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Risk management and the implementation of the Basel Accord in emerging countries: An application to Pakistan

Omar Masood[1] and John Fry[2 *]

Abstract

This paper addresses an important contemporary issue; namely the implementation of the Basel Accord worldwide. The Basel Accord provides a series of measures to improve the stability of the world's financial system but its implementation poses a number of challenges for both developing and emerging economies. Pakistan faces a number of unique challenges in this regard due to its recent economic expansion and the fact that the rate at which the Basel Accord is being adopted lags behind that of other countries. This paper throws light on this and a number of related issues due to a combination of the novelty of the survey data from risk managers coupled with a rigorous statistical analysis. Results reflect that the Basel Accord is generally well regarded due to its underlying aims of improved capital standards and a scientific treatment of risk. However, operational risk emerges as a key barrier to implementation in Pakistan. A number of further obstacles are highlighted, which, do seem to have been addressed although only with a partial degree of success. Privately owned banks appear to be more technically competent and more favourably disposed towards implementation than publicly owned banks.

Keywords: Risk Management, Basel Accord, Banking, Financial Regulation, Emerging Markets

JEL Classification: C25 C81 D03 G21 O53

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1. Introduction

As evidenced by the recent financial crisis, the global banking industry is becoming increasingly complex and risky. The main causes for such leveraged banking are international financial deregulation, product and technological innovation and above all the integration of global financial markets (Sahajwala and Van den Bergh, 2000). Such accelerations have led to banks upgrading the methodologies and procedures used to gauge and administer their risks (Carauana, 2004). The Basel Accord has thus emerged as an attempt to secure stability in financial systems and structures by using a set of rules which are acceptable in all global financial hubs and allow for a scientific treatment of risk. As part of the Accord banks face a number of minimum capital requirements. Such rules are advantageous to the economy as they cushion banks against losses resulting from credit, operational and market risk exposures and ensure the availability of capital in the economy throughout business cycles (BIS, 2004; Hassan Al-Tamimi, 2008). Tying banks to prescribed capital limits also guards against systemic risk (Amidu, 2007).

The Basel Committee on Banking Supervision (BCBS) was formed in 1974 by G10 central bankers under the auspices of the *Bank for International Settlements* (BIS) following the collapse of *Bankhaus Herstatt* in Germany and *Franklin National Bank* in the United States in 1974. (BIS, 2008; Engelen, 2005). The committee introduced its first Basel Accord, known as Basel I, in 1988. The main purpose of the Accord was to protect global banking systems from the affects of financial crises. The landmark achievement of this Accord was the acceptance of this principle and the establishment of minimum capital requirements of banks (Makwiramiti, 2008). Basel I attempted to address bank capitalization, alongside other inconsistencies in the banking environment, by primarily focussing upon Credit Risk. The second Basel Accord, Basel II, supplemented the original agreement by setting new minimal capital requirements, again based on risk profiling, but also introducing two new pillars: supervisory review and market discipline. Basel II was very short-lived in relation to its predecessor as it was promulgated during the onset of the global financial crisis. In response to a number of failings in Basel II, which came to light during the crisis, a further modification, Basel III, was initiated in 2010.

Conservative Risk Management is the hallmark of the Basel II framework for mobilizing financial stability across banking sectors worldwide (BCBS, 2006). This framework built on the basic premise of capital management as suggested by Basel I in 1988, but provided improved parameters, reflecting a clearer formulation of risks facing the banking sector and a mechanism for protecting banks against risk in a more methodical and scientific manner. Although primarily designed for G10 countries however, the Accord was structured in such a way that it could be applied across the world

equivalently in developed and developing countries (Mboweni, 2004). This was desirable because the Accord seeks to align capital adequacy of banks with the range of risks stemming from its various assets. In principle, this enables the Basel Accord to manage developments in the banking field pertaining to new financial instruments and financial technologies (Mboweni, 2004).

The Basel Accord re-engineered the organizational structures and processes of the supervisors and the banking sectors all around the world (Mboweni, 2004). The key to the effective and improved risk management under the Accord is its proper implementation (AIF: Disclosure Subcommittee, 2004). Accordingly, in order to have effective implementation around the world, co-operation between global supervisors and the respective institutions plays a pivotal role (Global Risk Regulator, 2005). The primary purpose of the Basel Accord is therefore to promulgate the three pillars of Basel II by rationalizing banks' risk appetite according to their residual resources, thus forming the basis of a sound banking structure.

In Pakistan banks are regulated by the Banking Supervision Department of the State Bank of Pakistan. It has set-up a road map for the implementation of Basel Accord which attempts to comply with Basel Accord Implementation guidelines issued by the BCBS. With the growth of international banking and the entrance of multinational banks into Pakistan's Banking Sector the diversity of the domestic Banking Sector has increased. This has also increased the public availability of banking services matching international standards. These developments have changed the nature of the risks facing the Pakistani banking system – risks that the very promulgation of the Basel Accord was intended to address. The multi-layered structure of the Basel Accord - and different levels of adoption around the world – creates further confusion. In Pakistan, it was originally intended that the Basel Accord would be implemented in full before December 31st 2009. However, the State Bank of Pakistan extended the dates for implementation for various special circumstances that the Pakistani Banking Sector faces. The fact that Pakistan's implementation of the Basel Accord lags behind that of other countries is also significant (see Section 3). There is thus a need to investigate the reasons behind this from a local perspective, over and above the international reasons stemming from the international banking crisis. In this regard research needs to be undertaken focusing upon the following issues:

- Compliance to the timetable introduced by the Supervisory Authorities;
- Problems faced by both the State Bank of Pakistan and individual banks;
- The present and proposed infrastructure available with the Basel Accord for smooth and successful implementation;
- HR capabilities;
- The impact the Basel Accord has upon bank exposures to credit, market and operational risks.

