1. PROPOSED TITLE

Corporate Governance, Managerial Power And Reputational Risk: Evidence From The Banking Sector

2. BACKGROUND AND LITERATURE REVIEW

2.1 Introductory Statement

Corporate governance clearly appears to have significant impact on bank reputation. While good governance mechanisms assist banks to attain and sustain public trust and confidence (Bank for International Settlements, 2006), failures of corporate governance especially failures of a bank’s board structure have been blamed for the recent credit turmoil in which bank creditability and reputation have yet to recover (Kirkpatrick, 2009). However, the question, like whether corporate governance can explain reputational risk in banks or whether the reputational damage is particularly lower in well-governed banks, have received little attention. My research study aims to empirically address these questions, testing the relevance of corporate governance and managerial power on reputational damage in banking sector.

The Basel Committee on Banking Supervision (2009, p.19) defines reputational risk as ‘the risk arising from negative perception on the part of customers, counterparties, shareholders, investors, debt-holders, market analysts, other relevant parties or regulators that can adversely affect a bank’ ability to maintain existing, or establish new, business relationships and continues access to sources of funding’. Interests on reputational risk in banking sector have grown after the occurrence of a string of major operational loss events. Examples are fraudulent trading in UBS, Société Générale and Allied Irish Bank generating operational losses of 2.3 billion USD, 7.2 billion USD and 691 million USD, respectively; fraud committed by custodial clients, generating $611 million USD loss for Republic New York Corporation; gender discrimination which resulted in $250 million operational losses for Merrill Lynch. The dollar value of

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1In this research, reputational risk, reputational damage and reputational loss are used interchangeably, referring to the difference between the market value loss and the operational loss announced.
operational losses stated may well understate the actual impact on the firm’s value. This is because banks not only suffer the direct financial losses but also the indirect effect of operational loss events via reputational risk (Perry and Fontnouvelle, 2005). Stated differently, the difference between the market value loss and the operational loss announced represents reputational risk faced by banks.

My study is motivated by lack of research on reputational risk in the banking industry. Fiordelisi et al. (2013) is one of very few studies exploring the determinants of reputational risk in banking sector. The authors have addressed six firm- and business-related factors affecting reputational damage, but have not incorporated corporate governance and managerial information in their analysis. Given the significance of bank governance and increasing focus on reputational risk in financial sector, I believe it is worth investigating the link between them.

2.2 Theories of Corporate Governance

2.2.1 Institutional Theory

Meyer and Rowan (1977) is often regarded as a primary source for studies on institutional theory. Under institutional theory, firms should incorporate institutionalized rules in order to gain stability, legitimacy, resources and enhance survival prospects. In this regards, institutionalized rules are portrayed as ‘many of the positions, policies, programs, and procedures of modern organizations are enforced by public opinion, by the views of important constituents, by knowledge legitimated through the educational system, by social prestige, by the laws, and by the definitions of negligence and prudence used by the courts’ (p.343). As institutionalized rules represent widespread understandings of social reality, they are beyond the control of any individual participant or firm. As such, these rules are taken for granted as legitimate, independent of their influences on work outcomes.

In the context of corporation reputation, Meyer and Rowan (1977) highlight that firms can only gain reputation when they use environmentally favored symbols and their behaviours complied with institutionalized rules, suggesting a positive association between corporate reputational and institutionalized rules.
2.2.2 Resource-based Theory

Resource-based theory examines the association between firm resources and sustained competitive advantage built on the assumptions that firm strategic resources are heterogeneously dispersed across firms and these disparities are constant over time (Barney, 1991). Financial performance is often cited as a firm’s competitive advantage for the ease of empirical testing of resource-based view. In the context of corporate reputation, resource-based theory focuses on how reputation as a valuable and scare asset can create enduring competitive advantage to the firm (Porter, 1980; Barney, 1991).

