same year.

**1.3. Modern banking review.** There are currently 11 commercial banks in Saudi Arabia with 1,184 branches. Three banks are fully Saudi owned; seven have minority foreign ownership and one foreign bank has a branch presence – Gulf Investment Bank (Bahrain). Five banks also have a joint venture agreements with major international banks under which the latter provide management and technical support. In 2003, SAMA granted Deutsche Bank first foreign (non-GCC) banking license in 20 years. Banks operate on the universal banking model and provide a broad range of products and services including retail and corporate banking, investment management and advice, and both domestic and international securities brokerage services. All banks fully participate in the various payment and settlement systems that are currently operational in the Kingdom.

**1.4. Commercial banking in the 21<sup>st</sup> century.** Saudi Arabia's banking today compares favorably with other countries in the Middle East. Deposits per capita income are about 50%<sup>1</sup> which is greater than those of Iran and four times those of Egypt.

However, there are inherent weaknesses. Three predominantly publicly owned commercial banks – the National Commercial Bank, Riyadh Bank and the Al Rajhi Banking and Investment Company – dominate the market, limiting competition. As a consequence, the on-oil private sector remains underdeveloped, with access to capital being a constant problem.

Recent reports in the Saudi and international press reveal some expansion in the banking sector. SABB, for example, announced that it would increase its network of branches in the kingdom to tap growing consumer demand for borrowing and to offer other financial services. However, this expansion was not to reflect in profit. Among others, Saudi Hollandi Bank, Bank Al Bilad, Bank Al Jazira and Saudi Al Rajhi Bank announced lower first-quarter net profit. Earnings were reduced by a decline in brokerage revenue, and in some cases, weaker income from banking services<sup>2</sup>.

**1.5. Saudi Arabian payment system.** SAMA has put in place the major components of a rational and comprehensive electronic payments infrastructure. The payments infrastructure provides a national network for all payment card and credit card transactions, at ATMs and points of sale (SPAN), a single electronic funds transfer system for high-value same-day and forward-dated payments and direct debits (SARIE). All Saudi banks are members of SWIFT, over which they send and receive all their international payment messages.

SARIE has 12 participants of which 11 commercial banks and the SAMA. According to the SARIE rules, interbank payments must be settled through SARIE and only banks are accepted as participants. The total daily value of transactions processed through SARIE averaged SAR 21.4 billion. The bulk of these transactions are interbank payments with an average of SAR 19 billion, while the figure for customer payments (i.e., credit transfers) is around SAR 2.4 billion. The remainder is SAMA Debits, while the value of Direct Debits is currently negligible. However, the volume of customer payments accounts for 95% of the total transaction volume processed by SARIE. The share of the largest 5 banks in interbank payments processed by SARIE is 72% in value and volume terms.

The trend for SARIE transactions in value and volume is expected to have a stable growth in the near future. However, the SAMA is anticipating that interbank payments to slightly increase in both value

<sup>1</sup> Saudi Arabia Commercial Banking Report (2007), Business Monitor International, p. 9.

<sup>2</sup> Saudi Arabia Commercial Banking Report (2007), Business Monitor International, p. 11.

and volume. Customer payments had a positive trend during the last three years and were expected to grow between 15% and 20%. As the Direct Debit functionality is currently undergoing a revitalizing process, it is expected to increase significantly.

**2. Analysis**

Previous literatures observe a negative relation between risk taking and experience (Graham, 1999; Li, 2002; Boyson, 2003). Other studies come to opposite results (Chevalier and Ellison, 1999b; Hong et al., 2000; and Lamont, 2002). Also, from a theoretical viewpoint, it is unclear whether managers should increase (Avery & Chevalier, 1999) or decrease (Prendergast and Stole, 1996) risk taking during the career.

As mentioned before, we conducted a series of questionnaire interviews with 110 different risk managers and regulators from 12 most significant banks in Saudi Arabia which work under the supervision of SAMA (Saudi Arabian Monetary Agency). The respondents were asked about their years of experience, performance pressures, satisfaction with incentives, reliance on data or models and projections to make their decisions. We founded that most of them had a similar viewpoint over these issues. However, we present in-depth analysis of our study.

We aimed to find out whether the senior risk managers are satisfied with the financial and non-financial incentives provided to them. We observed a diversified response from them with nobody showing complete satisfaction or complete dissatisfaction. There was, however, a mixed response which is shown by the table below.

Table 1. Contingency table cross-classified by variables *X* and *Y*

	a	b	c		
X	40	23	47		
	p	q	r	s	t
Y	2	25	47	24	12

Notes: Variable *X* – satisfaction with financial and non-financial incentives provided to the risk managers (a = satisfied, b = neither satisfied nor dissatisfied, c = dissatisfied); variable *Y* – level of satisfaction with quality of risk management techniques (p = very satisfied, q = satisfied, r = neither satisfied nor dissatisfied, s = dissatisfied, t = very dissatisfied).