This paper will explore various aspects of Basel Accord Implementation in Pakistan, thus clarifying the inability of Pakistani Banks to adopt the advanced techniques in the Accord. Previous studies have looked at the impact of implementation of the Basel Accord in a number of different countries including the United States, Brazil, Switzerland, India, Lebanon and South Africa (Jacobsohn, 2004; Cumming and Nel, 2005). However, no such study has yet been conducted in Pakistan. Further, most of these studies were conducted prior to the introduction of the Second Accord. It is therefore of interest to undertake a fresh study into the implementation of the Basel II Accord in Pakistan, both due to the timing (after Basel II and following the recent financial crisis and the subsequent commencement of Basel III) and due to the unique set of circumstances facing the Pakistan banking sector following its recent expansion.

The layout of this paper is as follows. Section 2 reviews the Basel Accord in its various incarnations and highlights a number of pertinent background issues regarding implementation. Section 3 discusses international comparisons and the implementation of the Basel Accord in more detail. Section 4 discusses the survey methodology. Section 5 introduces the statistical methodology used and gives the empirical results. Section 6 concludes.

2. The Basel Accord

2.1 Basel I

Basel I was first introduced in the 1988, with minimum capital requirements set at 8% of risk adjusted assets. The Accord was accepted all over the world by over 100 countries and Engelen (2005) points to its general acceptance by most of the banks globally since 1988. The adoption of Basel I in a significant number of countries across the world improved the resilience of the international banking system through improved capital standards (Rime, 2001; Cumming and Nel, 2005). The Basel Accord was formulated in response to the 1970s financial crisis, with the expectation that appropriate capital levels would help reduce systemic risk, with individual financial institutions better able to withstand all losses in general and credit loss in particular (Dobson and Hufbauer, 2001).

However, despite providing some stability to the financial sector Ong (2004) criticized the Accord for a "one size fits all" approach to risk management, being insensitive to the distinction between credit and other risks (Hai et al., 2007). Further, the introduction of new financial derivatives and the increased globalization and integration of world financial markets necessitated further revision (Hai et al., 2007). Regulations also led to banks "cherry picking" certain practices, providing leverage to

banks who then created high-risk portfolios of assets within particular risk categories (Cumming and Nel, 2005).

2.2 Basel II

The primary objective of Basel II was to guarantee the solidity of the financial system by ensuring that banks are appropriately and proportionately capitalized with respect to a number of different risk factors. The Accord takes the form of three pillars; Minimal Capital Requirements, Supervisory Review and Market Discipline. The First Pillar, Minimal Capital Requirements, extended the key feature of Basel I – measurement of risk and alignment with regulatory capital (Bailey, 2005) - but extended the definition of risk to include credit risk, market risk and operational risk.

Credit Risk can be measured in two different ways: the *Standardized Approach* (SA) and the *Internal Ratings Based* (IRB) approach. The IRB approach enables banks to use internal estimates of borrower creditworthiness in order to gauge future losses. Under the IRB approach two different possibilities of varying complexity are possible. Under the *Foundation* IRB (FIRB) approach banks compute estimates of the probability of default (PD) of respective borrowers and in the next step their supervisors in the respective regions complement this estimate with other appropriate inputs. Alternatively, using an *Advanced* IRB (AIRB) approach banks may use the probability of default (PD), loss given default (LGD), exposure at default (EAD), and maturity (M) to compute credit risk (BCBS, 2006).

In addition to refining the measurement of Credit Risk, Basel II also established that banks should allocate a proportion of capital for operational risk. This enhances the scope of Basel II because it requires banks to gauge the likely extent of losses from failed or inadequate internal processes, systems, and employee errors relative to external factors. To measure operational risk three different approaches were introduced: the *basic indicator approach,* the *standardized approach* and the *internal measurement approach*.

Basel II also specifies capital charges for banks' *Market Risk* exposures based upon their risk of loss stemming from on and off balance sheet positions due to volatility in market prices. Such risks include *Interest Rate Risk*, *Foreign Exchange Risk* and *Commodities Risk*. Basel II also specified prudent guidelines for the valuation of positions in the trading book. These consist of the provision of adequate systems and control, valuation methodologies of marking to market and marking to model, independent price verifications and valuation adjustment and reserves. The *valuation methodologies* involve actual measurement of market risk using either the *Standardized Measurement Method* or the *Internal Models Approach*.

Supervisory Review forms the second pillar of Basel II and is intended to ensure that banks have sufficient resources to undertake their internal risk assessment (BCBS, 2006). The Basel Accord dictates that all banks under their jurisdiction have systems and processes available for their capital adequacy assessment (BCBS, 2001). In doing so the Accord suggested that banks develop their assessment procedures and that the calculation of capital targets is continuously updated and remains in line with capital adequacy requirements (BCBS, 2001). Supervisors were also given powers to decide if banks are to hold higher capital levels over and above the 8% originally prescribed in Pillar I. Furthermore, supervisors were also given the authority to intervene in risk management procedures, revising and upgrading procedures and processes as and when they deemed necessary (BCBS, 2001).

The third pillar of market discipline emphasized the improvement of bank management by ensuring full disclosure, lucidity and clarity in public reporting. The main aim of this pillar is to increase the disclosure of capital adequacy in banks via their public reports (BCBS, 2006). This pillar clarifies issues already raised in (BCBS, 2001) which stated that market participants can only gauge the capital adequacy risk profiles of the banks if the reporting banks comply with the enhanced levels of market discipline (BCBS, 2001). In this way, by monitoring the activities of the banks and their ability to administer its exposure to risk, market participants will be in a position to reward banks that conservatively administer their risks, simultaneously penalizing those that fail to do so (Makwiramiti, 2008).

Initially, the Basel Accord was developed for internationally participating banks. However, it can equally be applied to banks with varying levels of complexity (BCBS, 2001). The Accord provides a principled framework for the treatment of risk coupled with supervisory review, hence adding increased flexibility in the calculation of risk and respective capital levels. Thus, the Accord has also contributed towards improvements in corporate governance and transparency (Makwiramiti, 2008). Other added benefits of the Basel Accord include improved regulatory framework, applications and processes. The advantages of Basel II can be categorized in the loan, portfolio, and organizational levels as laid out in Skosana Risk Management Company (2006).