2.2.2 Signalling Theory

Signalling theory in the context of corporate reputation lies within the explanation of information asymmetry: due to the information dispersion, external parties have to count on various corporate signals in making their judgements about firms’ relative reputational merits (Spence, 1973; Certon, Daily and Dalton, 2001). These signals thus help to mitigate the informational uncertainty and ambiguity between the firm and its external constituents. Spence (1973), examining the signalling activities in the labour market, concludes that signals are alterable and subject to manipulation by the job applicants. More generally, signalling activities are at individual firm’s discretion, or that firms can decide which signals to send to the stakeholders, which consequently affect their perceptions about firm reputation.

Subsequent research on signaling has addressed a number of firm characteristics that can function as signals for firms. Broadly, Fombrun and Shanley (1990) examine how a firm’s reputation is constructed in terms of four types of signals including the market signals, the accounting signals, the institutional signals and the strategy signals.

With regard to market signals, it is argued that outside parties and observers usually assign favourable reputation to firms with superior market (accounting) performance and low risk profile as these firms can attract a great amount of investors and thus have a greater market value than otherwise similar firms. Dividend policy can have different interpretations. On the one side, some scholars interpret high dividend payouts as a manifestation that a firm has more profits and thus want to distribute more to shareholders. The stock prices are expected to increase under this short-run favourable view of firms. On the other side, it is interpreted as an indicator that there are shortages of attractive investments opportunities within the firm, which
subsequently reduces its ability to generate future cash flows. The stock prices are expected to reduce under this long run and negative view of firms. Fombrun and Shanley (1990) build their hypothesis on the latter argument, suggesting a negative relationship between dividend yield and firm reputation.

Turning to institutional signals, is because the institutional purchase decisions are usually based on ‘careful screening by well-informed portfolio analysts’ (Fombrun and Shanley, 1990, p.239), firms with large number of institutional investors are viewed more favourably by the public than other firms. Hence, it is expected that better reputation is prevalent in firm with greater concentration of equity among institutions. Reputation judgements can also be affected by whether firms show their concerns for the wider society: the more social responsiveness the firm has, the higher its reputation is.

Concerning media visibility as a signal, firms being more visible in the media tend to receive more attention from the publics, and firm with more favourable coverage are more likely to receive positive judgements from the external audiences. With respect to firm size, Fombrun and Shanley (1990) argue that large firms are often subject to more public scrutiny and thus receive more favourable reputation than small firms. In addition, corporate audiences, when being asked to rate a firm’s reputation, are more likely to remember large firms than small firms.

Signals from differentiation can be observed through advertising activities. Advertising conveys positive signals about information of products and services as well as the firm characteristics, stressing on how the firm’s strategic position distinctively differs from its competitors. Hence, firms with extensive advertising campaigns tend to receive more favourable impressions from external evaluators than firms with fewer advertising allocations. A positive relationship between advertising intensity and corporate reputation is expected.

Different stakeholders can interpret firm diversification strategy differently. Fombrun and Shanley (1990) rely on the argument that capital markets prefer firms diversifying into related product-market domains to firms diversifying into unrelated domains since the inclusion of unrelated firms in overall firm structure is less likely to generate synergies between domains and might hinder actual distributions of capital within divisions. In addition, they argue that ‘unrelated diversification may make a firm more opaque to constituents because of corporate
managers’ greater ability to control the presentation of divisional results and activities in consolidated public statements’ (p.242). As such, external audiences feel it more difficult to interpret the informational signals from a firm’s unrelated diversification than those from a focused diversification, leading to a downgrade in the firm’s reputation.

2.3 Literature Review

2.3.1 Definitions of corporate reputation

In a broad view, corporate reputation represents perceptual impressions on how a firm is viewed by its key constituents and how the firm compares to its industry counterparts (Clark and Montgomery, 1998; Deephouse, 2000; Roberts and Dowling, 2002). From an institutional perspective, reputation is visualized as the accumulation of public judgements of the firm over time (Fombrun and Shanley, 1990), and the awareness and emotional reactions of stakeholders in terms of their affect and esteem toward a particular firm (Fombrun, 1996). The economic definition of reputation is directly linked to the consumers’ perceptions and anticipation about the firm’s product quality (Allen, 1984; Shapiro, 1982), or the competitors’ beliefs about how the firm will behave under particular circumstances (Kreps and Wilson, 1982; Milgrom and Roberts, 1982). Other researchers, including Musteen, Datta, and Kemmerer (2010) regard corporate reputation as a major intangible asset, which plays an important role in gaining competitive advantage. As such, firm reputation functions as a strategic intangible asset (Barney, 1991; Karpoff and Lott, 1993; Klein and Leffler, 1981).

