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A Fraud Triangle Analysis of the Libor Fraud

Mark Lokanan
*Satish Sharma**

I. Introduction

The London Interbank Offered Rate (LIBOR) is a benchmark rate in which banks charge each other an agreed upon interest rate for short-term loans. Beginning in 2007, accusations began to surface that the banks were rigging the LIBOR rates (see *The Telegraph*, 2012). As the collapse of the global financial crisis (GFC) drew closer in 2007, liquidity concerns drew public scrutiny towards banks (BBC, 2013, para. 8). With concerns about their financial stability, many of the banks that make up the LIBOR stopped lending to each other and some even submitted lower rates to position themselves to be financially stable. Together, these signs prompted commentators to declare that the banks were in financial trouble (BBC, 2012, 2013). In 2008, a *Wall Street Journal* (WSJ) article reinforced these accusations by reporting a marked difference in the LIBOR and the WSJ's calculation of the average interest rates (see Mollenkamp, 2008). The entire LIBOR scandal (hereinafter "fraud") came to light in the height of the GFC when, in 2008, a Barclays' employee queried by a New York Federal official explained that Barclays was underreporting its rates (BBC, 2013, para. 23).

News of the fraud "left the financial markets reeling" (Bischoff and McGagh, 2013, para. 2) and called into question the "role of financial reporting in the banking industry" (Gras-Gil, Marin-Hernandez, and Garcia-Perez de Lema, 2012, 730). Perhaps, to appear financially sound, the banks may have seen it to their advantage to underreport their LIBOR rates.

Quoting a low interest rate makes the banks appear stronger and creditworthy and, thereby, assure customers that they are in a healthy financial position (Rayburn, 2013, 226). In the aftermath, regulators attempted to shed light on the fraud by noting that they were too "focused on containing the financial crisis to analyze information connected with the potential rate-rigging" (Scott, 2013, para. 3). Some banking officials even noted that "regulators approved the actions" (Protess and Scott, 2012, para. 12).

Yet there are unsolved questions that regulators and banking officials did not address in their quest to seek answers for the fraud. Were the fraud banks under financial pressure to meet analysts' expectations when they manipulated the LIBOR rates? Did the fraud banks have weak internal control mechanisms that were easy to infiltrate by prospective fraudsters? Did the fraud banks have corporate cultures that rationalized fraudulent behaviors? To answer these questions, we employed the fraud triangle framework to investigate systemic manipulation and illegality by the banks involved in the LIBOR fraud.[1] The central research question is to evaluate the effectiveness of the fraud triangle to detect and prevent fraud in the banks that made up the LIBOR. The objectives of this research are as follows:

- To investigate whether financial pressure was a factor that led to the underreporting of the LIBOR rates by the fraud banks;
- To investigate whether the auditors' risk assessment procedures failed to identify risk in the fraud banks systems of controls; and
- To investigate whether the auditors rationalized fraudulent behavior by giving an unqualified opinion despite the red flags of fraud.

Taken together, the overall aim of this article is to investigate whether the fraud triangle is a useful framework to detect and prevent fraud in banks. Here, the research utilizes the fraud triangle framework to understand the undeniable attributes of systemic manipulation and illegality as fountainheads of the LIBOR manipulation.

Contributions to Practice and Theory

[1] See Matthews (2005) and Morales, Gendron and Guénin- Paracini (2014) for a discussion of the acts that are classified as fraud in the accounting and finance literature.

*The authors are, respectively, associate professors at Royal Roads University and Northumbria University.

Auditors have a responsibility to their client and stakeholders who rely on them to detect fraud during audit engagements and produce accurate and reliable financial statements to make informed decision (Asare, Wright, and Zimbelman, 2015; Lokanan, 2015; Sikka, 2010). In 2002, the American Institute of Certified Public Accountants (AICPA) took steps to enhance auditors' ability to detect fraud by adopting Statement of Accounting Standard (SAS) No. 99 (Ariail and Crumbley, 2016, p. 485). SAS No. 99 (superseded by AU sec. 316) states that auditors should plan their audits based on an assessment of fraud risks by using the fraud triangle framework. The adaptation of AU sec. 316 was a signal for auditors to spend more time analyzing each leg of the fraud triangle framework in audit engagements and provide greater details of risk in their documentations.