The global financial crisis highlighted a number of key failings in Basel II. These include over-estimates of common equity and a failure to distinguish between simple and complex positions in Trading Book Exposures. Basel II also overlooks issues of leverage, macro-prudential stability (the impact banks have on the financial system as a whole) and systemic risk. In response, some of these obvious failings have begun to be addressed in a third accord - Basel III. A useful overview of Basel III is contained in Folpmers (2010). A number of modifications were made to minimum capital requirements calculations including more conservative micro-prudential and macro-prudential capital rules. Additional requirements, based on liquidity ratios, were also introduced to counter banks building up excessive leverage with an insufficient liquidity cushion.

3. Implementation of the Basel Accord: international comparisons

There is a clear majority opinion that the implementation of the Basel Accord should result in increased financial stability as it provides risk-sensitive methodologies (BIS, 1999; BCBS, 2004; Cumming and Nel, 2005; van Rixtel, et al. 2004; Jacobsohn, 2004). Whilst the Basel Accord was primarily designed for G10 countries, and not for developing countries, it was nonetheless structured in such a way that it could be applied across the world in both developed and developing countries (Mboweni, 2004). However, it is reasonable to expect that the Accord will not be adopted across the world at the same time as banks in developing and emerging economies will have to work harder to meet international practices and procedures (Dupuis, 2006).

There a number of further issues which may limit the effectiveness of the Basel Accord. Crucially, Basel II failed to account for the effects of an international financial crisis – leading directly to the promulgation of a third Accord Basel III. There are procyclicality issues (IMF, 2005), which may aggravate instabilities in the banking system and, by their nature, may have more pronounced effects upon developing countries (Griffith-Jones and Spratt, 2001; Reisen, 2001; Ward, 2002). In economic downturns, increased risks lead to increased capital charges. These increases in the cost of capital may then lead to a contraction in the rate of bank lending. Economic distress may thus be transferred from the financial sector to the real economy (Jacobsohn, 2004; Heid, 2003). There are two further issues, namely potential clashes between international and local financial standards and credit risk management issues resulting from the use of rating agencies. This first scenario arises when the home country of a bank requires higher IRB approaches than the host country prescribes due to limitations in supervisory capacity. Regarding credit risk, rating agencies can manipulate Credit Risk Management in developing countries (IMF, 2005). Such companies can prescribe risk-weights for assets that can provide biased incentives for implementing standardized approaches in Pillar I. There is thus a need on the part of the supervisors of the respective countries to oversee the work of Rating Agencies.

The success of the Basel Accord, and the speed of its implementation, thus depends critically on the resource constraints of financial regulators across the world (Cornford, 2006). We review the effects of such measures in South Africa, India, Switzerland, Brazil, Jordan, USA and Pakistan. As discussed below the international experience varies greatly.

Prior to the introduction of the Basel Accord South Africa, the government worked for around 11 years to ensure that a number of fiscal and macroeconomic preconditions were met. Basel II was

finally implemented across the banking sector uniformly from January 2008 (Neville, 2005). In contrast, in India the pace of transition to the Basel Accord is very slow (Mehra, 2010). By December 2010 Indian banks were still following initial approaches, with a Reserve Bank of India notification stating that more advanced approaches are to be implemented from 2013.

In Switzerland, although all major banks started to apply approaches by the year 2006, it was mainly only the large internationally active banks that had the resources to apply methodologies like IRB (Swiss Federal Banking Commission, 2005). Similar to South Africa, Switzerland opted to integrate all three pillars into its regulatory system and adopted all the approaches available in the Basel II framework. There were no alterations made to the methodologies for credit, operational and market risks (Swiss Federal Banking Commission, 2005), although the Swiss implementation allows for two additional ways of calculating credit risk – the *Swiss Standard Approach* for domestic banks and the *International Standard Approach* for international banks. The initial approaches were introduced by January 2007 with more advanced methodologies coming into force by January 2008. This double paced time schedule allowed banks enough time for a smooth transition (Makwirmaiti, 2008). In Brazil, the first implementations of the Basel Accord were due to commence in 2004, later postponed to 2007. The process of implementation is expected to be completed in 2013, with the Central Bank of Brazil having put in place a detailed timetable for full implementation. In contrast, implementation of Basel Accord in Jordon is not at an advanced stage. Jordanian banks have met a number of preconditions for the Basel Accord. However, the existence of supervisory Authority is questionable, as no mechanism for external rating of credit exposures exists, thus compromising the integrity of the whole process (Barakat, 2009).

In terms of its adoption of the Basel Accord the United States formed a two-step ladder for its financial institutions. The US outlined specific criteria assigning the Basel I Accord for non-core Banks and the Basel II Accord for core Banks (Federal Reserve Board, 2007). Accordingly in the USA all such banks which opt for Basel II Accord are obliged to promulgate advanced approaches for capital allocations in their banks (Federal Reserve Board, 2007; Gordon-Hart, 2004). However, the recent financial crisis disturbed the path of implementation and many attempts to even out the two-step ladder approach have been scuppered. Currently, Basel III does not seem to constitute a major issue for US Banks as they appear to be more cushioned in terms of liquidity, leverage and buffer requirements (Folpmers, 2010). However, there are still deliberations under way about how to phase in the implementation of Basel III in line with international standards.

In Pakistan, the State Bank of Pakistan (SBP) has taken several steps towards the implementation of the Basel Accord. In 2005 the SBP set the following schedule:

- Standardized Approach for credit risk and Basic indicator / Standardized Approach for operational risk from 1st January 2008.

- Internal Ratings Based (IRB) approach from 1st January 2010. Banks wishing to adopt the Internal Ratings Based Approach for capital requirements against credit risk before 1st January 2010 may approach SBP for the purpose. Their request will be considered on case-to-case basis.