We observed that 36% of the risk managers were satisfied with the incentives, 21% had a diplomatic viewpoint by which they were neither very satisfied nor dissatisfied and remaining 43% were unsatisfied with the incentives provided. Kwan, Eisenbeis (1996) argue that both managerial compensation and power are typically linked to firm growth and larger firm size, management is may be induced to maxi-

mize firm growth beyond efficient size. A more detailed analysis showed us that the degree of satisfaction depends on the individual banks and not on the banking system as a whole. We found that maximum numbers of managers of a particular bank were satisfied, at the same time maximum number of managers of a different bank were unsatisfied.

A growing literature models the behavior of portfolio managers and investors. Much of this research examines the link between a fund manager’s compensation contract and his portfolio choice. Grinblatt and Titman (1989) show how compensation contracts that include a bonus for good performance can produce moral hazard incentives. According to Chen and Pennachi (2005), mutual fund managers can maximize the present value of their option-like bonus by choosing a fund portfolio with excessive risk. Moreover, the risk managers can capture the increased value of this bonus if they could hedge using their personal wealth.

Menkhoff, Schmid & Brozynski (2005) argue that managers, or more generally institutional investors, may have an incentive to herd due to the following reasons: (i) reputational risk of acting differently from other managers (Scharfstein and Stein, 1990; Trueman, 1994; Siebel, 1995; Prendergast and Stole, 1996; Avery and Chevalier, 1999; and Effinger and Polborn, 2001); (ii) receipt of correlated private information (Froot et al., 1992); (iii) following the prior trade of better-informed investors (Bikhchandani et al., 1992); (iv) shared aversion to stocks with certain characteristics such as lower liquidity (Falkenstein, 1996), and/or reward schemes based on relative performance (Eichberger et al., 1999). Jensen (1986), for example, argues that the role of managers as agents for stockholders is fraught with conflicts of interest which can affect asset selection, firm behavior, efficiency and performance. Managers, especially if they are risk averse, seek to maximize their own explicit and implicit compensation at the expense of shareholders.

The level of satisfaction of the managers with the quality of risk management and regulatory techniques applied was also analyzed; we got mixed results. Only minor 2% were very satisfied and 23% of managers showed satisfaction. However, a substantial portion of managers, i.e. 43%, were neither satisfied nor dissatisfied with techniques applied. Moreover, 22% were unsatisfied while 10% were very unsatisfied clearly suggesting the amount of trust and confidence these managers have on the existing techniques.

Masood, Stewart and Sultan (2007) supposed that public attention paid to the hiring and firing of mu-

tual fund managers suggests that fund managers work in an environment in which their actions and performance greatly affect their future career prospects. This leads to the question of whether fund managers' investment decisions are affected by their career concerns. A number of recent papers have argued that even in the absence of explicit incentive/punishment schemes which are based on a manager's actions, managers' career concerns may at times induce them to ignore private information and follow the herd (or to try to avoid following it) when their actions are observable. This goes in hand with Masood and Chaudhary (2008), who focused on the aspect that how much reliance these managers have on the data provided to them while making their decisions and found that nobody relied on the data to a large extent while 48% of managers used it to some extent and remaining 52% gave a limited scope to the use of data in their decision making. They used their experience and personal judgement more than data.

We then found out weather the risk managers are aware of operational risk approaches like the basic indicator, standardized and internal measurement. A substantial 75% of risk managers agreed to have the knowledge of these approaches while 25% of them agreed that they have no awareness about them. Furthermore, out of the 75% managers who agreed to use them, 37% accepted to use them to a large extent in implementing the approaches while a major 54% used it to some extent and only remaining 9% used them to a limited extent.

The next part of our analysis deals with SAMA and its relation to Basel II in the Saudi Arabian banking industry. We enquired on how far SAMA actually succeeded in implementing Basel II in Saudi Arabian banking sector. We found that only 15% of risk managers agreed to a large extent, whereas, a major 63% accepted some extent of implementing Basel II and 21% of the risk managers reported about a limited role of SAMA in its implementation.

We then observed whether SAMA provided training and expertise to the banks of Saudi Arabia in relation to Basel II implementation. The results were that 31% agreed to receive it very often while 16% reported that the training and expertise are given often, whereas 35% of the risk managers argued that it is given sometimes while the remaining 18% agreed seldom intervention of SAMA. The results clearly indicate that SAMA attaches significance to the implementation of Basel II in Saudi Arabia and also provides training to the banks, which certainly helps improving and updating the banking sector of the country.