This concentrated approach provides the accounting establishment (i.e., standard setters, accounting and auditing organizations, and accounting firms) with a conception of fraud that places emphasis on values, cultures, and people acting in unison (see Ariail and Crumbley, 2016; Lokanan, 2017; Morales, Gendron, and Guénin-Paracini, 2014; Power, 2013). In analyzing fraud, the triangle usually distinguishes between behavior that is individual versus collective (Crumbley, Fenton Jr., and Smith, 2017; Lokanan, 2017; Murphy and Dacin, 2011), moral versus immoral (Choo and Tan, 2007), and normal versus abnormal (Dellaportas, 2103). Yet the question of how the fraud triangle framework can be applied in settings where the occupational culture and environment is conducive to fraud has not been addressed. The data collected for this study attempts to address this gap by employing the fraud triangle to examine correlates of fraud in environments where financial pressures, control mechanisms, and culture are considered key nodes of problematization (see Dellaportas, 2013; Power, 2013). A better understanding of these nodes of problematizations should assist auditors to excavate beneath the subterranean cluster of fraud risks to detect red flags associated with fraud (Asare et al., 2015).

The rest of this paper is structured according to the following format. Section two examines the literature on the fraud triangle and its components to explain why people commit frauds. Section three discusses the methodology and empirical model employed to test the hypothesis that pressure, opportunity and rationalization are positively related to fraud. Section four evaluates the findings by elaborating on the descriptive statistics and logistic regressions technique employed in the model. Section five discusses and synthesizes the findings in relations to the previous literature on fraud and highlights areas for future research.

II. Literature Review and Hypothesis Development

Foundation of the Fraud Triangle Framework

The fraud triangle has its origins in criminologist Donald Cressey's (1953) book entitled Other *People's Money: A Study in the Social Psychology of Embezzlement*. In this seminal text, Cressey (1953) identified the common characteristics shared by individuals serving time in prison for embezzlement. Based on Cressey's (1953) observation, he hypothesized that these three criteria must converge for embezzlement to occur: (1) a non-shareable financial pressure; (2) knowledge of opportunity to commit the fraud; and (3) the ability to adjust one's self-perception to rationalize the criminal act. Cressey's (1953) work on non-shareable financial pressure, opportunity, and rationalization has evolved to what is now known as the "fraud triangle."

According to Cressey (1953), a non-shareable financial pressure presents a motive for the crime. An individual may conceive a situation as non-shareable if there are social stigmas attached to it (Dellaportas, 2013; Donegan and Ganon, 2008; Lokanan, 2015; Morales et al., 2014). Egocentrics or individuals with a strong sense of pride may also deem their financial situation as non-sharable (Rezaee, 2002, 2005). The non-sharable problem is driven by a financial need that can only be solved by stealing from the corporation. Perceived opportunity has to do with the individual's perception that there are inherent weaknesses in the company's systems of controls and that the probability of being caught for circumventing the system is remote (Cooper, Dacin, and Palmer, 2013; Gullkvist and Jokipii, 2013; Lokanan, 2015; Morales et al., 2014; Neu, Everett, Rahaman, and Martinez, 2013b). The likelihood of being caught is dependent on the individual's knowledge and technical skills to circumvent the system. Rationalization is the individual's ability to cleanse his or her conscience to justify the morally reprehensible behavior (Dellaportas, 2013; Lokanan, 2015; Murphy, 2012; Murphy and Dacin, 2011).

Despite these claims, the justification for the fraud triangle rings somewhat hollow (Huber, 2017; Lokanan, 2015; Morales et al., 2014). Huber (2017) noted that the fraud triangle as it was conceived and disseminated by the anti-fraud profession is "misused, abused, contorted, stretched out of shape, and pressed into usage for which it was never intended" (p. 30). The main contention of Huber's criticism is that there is no validity in the use of the fraud triangle to prevent and detect fraud. Lokanan (2015) also noted that the fraud triangle represented a restricted version of fraud. Central to his argument is the claim that the fraud triangle is very restricted "and endorses a body of knowledge that lacks the objective criteria required to adequately address every occurrence of fraud" (Lokanan, 2015, 202). Morales

et al., (2014) also argued that the fraud triangle is flawed because it only looks at the frail morality of the individual offender; the social context in which the individual operates is exonerated, and escapes scrutiny.

While these limitations of the fraud triangle are all valid, it is the way the fraud triangle was interpreted and disseminated by the anti-fraud community that may have been the problem. White-collar criminologists will tell you that there is no single theory or framework that can explain every occurrence of fraud (Huber, 2017). In the same manner, the fraud triangle was not intended to be a "cure for every ill" (Gill, 2017). Rather, the fraud triangle should be used as a framework to understand the basic motivations, opportunities, and rationalizations for fraud. Lokanan (2018) in providing a lens through which the fraud triangle should be interpreted noted that the fraud triangle should be a useful framework that aids in the understanding of why people commit fraud and not a scientific theory that is based on the methods of science. Underlying this position is the notion that the fraud triangle offers flexibility and adaptability and can be operationalized in a different context to guide fraud inquiries. It is in this sense that the fraud triangle is well positioned to provide insights on the LIBOR fraud.