2.3.2 Definitions of reputational risk

Basel Commitee on Banking Supervision (2001, p.4) describe reputational risk as ‘the potential that adverse publicity regarding a bank’s business practices and associations, whether accurate or not, will cause a loss of confidence in the integrity of the institution’. More recently, the Basel Commitee on Banking Supervision (2009, p.19) extends the definition of reputational risk as ‘the risk arising from negative perception on the part of customers, counterparties, shareholders, investors, debt-holders, market analysts, other relevant parties or regulators that can adversely affect a bank’s ability to maintain existing, or establish new, business relationships and continues access to sources of funding’. Reputational risk can be any action, event or context that could have favourable or detrimental influence on a firm’s reputation (Raner, 2004). He further stresses that reputational risk is simply the risk arising from various
sources that have impact on firm reputation. Honey (2009) defines reputational risk as the risk derived from the difference between a firm’s performance and stakeholders’ expectation. Due to various expectations from different stakeholder groups, it is more challenging for firms to manage their reputational risks. As argued by Perry and Fontnouvelle (2005), the effects on reputation are elusive and might occur slowly. Sources of reputational damage could be in form of the following losses: customer loss, employee or manager loss, potential business partner loss, increased credit costs, increased costs of maintenance due to stricter observations.

2.3.3 Evidence of reputational risk in non-financial sectors

Reputational risk has been a variable of interest to be investigated on non-financial industries over the past three decades. Much research has been devoted to examine how and to what extent the reputational damage relates to product recalls, employee-related events, and regulatory violation or fraud allegations. Using a sample of drugs and autos recalls, Jarrell and Peltzman (1985) find firms having products recalled from the markets experience substantial costs, which are far greater than the direct costs from recalls such as the costs of destroying defective products. These excess costs are largely credited to a loss of “goodwill” that the market imposes on the firms. Rubin, Murphy, and Jarrell (1988) use 80-day event window to examine the stock price effects to recall announcements of 31 firms between 1977 and 1981. Results provide strong evidence that the market strictly penalize firms offering defective products. Evidence reveals that on average, a firm loses about 7 percent of its net worth after the recall announcements. Seventy-three percent of firms report a negative excess return. Admed, Gardella, and Nanda (2002) document similar findings for a large sample of drug withdrawals: the average two-day cumulative return is -7.85% for firms withdrawing a drug; and abnormal returns are negative in 71% of firms examined.

A growing field of research examines the effect of regulation violation or fraud allegations on a firm’s reputation. Several sources of reputational penalties have been addressed, such as firms committing consumer fraud will face a loss of sales or that firms cheating in business dealings will experience adversely unfavourable changes in business contracts with suppliers. Karpoff and Lott (1993) suggest that reputational penalties could serve as an effective substitute for court-related penalties to deter corporate crime. Using as sample of 132 cases of alleged and actual corporate fraud between 1978 and 1987, they conclude that the loss in equity value due to
fines, civil penalties, court costs and criminal restitution accounts for only 6% of the total loss while the remaining loss of over 90% is credited to reputation loss. Using a sample of firms committing procurement fraud between 1983 and 1995, Karpoff et al. (1999) investigate whether firms being accused of procurement fraud actually experience penalties. They find that firms whether being investigated, indicted or suspended for fraud suffer substantially negative abnormal returns. The average abnormal return after the initial announcement of a fraud investigation, fraud indictment and suspension is -1.64, -1.70 and -4.49 respectively. The authors further stress that firm experience greater negative abnormal returns on follow-up indictment or suspension announcements about previously fraud cases. Additional results illustrate that firms’ market losses are significantly related to the firm’s reliance on government contract revenue, but not related to the size of court-imposed penalties. Evidence also reveals that the adoption of the U.S Sentencing Commission’s criminal penalty guidelines for organizations in 1991 makes firms having procurement fraud investigations experience more severe abnormal stock returns.