Table 2. Contingency table cross-classified by variables *R* and *S*

	a	b	c		
R	17	69	24		
	p	q	r	s	t
S	34	18	38	20	0

Notes: Variable *R* – how far SAMA actually succeeded in implementing Basel II in Saudi Arabian banking sector (a = to a large extent, b = to some extent, c = to limited extent); variable *S* – whether SAMA provided training and expertise to the banks of Saudi Arabia in relation to Basel II implementation (p = very often, q = often, r = sometimes, s = seldom, t = never).

We further observed, if the training provided by SAMA to the banks was useful in relation to Basel II implementation in Saudi Arabia. We came to the results that 48% of the risk managers agreed that it had largely been useful while a substantial 51% reported that it had been efficient to some extent whereas, an insignificant 1% argued limited extent. Hence it can be easily concluded that SAMA has been successful in its aim to provide efficient training to the banks in Saudi Arabia in relation to Basel II implementation.

Dugan (2007) argues that Basel II is a good example of interplay between risk management and regulation; it is built on a foundation of modern risk management practice, and it will help encourage continuing improvements in risk management. He also says that Basel II has increased the discussion of new techniques for measuring risk and validating models. It has created a common vocabulary around important risk concepts, such as the difference between default risk and recovery risk. It has led banks to recognize the value of formalizing aspects of risk processes that were being treated a little too casually at some institutions.

We next assessed how important it was for the banks in Saudi Arabia to implement Basel II. We found that only a minor 1% and 5% of risk managers agreed that their bank attaches much importance and little importance respectively to implementing Basel II. 6% of the managers reported that it was neither important nor unimportant to their bank to implement Basel II. The majority of them, i.e. 41%, however agreed that implementation of Basel II was unimportant to their bank, whereas 37% argued that their bank completely ruled out placing any importance on Basel II implementation.

We also observed to what extent the banks have been able to implement Basel II. Only 1% reported about large extent of implementation; however a substantial 83% agreed that their banks have been able to implement Basel II to some extent. While 10% gave a feedback of limited implementation of Basel II.

Thus by our results we also show the face of Saudi Arabian banking system, where SAMA, the central governing body of all the banks, gives importance to implementation of Basel II and also provides efficient training to the banks whereas, on the other hand, the Saudi banks attach no importance to implementation of Basel II.

According to Avery and Chevalier (1998), when firms have more observations of a manager's performance they will update their assessment of his ability less in response to a single observation and more experienced managers are survivors of a selection process, market assessments of their ability may on average be further away from the threshold level at which it becomes efficient to replace the manager. International evidence on the ability of age to influence funds performance is mixed, with results varying across countries and time. Gregory, Matatko and Luther (1997) provide evidence that mature funds outperform their younger counterparts. In direct contrast Otten and Bams (2001) revealed younger funds have superior performance over their older peers. Peterson et al. (2001) and Prather, Bertin and Henker (2004) found no significant difference between the age of the fund and performance.

Baker, Gibbons and Murphy (1993) assume if objective performance measures become greater, the incentives provided by implicit contracts decrease if the fallback contract is sufficiently attractive but increase otherwise. They also argued that if it becomes more difficult for the firm to produce accurate subjective performance assessments, the incentives provided by implicit and explicit contracts will decrease and increase, respectively.

The next part of our analysis focuses on the performance aspect of the risk managers of Saudi Arabian banks. We enquired on how much effective they have been in meeting their personal performance targets as set by senior management. We found that a significant 33% were very ineffective in achieving their personal targets whereas, a substantial 46% found themselves ineffective in meeting the targets set to them. 6% reported that they were neither effective nor ineffective while 12% considered themselves effective in meeting their requirements, only a minor 3% were very effective in meeting their targets set to them by their senior management. Hence, we can conclude that the senior management' policy of setting the personal targets to individual risk managers has not been successful in Saudi Arabian banking system as most of the risk managers are incapable of meeting these targets, which further leads to terminations and losses.

Table 3. Contingency table cross-classified by variables *A* and *B*

	p	q	r	s	t
A	36	51	7	13	3
	p	q	r	s	t
B	57	42	8	3	0

Notes: Variable *A* – how effective they have been in meeting their personal performance targets as set by senior management (p = very ineffective, q = ineffective, r = neither ineffective nor effective, s = effective, t = very effective); and *B* – effectiveness of risk managers in mitigating their losses compared to previous year (p = very ineffective, q = ineffective, r = neither ineffective nor effective, s = effective, t = very effective).

We also assessed the effectiveness of risk managers in mitigating their losses compared to previous year. We found that 52% accepted that they were very ineffective in covering their losses as compared to last year, while 38% of the risk managers agreed they were ineffective in mitigating their losses. While 7% of the risk managers reported that they were neither effective nor ineffective as they showed almost same performance as last year. Only 3% were effective in mitigating their losses as compared to last year. Hence we conclude that the risk managers in Saudi Arabian banking system are incapable of mitigating their previous losses. This kind of performance is accounted for either of the two reasons: 1) The individual performance target set by the senior management is extremely high; 2) As they use and trust their personal judgment more than the mathematical models and statistical projections available, as per Masood and Chaudhary (2008).