In line with Max Weber's (1947) work on organization, banks are rational, goal-oriented actors, and they are in the business to accumulate capital and maximize profit (Free, Macintosh, and Stein, 2007; Matthews, 2005; Murphy and Free, 2016; O'Connell, 2004). These goals are internalized by imperious executives who manage the banks. If, for some reason, the banks experience financial difficulties in an economic downturn, the goals become unattainable, and the banks experience financial strain (see Lokanan, 2017). Under stress to perform and meet financial analysts' expectations, crime may become an attractive option to mitigate the pressure of the banks to achieve their expected profit. Executives and traders with fetishisms for money see nothing wrong in deviating from their fiduciary duties and may be complicit in fraudulent behavior (Crumbley et al., 2017; Vaughan and Finch, 2013). Here, one needs to pause and query whether the banks that were involved in the LIBOR fraud were blocked or threatened from achieving their financial targets or was it an actual or perceived industry-wide threat that, because they were under financial pressure, they stood to lose a significant amount of money.

The Pressure to Commit Fraud

There are reasons to believe that the pressure to meet financial performance targets and analysts' expectations were evident in the LIBOR fraud. As some commentators have noted, the primary motivation of the banks involved in the fraud was profit (*The Economist*, 2012). Anecdotal evidence posits that the banks were already under financial pressure and were having trouble reaching their expected profit (Vaughn and Finch, 2013). Others argued that those in charge of fixing the rates had every incentive to do so, because there were signs in the making that some banks were already financially weak (*The Economist*, 2012). The disjunction between the banking culture to meet expected profit and the means to achieve the established profit benchmark were no longer realistic under the normal course of business. This situation, coupled with the fact that banking officials were already under pressure to achieve high profits to satisfy shareholders, and because their own remuneration was tied to fixing the rates, compounded the problem (Cohen, Dey, and Lys, 2008; Vaughan and Finch, 2013). Given that the banks were experiencing difficulties, and achieving their financial goals through legitimate channels, the next best course of action was to rig the rates and attain their economic goals through illegitimate means.

In general, the pressure leg of the fraud triangle asserts that individuals and organizations circumvent legislation when they are experiencing financial pressure (Lokanan, 2015; Schuchter and Levi, 2015). Merton (1938) was the first to argue that individuals who feel pressure or experience strain are more likely to be involved in criminogenic behavior. According to Merton (1938) and, subsequently, Agnew (1985, 1992) and Keane (1993), individuals experience strain when their efforts to attain material wealth are render unattainable because of blocked opportunities. As such, they feel deprived and revert to illegitimate means to acquire material success.

A similar level of reasoning can be applied to criminality at the organizational level (Baucus and Near, 1991; Donegan and Ganon, 2008; Dechow, Sloan, and Sweeney, 1996; Erickson, Hanlon, and Maydew, 2006; Johnson, Ryan, and Tian, 2009; Keane, 1993; Lokanan, 2017). When executives feel pressured because of poor financial performance, strain arises. Financial pressures create a discrepancy between achieving performance targets and the legitimate means to meet those targets. The more severe the financial strain experienced by the organization, the greater the pressure to maximize profit through fraudulent behavior (Baucus and Near, 1991; Cohen et al., 2008; Faber, 2005; Erickson et al., 2006; Johnson et al., 2009; Keane, 1993).

Others noted that organizations who perceived their financial performance to be moderate in comparison with their competitors were significantly more likely to engage in fraud (Baucus and Near, 1991; Brazel, Jones, and Zimbelman, 2009; Erickson et al., 2006; Lokanan, 2017; Perols and Lougee, 2011). Fraudulent behavior is magnified in times of economic uncertainties and can make an organization criminogenic if there are perceived financial difficulties ahead

(Donegan and Gagon, 2008). Organizations that falls in this realm may perceive financial stress to be industry-wide and may circumvent legislation to appear healthier in the eyes of their competitors (Palmer 2012; Perols and Lougee, 2011).

Case studies also confirm that many organizations turn to outright scandalous and unethical practices to top up their balance sheet when faced with imminent threats to their perceived financial forecasts (Brennan and McGrath, 2010; Clikeman, 2009; Holm and Zaman, 2012; Humphrey, Loft, and Woods, 2009; Neu et al., 2013b). In other situations, there is evidence to suggest that fraud results from the threat of perceived financial performance problems in relations to the expectation of the markets (Brennan and McGrath, 2010; Cohen, Ding, Lesage, and Stolowy, 2010; Dechow et al., 1996). In many ways, therefore, individuals and organizations experiencing or perceive the threat of financial pressure may engage in fraudulent behavior to protect themselves and their respective organizations from impending collapse (Baucus and Near, 1991; Cohen et al., 2010; Johnson et al., 2009).