According to annual reports submitted by banks in Pakistan, none have yet adopted Advanced Internal Ratings Based Approaches which were supposed to be implemented by the Banking sector from the 1st of January 2010. Thus, Pakistan has already lagged behind by more than a year in its implementation of the Basel Accord. Since Pakistan has made less progress than other countries it is therefore of interest to determine the reasons for the failure to comply with the original schedule and to identify potential further barriers to implementation.

4. Survey methodology

This study has been conducted in order to study obstacles to the implementation of the Basel Accord in Pakistan. The questionnaire used for our study has been adopted from the Basel Accord implementation of the Bank of Serbia and has been specially amended for the purpose of our study. The final Questionnaire has 52 questions:

- Questions about the risk profile of bank and the functional profile of respondents;
- Questions about the aptitude of the respective bank and their IT and HR resource availability regarding implementation of the Basel Accord;
- Questions about the risks covered in the First Pillar and efforts made by the bank to adopt advanced approaches to risk management.
- Questions about the Second Pillar of Basel Accord - Supervisory Review;
- Questions about the Third Pillar of Basel Accord - Market Discipline.

Questionnaires are required in studies which involve eliciting information about a phenomenon where patterns, frequency and success of adoption are not known (Taylor-Powell, 1998; Taylor-Powell and Hermann, 2000). The fact that our research questions concern contemporary issues regarding the inability of Banks to implement the advanced methodologies of the Basel Accord further necessitates use of a questionnaire. Results are thus gathered in a standardized and objective way, from a non-trivial proportion of the target population and in a quick and efficient manner.

There are currently around 38 banks operating in Pakistan. From these we have collected data from 5 key personnel from 12 of these 38 banks. These 12 banks own about 70% of market share both in Deposit and Asset categories. Further, the banks in our study have been selected with different

ownership types and Capital Adequacy Ratios (CARs) showing different patterns – some are increasing over time, some are decreasing. Summary statistics of banks in the sample are shown in Table 1. CARs calculated from published annual accounts are shown in Table 2.

Table 1: Summary statistics of banks in the sample.

Name of the Bank	**Ownership Type**	**Total Emp***	**Risk Division Emp***	**Credit Risk Emp****	**Total Risk Weighted Assets***	**Total Risk Weighted Credit Assets**	**Total Deposits***
KASB Bank	Local	1321	16	12	45.745	42.492	43.807
SC Bank	Foreign	5042	148	91	180.268	136.300	206.958
Askari Bank	Local	7270	69	58	165.596	144.793	205.970
Allied Bank	Local	11690	351	315	238.437	193.031	328.875
NIB Bank	Foreign	6385	47	38	101.957	86.115	93.920
MCB Bank	Local	9397	410	380	337.417	243.712	367.604
National Bank	Government	16248	308	286	624.881	459.755	726.465
Bank Alfalah	Foreign	7462	130	106	213.840	185.162	324.760
Faysal Bank	Foreign	2042	117	99	103.420	83.013	123.655
United Bank	Foreign	8738	185	163	485.958	386.466	503.832
B of Punjab***	Government	4811	100	85	172.345***	151.000***	195.073
Habib Bank	Local	13122	524	490	586.894	471.902	653.452

Data Source: *Annual Financial Statements are Available on the Website of State Bank of Pakistan.
: **Average of response of all survey respondents in each bank
***Bank of Punjab has not been issuing its Annual reports for the last two years due to Capital Adequacy problems (with the Permission of State Bank of Pakistan). The figures listed are expected figures as obtained from survey respondents

Table 2: Capital Adequacy Ratios of Banks in the Sample from 2005-2009.

Year	KASB	SCB	ACB	ABL	NIB	MCB	NIB	BALF	FBL	UBL	BOP	HBL
2005	9.34	6.45	11.3	12.17	11.61	12.54	11.51	8.66	12.01	9.26	12.78	9.93
2006	8.95	8.14	12.37	12.8	17.44	18.65	16.5	9.48	11.42	11.1	10.09	12.81
2007	12.18	9.45	13.2	10.26	3.33	16.73	18.05	9.85	10.27	10.32	9.69	11.6
2008	9.05	9.99	12.1	10.9	19.52	16.28	16.9	8.03	10.84	9.96	1.92	12.33
2009	3.53	11.57	13.5	13.47	19.53	19.07	17.23	12.46	12.36	13.18	7.68*	13.07

*Data Source: expected figure from the last available financial statements

With the dual aims of obtaining a representative sample of the banking sector and analyzing the extent of the implementation of the Basel Accord, respondents from the included banks were surveyed as follows:

- Two questionnaires were filled in by senior executives to gauge the extent of Basel Accord awareness at the higher management level.
- One questionnaire was filled in by an executive of the Risk Management Division.
- Two questionnaires were filled by a Branch Manager at each bank to gauge the extent of Basel Accord awareness at the lower management level.
- A combination of 40 personal interviews and 20 telephone interviews were conducted in order to ensure the level and accuracy of survey responses.

The survey highlights the following areas of interest:

- **Type of Bank:** Are there differences in the implementation of Basel Accord between Public and Private Sector Banks in Pakistan?
- **Inclination of the Bank towards the Basel Accord**
- **External Training:** Has the bank initiated external training in relation to the Basel Accord?
- **Competence of Employees in Risk Management Department:** The opinion of the respondent regarding the expertise of Employees in their Risk Management Department.
- **Effectiveness of Basel Plan Implementation:** The opinion of the respondent regarding the effectiveness of the bank's implementation plan.
- **Changes required in the System to ensure Basel Accord Compliance?**

- **Years Covered for Default time Series Data:** The longer the period of time that data is available indirectly measures the compliance and inclination of the bank towards the Basel Accord and related standards.

- **Compliance with Market Discipline:** The extent of compliance with disclosure requirements as per International Financial Reporting Standards and other disclosure requirements of Basel Accord.