Avery and Chevalier (1998) argue that with a competitive labor market, terminations will occur in such a model whenever firm's assessments of a manager's ability fall below some threshold which is sufficiently low so as to make it efficient to incur the transaction costs involved in replacing him with a new manager. Termination will thus be expected to follow poor performance. Jovanovic (1979) states that while the skills of a mutual fund manager seem unlikely to be company-specific, terminations could similarly be generated by assuming that there are a limited number of positions for fund managers and a large pool of potential managers of unknown ability.

Early mutual fund studies generally considered the ability of managers to create superior returns (Trenor, 1965; Sharpe, 1966; and Jensen, 1968). Results generally supported the notion of efficient markets by denying managers the ability to outperform an equivalent risk market portfolio. Ippolito (1989) provided evidence of mutual funds exhibiting superior risk adjusted returns after the consideration of fees. Further contradictory evidence is reported by

studies such as Grinblatt and Titman (1993), Goetzmann and Ibbotson (1994), and Dutta (2002) who all report the existence of persistent positive returns. Wermer (2000) provided additional evidence that managers are able to cover additional cost with superior performance. Golec (1996) found that fees are positively associated with negative excess returns, Wermers (2000) found funds generally under-perform to the extent of the fees.

By the scope of this paper we also analyzed the number of mitigating actions the risk managers have successfully managed. We found that 36% of the risk managers managed around 10-15 mitigating actions while 26% of the risk managers agreed to have dealt with 15-20 mitigating actions within the previous year, whereas 38% reported to have managed 20-25 mitigating actions within last year.

According to Chen and Pennachi (2005), if the fund manager's compensation rises in proportion to the fund's inflows, this leads to convex performance – fund flow relation produces a convex performance – compensation structure. Sirri and Tufano (1998) note that such compensation is similar to a call option, providing an incentive for a manager to raise the risk of the fund's relative returns and increase the option's value. To empirically test for the presence of this risk-taking incentive, studies including Chevalier and Ellison (1997), Brown, Harlow, and Starks (1996), and Busse (2001) examined the risk-taking behavior of a cross-section of mutual funds for which this incentive is predicted to differ.

We then analyzed to what degree the bonus is linked with the personal performance and with the overall performance of the bank. We found that all risk managers reported that the bonus is given solely on the basis of overall bank performance and is not linked with their personal performance. This policy reduces the effectiveness of individual performance targets and hence reduces the efficiency of risk managers in Saudi Arabia.

Das and Sundaram (2002) show that the relative advantages of symmetric and bonus contracts can be reversed if investors' choice of funds is made endogenous to the funds' risk levels and compensation contracts. In their model, bonus contracts provide better risk-sharing between investors and fund managers when investors take account of a fund's risk and contract choice. When investors cannot observe a manager's choice of portfolio risk or the manager's effort level, compensation contracts with symmetric payoffs dominate contracts that include a bonus. Starks (1987) considers the moral hazard incentives of a bonus contract, focusing on situations of asymmetric information between investors and fund managers. If managerial ability displays

decreasing returns to scale. Carpenter (2000) specifies compensation equal to a fixed-fee plus a call option written on the value of the managed portfolio with an exercise price equal to a benchmark asset. Cuoco and Kaniel (2001) is similar and permits compensation to contain a penalty for poor performance in the form of the manager writing a put option on the managed portfolio.

We finally also enquired risk managers about their satisfaction connected with risk related objectives set to them by their senior management for this year. We found that only 4% of the managers were unsatisfied, however 21% of the risk managers were neither unsatisfied nor satisfied with the targets assigned to them. A substantial 42% of the risk managers were satisfied and 33% were very satisfied respectively with the objectives assigned to them, clearly indicating that the targets assigned were not very high.

### 3. Modelling

The scope of this paper is to analyze the relationships between main decision variables that underpin the decision process of fund managers. This is an exploratory analysis where no particular hypothesis is tested. A suitable model is sought that may help in understanding what are the inner links between the use of financial data information, educational qualification and incentives.

The modelling refers to a contingency table cross-classified by 10 variables, many of those being ordinal variables. Thus, special methods are needed (Agresti, 1984). Moreover, having only 81 observations, the table is very sparse and the standard methods for extracting inference are not feasible since asymptotic methods are based on assumptions that are not valid. For this small sample more advanced statistical methods are needed.

Conditional independence models or graphical association models seem perfectly suited for this task provided, some extra caution is taken in the model selection process. This class of models belongs to the class of log-linear models. The parameters describing the interactions between the variables are logarithms of odds ratios and some constraints ought to be imposed in order to avoid over parameterization. Here we do not discuss in detail the issues related to the estimation and testing these models, further details being provided in Edwards (1995) and Lauritzen (1996) and the references therein. Only points of interest relevant to our investigation are briefly mentioned.