Implementing both ordinary least squares (OLS) and fixed-effect regressions, Basdeo et al. (2006) investigate the extent to which firm can influence their reputations through their market behaviours. They find that a firm’s reputation is positively associated to its total number of market actions and the complexity of these actions. However, they find no evidence that the positive relationship between the total number of a firm’s market actions and reputation is stronger for firms operating in industries with greater levels of concentration. Results show support to hypothesis that the positive association between the complexity of the firm’s actions and reputation is stronger for firms in industries with greater levels of concentration. Additional results present no support to the substitutive effects of rival actions on the firm’s reputation; in particular, insignificant results of rival actions on firm reputation suggest that the total level and complexity of the rivals’ actions do not have negative impact on the firm’s reputation. However, the results lend support to the complementary effects of rival actions on the firm’s reputation: they find that the firm’s reputation increases when the lags between a focal firm’s behaviours and the behaviours of its competitors increase, and when there are similarities of rivals’ actions to those of the focal firm. Overall, the results in this paper depict market actions as a device through which firms can increase their reputations. Gabbioneta et al. (2007) examine how the assessments and behaviours of securities analysts can influence collective beliefs of critical resource-holders, such as retail as well as institutional investors. Using a survey of 75 securities
analysts on the Milan Stock Exchanges, they find that securities analysts assign more favourable reputation to firms with higher financial performance, with better quality of financial disclosure, with better quality of governance structures and with better quality of leadership.

Jarrell and Peltzman (1985) and Klein and Leffler (1981) both emphasize that reputational consequences are more predominant when the affected party is a related party rather than a third party. Murphy, Shrieves, and Tibbs (2009) further extend this idea by examining the implication of misconduct allegations on the changes in profitability and risk within a firm. They find that firms accused of misconduct face an adverse stock price reaction and that the reaction is two to three times negative for related-subgroup than for third-party subgroup. In addition, the magnitude of changes in earnings and risk are much greater for those allegations affecting related parties than for third parties.

2.3.4 Evidence of reputational risk in financial sectors

Studies on reputational risk in financial sector mostly investigate a firm’s reaction to the announcement of operational loss events. Empirical evidence indicates that in the event of operational loss, reputational damage is the largest component attributable to the total loss faced by a firm. Perry and Fontnouvelle (2005) examine reputational losses by observing 115 operational loss events occurring at financial firms from around the world between 1974 and 2004. Results show that market value is three times more likely to decline after releasing the announcement of an internal fraud. However, there is weak evidence that firm reputational damage is caused by external event announcements. The authors suggest that the announcement of losses due to internal fraud is a strong indicator signaling to the investors that firms are encountering some fundamental internal control problems. Evidence also reveals that the market value does decline by more than six times for internal fraud announcements made by firms with strong shareholder rights. This is because investors are less anticipated that these loss announcements would occur in firms with high shareholder rights, and thus substantially higher negative decline is given as a way policing these firms.

Using a sample of 403 bank events and 89 insurance events suffering operational losses greater than 10 million USD, Cummins et al. (2006) find that there is a significant negative stock price reaction to the operation loss announcements, and that the losses are particularly greater for
firms with higher Tobin’s Q ratios (i.e., firms with strong growth prospects). Additional evidence shows that insurers suffer much stronger losses than banks.

Gillet et al. (2010) analyse the reputational damage stemming from operational losses greater than 10 million USD for a sample of 152 events of European and U.S financial companies over the period between 1990 and 2004. Evidence shows that European sub-sample is more likely to suffer larger loss in market value, and thus larger reputational damage compared to U.S sub-sample. Results also reveal that financial firms, where losses are unknown, experience a substantial decline in market value. This is because investors perceive that these firms are attempting to hide the magnitude of operational losses and that not release the information to the public. In addition, the lowest CAR is observed in losses due to fraud events.