- **Basel Customer Awareness:** Are banks raising awareness amongst its customers regarding Basel Accord Compliance. Such steps are necessary in the light of Data Sharing, an issue highlighted in the Accord, and other international experiences of the financial crisis.

Based upon our over-riding research questions we have developed the following hypotheses for analyzing deviations in the Pakistan banking sector for the Road Map for Basel Accord implementation in Pakistan.

- **H1:** *Pakistani banks are very much inclined to Basel Accord Implementation and they have taken a number of steps regarding policy making, up-grading of employee skills and technology for achieving the results.*

- **H2:** *Progress on Basel Accord implementation is uniform across the banking sector and there are no significant differences in the steps taken by Public Sector and Private Sector banks.*

As detailed below in Sections 5.1-2 Hypotheses 1 and 2 can be tested in a statistically rigorous manner based on the data on survey responses.

5. Statistical analysis of the survey data

5.1 Measuring inclination towards the Basel Accord and potential barriers to implementation

Our overall aims were to examine attitudes towards Basel Accord implementation plans across Pakistani Islamic banks and thus to determine which factors appear to be the biggest obstacles to implementation of the Basel Accord in these banks.

The questionnaire, see the Appendix, asks a number of general questions about the significance of the implementation of the Basel Accord (Q1-2) and further questions regarding overall attitudes to implementation (Q3-8) and a number of wider issues. These include questions regarding practical implementation of the Accord (Q10-11, Q17-20, Q31), knowledge and training of staff (Q12-14), risk management (Q15-16), whether or not practices currently comply with the Accord (Q21-22, Q32), further changes necessitated by the Accord (Q23-24), issues pertaining to data protection and security (Q25-29), minimal capital requirements (Q9, Q30), credit risk (Q34-37), market risk (Q38-40), operational risk (Q41-43), issues relating to the supervisory review process (Q44-48) and market discipline (Q49-Q52).

Our first task in analysing the data was to produce a score measuring respondents' attitude (positive or negative) towards implementation of the Basel Accord. To do this we analysed each individual's answer to Questions 3-8. If they *strongly agree* or *agree* with the proposition they score 1, if they *strongly disagree* or *disagree* they score -1 and if they *neither agree nor disagree* they score 0. Next, if the proposition has negative implications regarding the implementation of the Basel Accord (Question 4) these scores are multiplied by -1. Finally, a score is allocated to an individual by adding their scores for each of the Questions 3-8. As constructed, high values indicate favourability towards implementation of the Basel Accord. Negative values indicate opposition. A value of zero indicates neutrality.

Overall findings show that managers are on the whole favourable towards the implementation of the Basel Accord. A one-sample t-test (Snedecor and Cochran, 1989 Chapter 5) gives a t-statistic of 4.502 on 59 degrees of freedom giving a p-value of 0.000. A "smoothed histogram", kernel density estimate, (Venables and Ripley, 2002 Chapter 5) of the survey responses is shown in Figure 1 and reinforces the overall impression that managers are generally well-disposed towards implementation of the Basel Accord although a degree of opposition towards implementation is also apparent. As shown in Figure 1 there is a high probability (greater than 0.5) of obtaining a positive score and the modal value, or most commonly observed value, is clearly positive. In contrast, there is no statistically significant evidence for a difference between publicly and privately owned banks. An unpaired pooled two-sample t-test (Snedecor and Cochran, 1989 Chapter 6) gives a t-value of -1.597 and a p-value of 0.116. Nonetheless, it does appear that privately owned banks may be better disposed towards the implementation of the Basel Accord than publicly owned banks.

Having deduced that, overall, managers are favourably disposed towards the implementation of the Basel Accord we examine the survey data more fully in order to identify potential obstacles and the corresponding capacity building needs in the banks. We do this by regressing the sentiment scores against explanatory variables pertaining to the survey data (Q9-52) described above. Model selection

is performed using stepwise regression, based on sequential F-tests (Bingham and Fry, 2010 Chapter 6), starting from the baseline model

$$y_i = \beta_0 + \varepsilon_i, \tag{1}$$

where y_i is the score of the ith survey respondent, β_0 is the underlying average score and ε_i is a random error term. In the sequel we fit the model

$$y_i = \beta_0 + \beta_1 x_{1,i} + \ldots + \beta_p x_{p,i} + \varepsilon_i, \tag{2}$$

where $x_1, \ldots, x_p$ are explanatory variables pertaining to the survey data. The results obtained for the final model selected are shown in Table 3. The R^2 value is 0.82, suggesting that the model explains a substantial amount, 82%, of the variability in the scores of the survey respondents. The survey questions relating to the final model are shown below in Table 4.