The main tool is a graph called the *conditional independence graph* (CIG). The nodes of the graph are in one-to-one correspondence with the set of

variables. Between any pair of variables (nodes) there is no edge if and only if those variables are conditionally independent given the rest of variables involved in the analysis. A direct edge between two variables signifies a direct association or relationship.

Hence, a particular statistical model can be represented by a graph. The end result of any model selection process in this context can be visualized and the associations can be read directly on the associated graph. Ideally this graph should be as simple as possible, following Occam's razor principle that *ceteris paribus*, the simplest model is the most informative.

Backward stepwise selection starts from the saturated model having included or possible edges as illustrated in Figure 1, and sequentially tests for deletion of an edge from the graph. The edge with the highest P-value larger than the significance level is dropped from the CIG. This means that the corresponding pair of variables is conditionally independent given the remaining variables, or in other words, there is no direct association between that pairs of variables. The procedure continues until all edges left in the graph are significant.

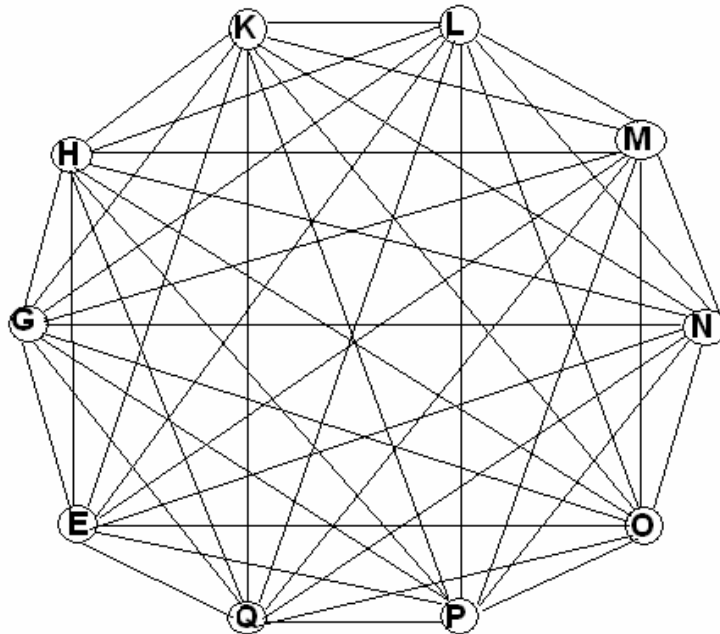
Another procedure that is sometimes used is forward selection; this starts from the simplest possible model of main effects for which there is no

edge in the CIG, and sequentially tests for inclusion of an edge between a pair of variables. The procedure stops when no possible edge can be included in the graph. The disadvantage of this procedure consists in the fact that the testing is done by comparison of two models that do not fit well, so both are incorrect.

Hence, we use backward stepwise selection. Because of the sparse data asymptotic likelihood tests may be misleading. Exact tests constructed by conditioning on the marginal totals offer a solution (see Edwards (1995) for a good description). Kreiner (1987) recommended using Monte Carlo sampling to compute exact tests that correct for sparseness, and this is the computational method employed here.

#### 4. Empirical results

We have developed three different models based on their relationship, on the basis of our observations. The first conditional independence model selected by the procedure described above is illustrated in Figure 1a. We developed a model based on ten variables. The model is developed by conditional independence graph using backward selection approach. The maximal (saturated) pattern of this model is as shown below.

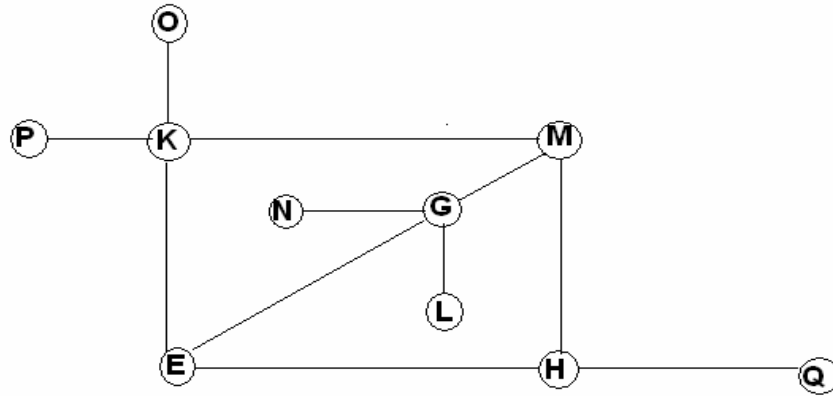


Notes: The variables are: K = Reliance on data to make decisions; L = Use of mathematical and statistical model; M = Overconfidence of risk managers; N = 1 / Importance given to non-financial data; O = Level of satisfaction with quality of risk management; P = Efficiency of the model; Q = Satisfaction with financial and non-financial incentives; H = Returns received; G = Decisions based on personal judgment; E = Performance pressure.