Fiordelisi et al. (2013, 2014) are the first analysing the reputational damage on the heels of operational losses greater than 1 million USD and thus are able to draw a larger sample size compared to previous literature. They document that market value losses appear to be significantly larger in banks with bigger size, poor capitalization and higher profitability. The losses announced from ‘pure’ operational losses are larger among other loss types, with reputational losses due to external fraud the largest. With regards to geographic area, Europe appears to bear greater losses than the U.S.

Utilizing a sample of 150 reputation events between 2008 and 2012, Oxford Metrica Press (2013) examines the value impact of reputational risk in corporates, banks and insurers. The results present evidence of substantial underperformance of sampling firms over the past five years and stress that ‘value destroyed in banking sector over the last five years has been mirrored in the insurance sector’ (p.7). One limitation of this analysis is small sample size, consisting of only the largest (by market capitalization) 25 companies, 25 banks and 25 insurers. The approach in this analysis is to identify the worst and the best trading month in each company in order to generate a portfolio of 75 negative reputation events and a portfolio of 75 negative reputation events. The results show that negative reputation events destroy an average of 30% of value; and the positive reputation events generate an average of 40% of value. Evidence suggests that financial institutions (i.e., banks and insurance companies) are more likely to suffer greater loss or gain (negative or positive reputation events) in value than do corporates. From a positive event, the likelihood that a firm will gain suddenly more than 30% of its value is 80% for banks.
and insurers and 28% for corporates. There is a 60% chance that insurance companies will lose their value suddenly by more than 30% from a negative reputation event; the corresponding likelihood is 44% and 12% for banks and for corporates respectively. Findings also illustrate that while corporates and banks get back to market expectations by the end of post-event year, insurance companies still underperform by 15%. Also, the type of reputation events (i.e., performance, external factors and structuring) has little explanatory power to explain the variation in value impact or recovery.

2.3.5 Corporate reputation and corporate governance

Using Governance Index as proxy for shareholder rights, Perry and Fontnouvelle (2005) find that a firm’s stock price is six-time more likely to decline in firms with high shareholder rights than in firms with weak shareholder rights subsequent to the announcement of internal fraud. They argue that this is because shareholders less anticipate to see a loss to occur at a firm where they have more controls (i.e., high shareholder rights), they heavily discount the firms’ market value as a way policing these firms. Their results suggest substantial reputational effects for internal fraud announcements made by firms with strong shareholder rights, but there is no evidence supporting the reputational effects for non-internal fraud announcements made by firms with strong shareholder rights.

Musteen, Datta, and Kemmerer (2010) investigates the relevance of board characteristics on corporate reputation using a sample of 324 firms ranked on the Fortune’s list of most admired companies in the U.S. They find that board characteristics have predominant impact over the evaluation of firm reputation by other parties. In particular, they find that firms with larger board size and firms with greater proportion of outside directors exhibit superior reputation than those with smaller board size and firms with greater proportion of insiders. An inverted-U association is observed between the average tenure of outside directors and corporate reputation. However, they find a negative relationship between independent leadership structure (i.e. absence of duality) and corporate reputation, contrary to expectations.

3 Performance category includes reputation events that have predominant effect on a firm’s earnings. External factors category comprises reputation events that involve others’ action affecting the firm, such as information released by the competitors or changes in government regulations. Restructuring category comprises of reputation events relating to merger and acquisitions, changes in dividend policy or sharer buybacks, and changes in capital structures (Oxford Metrica Press, 2013).

4 See Gompers, Ishii and Metrick (2003)
Gabbioneta, Ravasi and Mazzola (2007) conduct an analysis based on a survey of 75 analysts operating on the Milan Stock Exchange. The findings suggest that corporate governance is one of the predominant factors that securities analysts use to form their judgements about a firm’s reputation, in particular, the effectiveness of the firm’s governance structures, the presence of independent board members and the rights of minority shareholders’ interests.

2.4 Expected Contributions

My study contributes to existing literature in several important ways. First, empirical studies on the drivers of reputational damage in banking sector are still limited. As far as I aware, Fiordelisi et al. (2013, 2014) is the only two papers that extensively examine the determinants of bank reputational damaged followed by operational loss announcements. My study complements to the study of Fiordelisi et al. (2013, 2014), extending the analysis to bank governance. In particular, I will focus on bank governance and CEO power. Second, my study will provide further evidence of the relevance of bank governance on reputational loss for various types of loss events.