Figure 1: Smoothed histogram (kernel density estimate) of survey responses

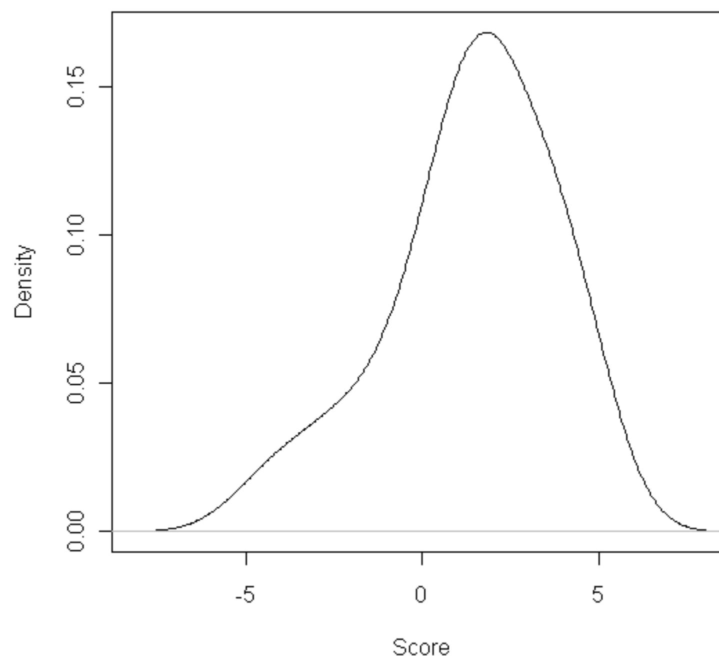

Table 3: Regression Output for the final model

Issue	Variable	Estimate	Estimated Standard Error	*t*-value	*p*-value
	Intercept	-6.023	1.294	-4.658	0.000***
Credit Risk	Number of years data on historical default (Q36a)	0.870	0.105	8.299	0.000***
	Local Development of credit risk models (Q37)	3.753	1.391	2.698	0.010**
Practical Implementation Issues	Basel Accord Implementation Department set-up (Q17)	1.617	0.506	3.196	0.002**
	Q11 (Agree)	1.807	0.839	2.155	0.036*
Minimal Capital Requirements	Q9 (Neither Agree Nor Disagree)	1.564	0.791	1.978	0.054
	Q9 (Agree)	1.769	0.359	4.931	0.000***
Data security	Q27 (Agree)	1.340	0.451	2.974	0.005**
Operational Risk	Standardized Measurement Approach (Q41)	-1.553	0.628	-2.473	0.017*
	Unknown Measurement Approach (Q41)	3.822	1.372	2.785	0.008**
	Q30b (Neither Agree Nor Disagree)	-0.167	0.359	-0.467	0.643
	Q30b (Agree)	1.912	0.647	2.956	0.005**

The results of the survey shown in Table 3 indicate highlight the following as potential limiting factors regarding implementation: Credit Risk, Practical Implementation Issues (IT and HR), Minimal Capital Requirements, Data Security and Operational Risk. The regression output in Table 3 and the survey questions in Table 4 lead to the following interpretation.

Results from the final regression model clearly highlight the importance of Credit Risk. As the number of years of data on historical default increases, the level of support for implementation of the Basel Accord increases. Similarly, local development of credit risk models is also associated with increased support for the Basel Accord. In sum, as the level of experience in Credit Risk increases the favourability towards implementation of the Basel Accord increases.

Table 4: Survey questions pertaining to the final regression model

Q9. Do you think that the Basel Accord will lead to Lower Capital Requirements for some Banks?
Q11. Do you think Information Technology, and HR Problems might hinder implementation of the Basel Accord?
Q16b. How many employees are engaged in the Risk Management Process in your Bank? (Operational Risk)
Q17. Has your Bank set up any special Basel Accord Implementation Department?
Q27. Do you think that your Bank should plan to resolve data protection issues under the Basel Accord by taking the consent declaration of its customers?
Q30b. The current IT structure supports Basel Accord Requirements for Operational Risk?
Q36a. How many years are covered by the time series that you have created for credit risk assessment (of default)?
Q37. If you are using models for measuring economic capital for credit risk, how were these models developed?
Q41. Which approach (es) are you planning to use for measuring operational risk in your bank?

However, results also demonstrate that the Basel Accord raises serious questions regarding Operational Risk. As the number of employees working in Operational Risk increases, support for the Basel Accord decreases. Terms included in the final model suggest that less advanced approaches, *Standardized* and *Basic* approaches to modelling Operational Risk, are also associated with a less favourable view of the Basel Accord. Additional variables in the model (relating to Question 30)

indicate that whether or not the current IT structure supports the Basel Accord Requirements for Operational Risk is also significant. Minimal Capital Requirements constitute an important component of Operational Risk, with results also suggesting that significant numbers of managers think that the Basel Accord may actually *lower* capital requirements for some banks. Results suggest that managers who generally support implementation nonetheless appreciate wider issues that arise as part of the wider process. Managers who highlight the importance of data security (Q27) also tend to be more favourably inclined towards the Accord. Results also suggest that more favourable managers have successfully recognised that Information Technology and HR issues may hinder implementation of the Accord. In addition, results also highlight other practical aspects of implementation of the Basel Accord. Managers tend to be more supportive of implementation if their bank has established a dedicated Basel Accord Implementation Department.

In sum, results highlight the area of operational risk as a barrier to the implementation of the Basel Accord. Results also indicate that a number of further issues have only been addressed with a partial degree of success. These include modelling credit risk, having a dedicated Basel Accord implementation department, data security and IT and HR considerations.

5.2 Testing for differences between Public and Private Sector banks

In this subsection, our aim is to investigate factors which distinguish between private and publicly owned banks. In statistical terminology, we investigate which factors increase the probability of classifying a randomly chosen bank as privately owned. This is achieved by fitting a logistic regression model (McCullagh and Nelder (1989), Chapter 13; Bingham and Fry (2010), Chapter 8) and, as before, we regress observed outcomes against explanatory variables pertaining to the survey data (Q9-Q52) described above.

Let p_i denote the probability that the ith bank is privately owned. Let $\eta_i = \log\left(p_i/1 - p_i\right)$. We start with the benchmark model

$$\eta_i = \beta_0, \tag{3}$$

where β_0 is related to the underlying average proportion of privately owned banks[3] and there are no underlying features in the data which distinguish between privately owned and publicly owned banks. Using equation (3) as our benchmark model, in the sequel we fit the model

$$\eta_i = \beta_0 + \beta_1 x_{1,i} + \ldots + \beta_p x_{p,i}, \tag{4}$$

where $x_1, \ldots, x_p$ are explanatory variables pertaining to the survey data. Model selection is performed using stepwise model selection based on χ^2 likelihood-ratio tests for nested models (Bingham and Fry, 2010 Chapter 8). The results obtained for the final logistic regression model selected are shown in Table 5. The survey questions relating to the final model are shown below in Table 6.

Although none of the variables included in the final model are individually statistically significant, as measured by univariate *t*-tests, the χ^2-tests clearly demonstrate that the aggregate effects of the variables *is* statistically significant. Results indicate a clear delineation between publicly and privately owned banks, with privately owned banks seemingly better prepared overall for Basel Accord implementation. Privately owned banks are more likely to have a highly functioning Basel Accord implementation department and are also more likely to have used additional amounts historical data in order to assess market risk. Once we control for other factors, results suggest that privately owned banks are less likely to have developed internal models for credit risk.