**Fig. 1a. Conditional independence graph of the saturated (maximal) model**

In this model all ten variables are dependent ones. G (Decisions based on personal judgment) and K (Reliance on data) are the most significant variables in the

model with four edges each, followed by M (Overconfidence of the risk manager), E (Performance pressure) and H (Returns received with three edges each).



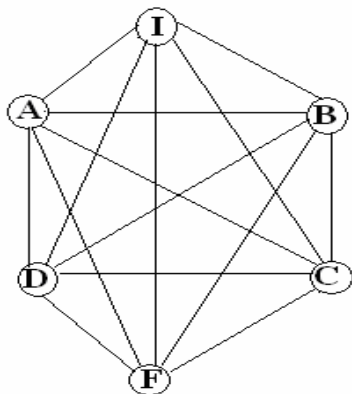
Notes: The variables are: K = Reliance on data to make decisions; L = Use of mathematical and statistical model; M = Overconfidence of risk managers; N = 1 / Importance given to non-financial data; O = Level of satisfaction with quality of risk management; P = Efficiency of the model; Q = Satisfaction with financial and non-financial incentives; H = Returns received; G = Decisions based on personal judgment; E = Performance pressure.

Source: Masood and Chaudhary (2008).

**Fig. 1b. Conditional independence model selected by backward stepwise selection for Figure 1a**

The variables P (Efficiency of the model) and O (Level of satisfaction with quality of risk management) are related to K (Reliance on data). The risk managers still do not trust the efficiency of these projections and models, hence very few managers rely on the data. Whereas L (Use of mathematical projection and statistical model) and N (1/ Importance given to non-financial data) are related to G (Decisions based on personal judgment). Lack of efficient models and statistical projections unimportance given to non-financial data while taking are due to the fact that the managers trust and use their personal judgment more than these models.

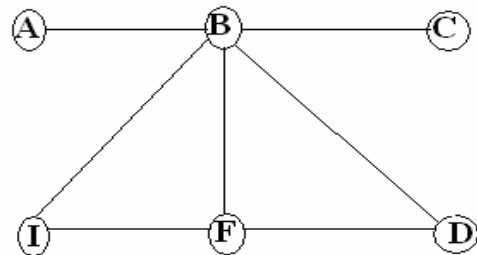
Our second conditional independence model is based on commitment of SAMA towards implementing Basel II and importance of Basel II in Saudi Arabian banking sector. Thus, in the model we have combined the importance given by SAMA and the importance given by the banks to implementation of Basel II.



Notes: The variables are: A = Extent of commitment of SAMA to implement Basel II in Saudi Arabia; B = Success of SAMA in implementing Basel II in Saudi Arabian banking sector; C = How often SAMA has provided training and expertise to banks in relation to implementation of Basel II; D = Effectiveness of training provided by SAMA; E = 1/Importance for banks to implement Basel II; I = Extent to which banks have implemented Basel II.

**Fig. 2a. Conditional independence graph of the saturated (maximal) model**

This model contains six variables. Here all the variables used are dependent ones. This is also a conditional independence model selected by backward stepwise selection for Figure 2a. Here B (Success of SAMA in implementing Basel II in Saudi Arabia) is the most important variable as it has five edges. The other most significant variable in the model is F (1/ Importance for banks to implement Basel II) which has three edges.



Notes: The variables are: A = Extent of commitment of SAMA to implement Basel II in Saudi Arabia; B = Success of SAMA in implementing Basel II in Saudi Arabian banking sector; C = How often SAMA has provided training and expertise to banks in relation to implementation of Basel II; D = Effectiveness of training provided by SAMA; F = 1/ Importance for banks to implement Basel II; I = Extent to which banks have implemented Basel II.

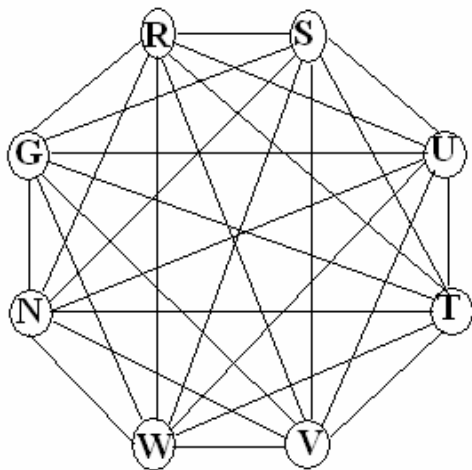
**Fig. 2b. Conditional independence model selected by backward stepwise selection for Figure 2a**

Our observations clearly indicate that SAMA attaches significance to the implementation of Basel II in Saudi Arabia and also provides training to the banks, which certainly helps improving and updating the banking sector of the country. B (Success of SAMA in implementing Basel II in Saudi Arabian banking sector) is related with D (Effectiveness of training provided by SAMA) and I (Extent to which banks have implemented Basel II).