2.5 Research Objectives

Given the significance of governance in banking and growing attention of reputational damage in financial industries, my study aims to examine the relevance of bank governance on reputational damage in banks. Particularly, I examine whether strong bank boards and higher CEO power affects the reputational damage in banks. Following Perry and Fontnouvelle (2005), by categorizing operational losses into event types, I observe whether the market reaction to operational loses differs for one specific type of event relative to other types of events (i.e., internal fraud events vs. external fraud events).

3. PROGRAM AND DESIGN OF THE RESEARCH INVESTIGATION

3.1 Hypotheses, Methodology and Research Plan

3.1.1 Hypotheses

Gompers et al. (2003) develop a Governance Index to capture the strength of shareholder rights in large U.S firms. They find that high corporate governance index is significantly negatively related to firm performance: firms with weaker shareholder rights (i.e., higher
governance index) have lower profits, lower sales growth, lower stock returns and lower firm value. This demonstrates a strong positive relationship between corporate governance and stock returns.

Using a sample of financial firms, Perry and Fontnouvelle (2005) suggest magnitude of reputational damage following an operational loss announcement is also affected by differences in firms’ corporate governance. The authors propose two opposing explanations on the relationship between reputational loss and corporate governance structures. The first explanation favors a small reputational effect in firms with strong shareholder rights (i.e., good governance) because ‘investors are confident that they will have enough control over management to mitigate any future consequences from the loss’ (p. 23). The second explanation proposes opposite argument that firms with strong shareholder rights tend to suffer greater reputational losses. This is because investors do not expect to see a loss in firms where they have had more controls and influences. Perry and Fontnouvelle (2005) further stress that the reputational effects of shareholder rights on a firm’s market value also differ between types of loss event. More specifically, losses that are uncontrollable by management, such as external losses, should have similar effect on the market value of a firm irrespective of its level of shareholder rights. In contrast, losses incurred as a result of managers’ behaviours, such as internal losses, should have different impact on firms with strong versus weak shareholder rights.

In favor of the second explanation of Perry and Fontnouvelle (2005), I hypothesize that in the event of reputational loss, bank reputational damage is more pronounced in well-governed banks than in poorly governed banks. Prior evidence suggests that larger but not excessively independent boards are more efficient in monitoring and advising banks and their managers, and hence generate more value (Andres and Vallelado, 2008). If higher proportion of independent outside directors (i.e, non-executives) indicates good bank governance, I would expect that in the event of operational loss, banks reputational damage increases as the percentage of independent directors increase.

Besides board of directors, other internal mechanisms such as CEO compensation or ownership structure are also effective mechanism in dealing with governance issues (Caprio, Laeven, and Levine, 2007). CEO power could affect the board’s monitoring role and thus damage the quality of corporate governance. Two proxies of CEO power are examined,
including CEO duality and internally hired CEO. The presence of CEO duality (CEO also chairs the board) reduces board independence in monitoring managers (Fama and Jensen, 1983; Jensen, 1993), indicating poor governance mechanism. Hence, I expect that the bank reputational damage is more pronounced in banks with separation of CEO and chairman roles. Internally-hired CEOs are those having long-term commitment with the organization and thus ‘possess’ greater power and influence over the board decisions (May, 1995; Adams et al., 2005). I expect that in the event of operational loss, bank reputational damage is more pronounced in banks with externally hired CEOs.

3.1.2 Methodology

The most common method of measuring reputational loss is an event study. In particular, reputational loss is measured by observing the market reaction to a firm’s stock price on the announcement day of a particular operational loss event. First, abnormal return is estimated using the Sharpe (1963) market model by applying OLS-regression approach for time series of one full trading year (i.e., 250 trading days) prior to the event window and regressing the daily returns for stock \( j \) on day \( t \) \( (R_{j,t}) \) on returns on market index on day \( t \) \( (R_{m,t}) \).