6. Conclusions

This paper addresses the important contemporary issue of the implementation of the Basel Accord in Pakistan. Adopting the Basel Accord is intended to safeguard the future stability of the world’s financial system and poses a number of specific challenges regarding implantation for both developing and emerging economies. Pakistan faces a number of unique challenges in this regard due to recent expansions in its banking sector and the fact that the rate at which the Basel Accord is being adopted in Pakistan lags behind that of other countries. This paper throws light on this and a number of related issues due to a combination of the novelty of the survey data from risk managers (at various levels of seniority across different institutions) in Pakistan banks coupled with a rigorous statistical analysis.

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[3] If p is the underlying probability that a bank is privately owned, $\beta_0 = \log(p/1-p)$.

Table 5. Final logistic regression model: determinants of private ownership

Coefficient	Estimate	Estimated Standard Error	*t*-value	*p*-value
Intercept	19.01	5770.84	0.003	0.997
Question 18 (Neutral)	35.77	6522.90	0.005	0.996
Question 18 (Agree)	18.16	6656.54	0.003	0.998
Internal model for credit risk	-35.69	6302.67	-0.006	0.995
No. of years historical data on market risk	17.12	2533.97	0.007	0.995

Table 6: Survey questions pertaining to the final logistic regression model

Q18. Do you think that the Basel Accord Implementation Department is highly functional in your Bank?
Q34. Have you developed methodology for identifying and measuring credit risk for your internal needs?
Q39. How many years are covered by the time series that you have created for market risk assessment?

The Basel Accord is generally well regarded due to its underlying aims of improved capital standards and administration coupled with a principled and scientific treatment of risk. This is reflected by results from the survey which show that the Basel Accord is generally viewed positively by managers (p=0.000). Results from the survey highlight operational risk as a key barrier to be overcome before implementation of the Basel Accord can be achieved. A number of further obstacles are highlighted, which, do seem to have been addressed with at least a partial degree of success by some of the banks in the study. These issues include advanced modelling of credit risk, having a

dedicated Basel Accord implementation department, data security and IT and HR considerations. Results also show that as the level of technical expertise increases, favourability towards implementation of the Basel Accord increases.

The survey data also offer intriguing insights into potential differences between publicly owned and privately owned banks. Results suggest that in a number of ways privately owned banks appear to be better prepared for implementation. Privately owned banks are more likely to have both a highly functioning Basel Accord implementation department and to have used additional amounts historical data to assess market risk. Coupled with additional technical expertise, results suggest that privately owned banks may also be more favourably inclined towards implementation of the Basel Accord. Results in Section 5.1 are suggestive of a higher level of support for implementation amongst privately owned banks, although the observed sample difference lacks formal statistical significance (p=0.116).

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Appendix: The Questionnaire

QUESTIONNAIRE
ON THE IMPLEMENTATION OF BASEL ACCORD

Name of the bank:____
Person in charge of completing the questionnaire: ______________________________
Position: ____
Phone: ____
E-mail: ____
Contact person: ____
Position: ____
Phone:_______ ____
E-mail: _____________ ____

Objective: The objective of the Questionnaire is to examine Basel Accord implementation plans and to determine the corresponding capacity building needs in the Banks.

Please check the response to indicate how strongly you agree or disagree with each of the following statements. Make sure that you only check one response to each question. Remember that there are no right or wrong answers. Possible responses are:

SA - strongly agree **A** – agree **N** = neither agree nor disagree
D – disagree **SD** – strongly disagree

Questionnaire about Standards of Basel Accord in Pakistani Banks

1-Do you perceive that the implementation of Basel II in Pakistan is highly significant?

SA A N D SD

2-Do you think that implementation of the Basel Accord will be highly significant in your Bank?

SA A N D SD

3-Is your Bank highly inclined towards implementation of the Basel Accord?

SA A N D SD

4-Do you think that Basel Accord Implementation will have more Problems than Advantages?

SA A N D SD

5-Do you think that the Basel Accord will improve Risk Management Processes?

SA A N D SD

6-Do you think that the Basel Accord will improve Corporate Governance?

SA A N D SD

7-Do you think that the individual approach to Banks will be advantageous to the Banking System as a whole?

SA A N D SD

8-Do you think that the use of internal risk models for capital calculation will be advantageous to the Banking System as a whole?

SA A N D SD

9-Do you think that the Basel Accord will lead to Lower Capital Requirements for some Banks?

SA A N D SD

10-Do you think that Basel Accord will lead to Higher Capital Requirements for some Banks which might eventually be a problem in the implementation of the Basel Accord?

SA A N D SD

11-Do you think Information Technology, and HR Problems might hinder implementation of the Basel Accord?

SA A N D SD

12-Do you think that the employees in your Bank have adequate knowledge of the standards of Basel Accord?

SA A N D SD

13-Do you think that the education about the Basel Accord is being imparted adequately by your Bank to its employees?

SA A N D SD

14-Has your Bank involved any external trainer for the training of Bank Staff in relation to the Basel Accord?

Yes No

15-Do you think that the employees involved in the risk management process are very proficient?

SA A N D SD

16-How many employees are engaged in the Risk Management Process in your Bank?

- Credit Risk
- Operational Risk
- Market Risk

17-Has your Bank set up any special Basel Accord Implementation Department?

Yes No

18-Do you think that the Basel Accord Implementation Department is highly functional in your Bank?

SA A N D SD

19-Do you think that the staff responsible for implementation of the Basel Accord possesses highly professional skills to match international standards?

SA A N D SD

20-Do you think that the plan for the implementation of the Basel Accord in your Bank is highly effective?

SA A N D SD

21-If your Bank is a member of a Banking Group do you think that the reports being submitted in this regard comply with Basel Accord?