The model shows that SAMA gives importance to implementation of Basel II and also provides effi-

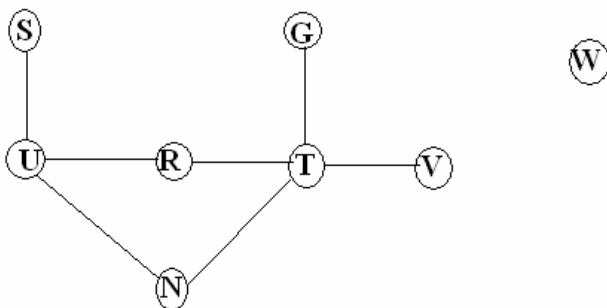
cient training to the banks whereas the Saudi Arabian banks place no importance on implementation of Basel II.

The third model is related with the effectiveness and the performance of risk managers in Saudi Arabia. This model has eight variables, six new variables and two variables common to model 1, i.e. N (1 / Importance given to non-financial data) and G (Decisions based on personal judgment). The model is again developed by conditional independence graph using backward selection approach. The maximal (saturated) pattern of this model is as shown below.



Notes: The variables are: R = Success in implementing operational risk approaches; S = Effectiveness in mitigating losses as compared to the last year; U = Percentage of successful mitigating actions; T = Effectiveness in meeting the personal performance as set by senior management; V = High targets given by senior management; W = Bonus linked with the personal performance; N = 1 / Importance given to non-financial data; G = Decisions based on personal judgment.

**Fig. 3a. Conditional independence graph of the saturated (maximal) model**



Notes: The variables are: R = Success in implementing operational risk approaches; S = Effectiveness in mitigating losses as compared to the last year; U = Percentage of successful mitigating actions; T = Effectiveness in meeting the personal performance as set by senior management; V = High targets given by senior management; W = Bonus linked with the personal performance; N = 1 / Importance given to non-financial data; G = Decisions based on personal judgment.

**Fig. 3b. Conditional independence model selected by backward stepwise selection for Figure 3a**

In this model seven variables are dependent while one is an independent one, i.e. W (Bonus linked with the personal performance), as by our observations bonus is given solely on the basis of overall bank performance and is not linked with the personal performance.

This is a conditional independence model selected by backward stepwise selection for Figure 3a. In this model T (Effectiveness in meeting the personal performance as set by senior management) is the most significant variable as it has four edges in the model, followed by U (Percentage of successful mitigating actions) having three edges. By our results we found that the risk managers in Saudi Arabian banking system are incapable of mitigating their pervious losses. Hence, this is related in the model to V (High targets given by senior management) and G (Decisions based on personal judgment).

**Conclusions**

Following a series of interviews with 110 risk managers and regulators, from 12 most significant banks, which work under the supervision of SAMA, we collected data describing their personal opinions on important questions related to the investment decision process. After the analysis we can conclude that:

1. A more detailed analysis showed us that the degree of satisfaction depends on the individual banks and not on the banking system as a whole. We found that maximum numbers of managers of a particular bank were satisfied, at the same time managers of different banks were unsatisfied.
2. We found that maximum number of risk managers have the knowledge about risk approaches like the basic indicator, standardized and internal measurement. Furthermore they also agreed to use them to some extent while making their decisions.
3. The results clearly indicate that SAMA attaches significance to the implementation of Basel II in Saudi Arabia and also provides training to the banks, which certainly helps improving and updating the banking sector of the country.
4. SAMA the central governing body of all the banks, gives importance to the implementation of Basel II and also provides efficient training to the banks whereas, on the other hand, the Saudi banks gave no importance to the implementation of Basel II.
5. We also conclude that the policy of senior management of setting the personal targets to individual risk managers has not been successful in Saudi Arabian banking system as most of the

risk managers are incapable of meeting these targets, which further leads to terminations and losses.

6. By our results we came to the conclusion that the risk managers in Saudi Arabian banking system are incapable of mitigating their previous losses.

7. We found that bonus is given solely on the basis of overall banks performance and is not linked with their personal performance. This policy reduces the effectiveness of individual performance targets and hence reduces the efficiency of risk managers in Saudi Arabia.