Following Gillet et al. (2010) and Fiordelisi et al. (2013), stock returns are adjusted by adding the ratio between the operational loss (OLOSS) and the market capitalization (MCAP) of the company to capture the reputational effect. The abnormal return \( (AR_{j,t}) \) following the operational loss of financial company \( i \) for day \( t \) can be expressed as follows:

\[
AR_{j_0} = R_{j,t} - \mu_j - \beta_j R_{m,t} + \frac{OLOSS_{it}}{MCAP_{jt}},
\]

where \( \mu \) is the idiosyncratic risk component of share \( j \) and \( \beta_j \) is the beta coefficient of share \( j \).

Various event windows before and after operational loss announcements are taken into consideration. My analysis mainly focus on the following short event window: (-1,1). For the robustness checks, I also estimate CARs using different event windows with different length: (-20,20), (-10,10), (-5,5) and (-3,3).

I test the statistical significance of mean ARs using the Boehmer et al. (1991) test statistic \( Z \) to capture the event-induced increase in return volatility as follows:
where $N$ is the number of stocks in the sample and $SR_{j,t}$ is the standardized abnormal return on stock $j$ at day $t$ measured following the Mikkelson and Partch (1988) approach as follows:

$$Z = \frac{1}{N} \sum_{j=1}^{N} SR_{j,t} \sqrt{\frac{1}{N(N-1)} \sum_{j=1}^{N} (SR_{j,t} - \frac{1}{N} \sum_{j=1}^{N} SR_{j,t})^2}$$

$$SR_{j,t} = \frac{CAR_{j,e1-e2}}{\hat{S}_j \sqrt{T_{e1} + \sum_{t=T_{e1}+1}^{T} (T_{e1} \bar{r}_m)^2 / \sum_{t=T_{e1}+1}^{T} (r_{jt} - \bar{r}_m)^2}}$$

Where $e_1$ and $e_2$ are the first and last days in the event window, $CAR_{j,e1-e2}$ is the cumulated abnormal return of stock $j$ in the event window $(e_1, e_2)$, $\bar{r}_m$ is the return on market index on day $t$ (event period), $\bar{r}_m$ is the average return on market index in the estimation period, $\hat{S}_j$ is the estimated standard deviation of abnormal return on stock $j$, $T$ is the number of days in the event window. The $Z$ test statistic in Eq. (3) has a t-distribution with $T-2$ degrees of freedom and converges to a unit normal.

### 3.1.3 Data

The analysis deals with operational loss events occurred between 1996 and 2014 for a large sample of U.S banks (both commercial and investment). Data on operational risk loss events such as the loss size, the event types or complete explanation of loss events, is collected from OpVantage First database. Financial data is obtained from Compustat Annual Industrial File. Data on governance information such as the CEODUAL$^5$ and EINDEX$^6$ is retrieved from RiskMetrics. Market information such as share price is collected from Centre for Research in Security Prices (CRSP).

### 3.2 Resources and Funding Required

No out of ordinary resource needs or funding requirements are foreseen at this stage.

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$^5$ CEODUAL indicates whether a CEO is also a chairman of a firm

$^6$ EINDEX is Entrenchment Index, developed by Bebchuk, Cohen and Ferrell (2005). The index ranges from 0 to 6.
3.3 Individual Contribution to the Research Team

All writing, data collection and data analysis will be conducted by the doctoral candidate
### 3.4 Timeline for Completion of the Program

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### Research Capacity Development

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</table>

### Research Career Development

<table>
<thead>
<tr>
<th>Communicating and Academic Writing Skills</th>
<th>Thesis Writing workshops, Presentation Skills, Critical Writing, Thesis Writing Workshops</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Process</td>
<td>Literature Review, Refine Aims, Research Problems and Contributions, Collect and Manage Data, Sample Selection, Descriptive Statistical Analysis and Preliminary Results, Perform Empirical Analysis, Revise Results</td>
</tr>
</tbody>
</table>

### Writing Process

<table>
<thead>
<tr>
<th>Title and Abstract</th>
<th>Introduction, Background, Literature Review, Theoretical Framework and Hypothesis</th>
</tr>
</thead>
</table>
4. COURSE WORK

Not applicable. AIRS – IFN001 exempted.

5. REFERENCE LIST