Yes No Not Applicable

22-If your Bank is a member of a Banking Group do you think that capital adequacy standards at an aggregate level comply with the requirements of Basel Accord?

Yes No Not Applicable

23-Do you think that updating IT systems would require higher costs to comply with Basel Accord in comparison with personnel training and outsourcing?

SA A N D SD

24-Do you think that the Basel Accord changes the method your bank uses to collect data for its Decision making processes?

SA A N D SD

25-Do you think that your Bank is collecting sensitive information like the “personal traits” of its corporate and individual customers to meet the requirements of Core Principles of Basel Accord?

Yes No Not Applicable

26-Is your Bank willing to share data of large customers to settle their credit limits within banks or with other third parties if it will be allowed by the Banking Laws of your country?

Yes No Not Applicable

27-Do you think that your Bank should plan to resolve data protection issues under the Basel Accord by taking the consent declaration of its customers?

Yes No Neither Agree Nor Disagree

28-Does your national legislation contain any specific provisions on Basel II and data protection or do you know about projects/drafts to do so?

Yes No Neither Agree Nor Disagree

29- Do you think that the current/drafted (if existing) national data protection legislation and banking legislation in your country is clear enough to enable your bank to solve data protection issues raised by the Basel Accord?

SA A N D SD

Questions about Pillar 1 Minimum Capital Requirements:

30-The current IT structure supports Basel Accord Requirements for:

Credit Risk	**:**	SA	A	N	D	SD
Operational Risk	**:**	SA	A	N	D	SD
Market Risk	**:**	SA	A	N	D	SD

31-Do you think that there would be problems in integrating the systems required for Basel Accord Implementation into the mainstream systems of your Bank?

SA A N D SD

32-Do you think that database design, internal models, and budgets are in close conformity as required by the Basel Accord?

SA A N D SD

CREDIT RISK:

33- Which approach (es) your bank is using for measuring credit risk in your bank?

- Simplified Standardized Approach
- Standardized Approach
- Foundation Internal Ratings-Based Approach
- Advanced Internal Ratings-Based Approach
- Unknown

34- Have you developed methodology for identifying and measuring credit risk for your internal needs?

- No, we are only using the methodology prescribed by the State Bank of Pakistan
- Yes, we are also using internally developed methodology

35-In case you are using internally developed methodology, how many risk categories do you use for ranking of debtors?

- Up to 7
- 7 - 10
- More than 10

36-How many years are covered by the time series that you have created for credit risk assessment?

- Default

❖ Less than 1 year
❖ 1 – 3 years
❖ 3 – 5 years
❖ More than 5 years
❖ We have not created time series yet

- Recovery rate

❖ Less than 1 year
❖ 1 – 3 years
❖ 3 – 5 years
❖ More than 5 years
❖ We have not created time series yet

- Other time series (specify name)

❖ Less than 1 year
❖ 1 – 3 years
❖ 3 – 5 years
❖ More than 5 years
❖ We have not created time series yet

37. If you are using models for measuring economic capital for credit risk, how were these models developed?

- Locally (internally) developed
- By the parent company or another member of the group but they are adopted to local conditions
- By the parent company or another member of the group but they are not adopted to local conditions
- Purchased
- We are not using models for that purpose

MARKET RISK:

38-Which approach (es) and from when are you planning to use for measuring market risk in your bank?

- Standardized Measurement Method: _____________
- Internal Models Approach: ____________________

- Unknown

39-How many years are covered by the time series that you have created for market risk assessment?

- Less than 1 year
- 1 – 2 years
- 2 – 3 years
- Over 3 years
- We have not created time series yet

40-If you are using models for measuring economic capital for market risk, how were these models developed?

- Locally (internally) developed
- By the parent company or another member of the group but they are adopted to local conditions
- By the parent company or another member of the group but they are not adopted to local conditions
- Purchased
- We are not using models for that purpose

OPERATIONAL RISK:

41-Which approach (es) are you planning to use for measuring operational risk in your bank?

- Basic Indicator Approach: _____________
- Standardized Approach: ____________
- Alternative Standardized Approach: ____________
- Advanced Measurement Approach: ____________
- Unknown

42-How many years are covered by the time series that you have created for operational risk assessment?

- Less than 1 year
- 1 – 2 years
- 2 – 3 years
- Over 3 years
- We have not created time series yet

43-If you are using models for measuring economic capital for operation risk, how were these models developed?

- Locally (internally) developed
- By the parent company or another member of the group but they are adopted to local conditions
- By the parent company or another member of the group but they are not adopted to local conditions
- Purchased

- We are not using models for that purpose

Pillar II Supervisory Review Process:

44- The Supervisory Review guidelines currently formulated by Pillar II are helpful in improving supervisory review regime?

SA A N D SD

45-The supervisor has enough resources to comply with the requirement of four key principles of supervisory review process:

Yes No Neither Agree Nor Disagree

46-Which segments of Pillar I are difficult to monitored under the supervisory review process?

- Credit Risk Methodologies
- Operational Risk Methodologies
- Market Risk Methodologies

47-There is a need for additional legal processes within the national legal regime for appropriate implementation of the Basel Accord?

Yes No Neither Agree Nor Disagree

48-There are additional risks to be captured in Pillar I for capital adequacy requirements in order for more effective implementation of the Supervisory Review Process?

Yes No Neither Agree Nor Disagree

Part III Market Discipline:

49-Do you think that your Bank adequately complies with the disclosure requirements of the Basel Accord regarding Market Discipline?

Yes No Neither Agree Nor Disagree

50-Do you consider national legislation to be hindrance in meeting disclosure requirements under the Basel Accord?

Yes No Neither Agree Nor Disagree

51-Do you consider that the disclosure requirements under the Basel Accord regarding proprietary information can lead the Bank to a comparative disadvantage?

Yes No Neither Agree Nor Disagree

52-Has your bank devised any customer awareness strategies for complying with the Market Discipline Requirement of Pillar III?

Yes No