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## Appendix

### Questionnaire

#### Questionnaire for senior bank managers and regulators

**Name:**

**Post held:**

**E-mail:**

**Date:**

Name of the bank (tick)

- |                        |                          |
|------------------------|--------------------------|
| <b>Al Jazira Bank</b>  | <input type="checkbox"/> |
| <b>Commercial Bank</b> | <input type="checkbox"/> |
| <b>Investment Bank</b> | <input type="checkbox"/> |

- National Bank**
- Al Rajhi Bank**
- Riyad Bank**
- Samba Financial Group (Samba)**
- Saudi British Bank**
- Banque Saudi Fransi**
- Saudi Hollandi Bank**
- Al Bilad Bank**
- Al-Enma'a Bank**

Q. Sex:

- Male**
- Female**

Q. Years of experience as a senior manager:

- 0 - 5**
- 6 - 10**
- 11 - 15**
- 15 - 20**
- 21 & more**

Q. Educational qualification (relevant):

- BA/BSc**
- MA/MSc**
- MBA**
- PhD**
- Other**

Q. How many risk analysis and regulating departments have you worked in?

- 0 - 3**
- 4 - 6**
- 7 - 9**
- 9 - 12**
- 12 or more**

Q. Do you think there is a lot performance pressure being a risk manager and regulator?

- Yes**
- No**

Q. Are you satisfied with financial and non-financial incentives provided to the senior risk managers?

- Very satisfied**
- Satisfied**
- Neither satisfied nor dissatisfied**
- Unsatisfied**
- Very unsatisfied**

Q. What is your level of satisfaction with the quality of risk management and regulatory techniques applied?

- Very satisfied**
- Satisfied**
- Neither satisfied nor dissatisfied**
- Unsatisfied**
- Very unsatisfied**

Q. How much do you rely on the data to make your decisions?

- To a large extent**
- To some extent**
- To a limited extent**

Q. How many of your risk management decisions are based on your personal judgment more than anything?

- To a large extent**
- To some extent**
- To a limited extent**

Q. How often do you use mathematical projections and statistical models (VAR/Credit Risk) for risk management and implementation?

- Very often**
- Often**
- Sometimes**
- Seldom**
- Never**

Q. How efficient do you think these are?

- Very efficient**
- Efficient**
- Neither efficient nor inefficient**
- Inefficient**
- Very inefficient**

Q. What importance do you give to the benchmarking of different institutions/SAMA while making risk management decisions?

- Very important**
- Important**
- Neither important nor unimportant**
- Unimportant**
- Very unimportant**

Q. What importance do you give to non-financial data while making risk management and regulatory decisions?

- Very important**
- Important**
- Neither important nor unimportant**
- Unimportant**
- Very unimportant**

Q. How much do you rely on risk loss data from SAMA and other institutions?

- Too much**
- Heavily**
- Ambivalent**
- Hardly**
- Almost never**

Q. To what extent is the SAMA top management committed to implementing Basel II in Saudi Arabia?

- To a large extent**
- To some extent**
- To a limited extent**

Q. How far has SAMA been actually successful in implementing Basel II in the Saudi Arabian banking sector?

- To a large extent**
- To some extent**
- To a limited extent**

Q. How often has SAMA provided training and expertise to your bank in relation to Basel II implementation?

- Very often**
- Often**
- Sometimes**
- Seldom**
- Never**

Q. Do you think the training provided by SAMA has been useful in relation to Basel II implementation in Saudi Arabia?

- To a large extent**
- To some extent**
- To a limited extent**

Q. How important is for your bank to implement Basel II?

- Very important**
- Important**
- Neither important nor unimportant**
- Unimportant**
- Very unimportant**

Q. To what extent have you been able to implement Basel II in your bank?

- To a large extent**
- To some extent**
- To a limited extent**

Q. Are you aware of operational risk approaches like the basic indicator; standardized and internal measurement?

- Yes**
- No**

Q. If yes, to what extent have you been successful in implementing the above approaches?

**To a large extent**

**To some extent**

**To a limited extent**

Q. How effective have you been in mitigating your losses compared to the last year?

**Very ineffective**

**Ineffective**

**Neither effective nor ineffective**

**Effective**

**Very effective**

Q. How effective have you been in meeting your personal performance targets as set by senior management?

**Very ineffective**

**Ineffective**

**Neither effective nor ineffective**

**Effective**

**Very effective**

Q. How many mitigating actions have you managed within the last year?

**Please specify an exact number if possible or if not possible please provide your best estimate.**

Q. What percentage of mitigating actions have you successfully dealt with?

Q. To what degree is your bonus linked with your personal performance and with the overall performance of the bank?

**Solely personal performance**

**Mainly personal performance and some bank performance**

**Half personal performance and half bank performance**

**Mainly bank performance and some personal performance**

**Solely bank performance**

Q. Are you satisfied with the risk related objectives set for you by the senior management for this year?

**Very unsatisfied**

**Unsatisfied**

**Neither satisfied nor unsatisfied**

**Satisfied**

**Very unsatisfied**