The Opportunity to Commit the Fraud

The opportunity structures conducive to fraudulent behavior without getting caught is the second leg of the fraud triangle. Perceived opportunities are the factors within the organization that allow the individual to commit the fraud (Albrecht, Albrecht, and Albrecht, 2004; Fleak, Harrison, and Turner, 2010; Murphy and Free, 2016; Strand Norman, Rose, and Rose, 2010). There are many factors that contribute to the opportunities to commit fraud (LaSalle, 2007; Neu et al., 2013b; Power, 2013; Lokanan, 2017). Research on this issue has found that some of the more prevalent factors that enhance opportunity are weak or non-existent internal control to prevent and detect potential fraudulent conduct, inadequate audit procedures, and access to controls and organizational structures that are conducive to fraud (Albrecht et al., 2012; Boyle, DeZoort, and Hermanson, 2015; LaSalle, 2007; Lokanan, 2014; McNulty and Akhigbe, 2016; Murphy and Free, 2016; Power, 2013; Strand Norman et al., 2010).

Financial services organizations and companies with weak or non-existent internal controls are more susceptible to fraud (Crumbley et al., 2017; Bell and Carcello, 2000; Cooper et al., 2013; Davis and Pesch, 2013; Lokanan, 2014; Power, 2013). The perceived opportunity to engage in fraudulent behavior reflects the overall strength of the organization's internal control system (Hogan et al., 2008; Lokanan, 2014; Trompeter et al., 2014). Organizations are "responsible for establishing vigilant systems of control aimed at preventing and detecting lapses in organizational members' morality" (Morales et al., 2014). Studies have found that an effective control system is one that is appropriately implemented and clearly outlines management roles in the prevention of the fraud (Boyle et al., 2015; Murphy and Free, 2016; Schuchter and Levi, 2015; Strand Norman et al., 2010).

The role of both internal and external auditors is also pivotal to prevent fraud (Brazel et al., 2009; McNulty and Akhigbe, 2015; Mohd-Sanusi, Haji Khalid, and Mahir, 2015; Neu et al., 2013a; Sikka, 2010; Strand Norman et al., 2010). The audit committee is responsible for providing independent checks on the systems in place to safeguard the organization's assets (Knaap and Knaap, 2001; Neu et al., 2013b; Rezaee, 2005). Working in conjunction with information technology (IT) experts, internal auditors can provide assessments that would cause potential perpetrators to question whether they could circumvent the control system without getting caught while committing the fraud (Abbott et al., 2004; Boyle et al., 2015; Cullinan, 2004; Gullkvist and Jokipii, 2013; Roussy, 2013). More recent research in this area has noted that the perceived opportunity to engage in fraudulent behavior is enhanced by the possibility to do so, but it is thwarted by the presence of a prevention program that sees the organization as a place where fraudulent behavior is concocted and perpetrated (LaSalle, 2007; Lokanan, 2014; Morales et al., 2014; Neu et al., 2013a; Power, 2013). Others have noted that ''objective opportunities'' to engage in illegal behavior are always present in organizations; the challenge is to understand why individuals in organizational life come to perceive their situation as an opportunity to circumvent legislation and involve in fraudulent conduct (Gabbioneta et al., 2013; Morales et al., 2014; Murphy, 2012; Murphy and Free, 2016).

Further studies on the opportunity leg of the fraud triangle have found that access to an organization's controls plays a critical role in deterring whether to commit or desist from committing a fraudulent act (Brazel et al., 2009; Dellaportas, 2013; Gabbioneta et al., 2013; Knaap and Knaap, 2001; Schuchter and Levi, 2015). Research in this area has found that the individual's knowledge of the internal control system and their ability to manipulate it without getting detected were determining factors in deciding whether to commit the crime or not (Dellaportas, 2013; Schuchter and Levi, 2015). Others have noted that alternative fraud models employed by public accountants to detect fraud risks found that the perceived opportunity to engage in illegal activities is a critical component when evaluating fraud risks (Boyle et al., 2015; Cohen et al., 2010; Knaap and Knaap, 2001; LaSalle, 2007; Murphy, 2012; Power, 2013; Soral, Iscan, and Hebb, 2006). Researchers employing case studies in their analysis have noted that opportunity

is an appropriate measure to capture risk in a financial statement audit (Gabbioneta et al., 2013; Lokanan, 2015; Matthews, 2005; McNulty and Akhigbe, 2016; Turner, Mock, and Srivastava, 2002).

Another stream of research on the opportunity leg of the fraud triangle has found that the structure of the organization shapes the type of fraud and the likely perpetrators (Brazel et al., 2009; Davis and Pesh, 2013; Gabbioneta et al., 2014; Neu et al., 2013a; O'Connell, 2004; Power, 2013). Murphy (2012) and Murphy and Dacin (2011) found that individuals who may, at first, not be predisposed to fraudulent behavior can be persuaded to act fraudulently in institutional settings that create a pathway for fraud. Perhaps the leading study in this area is by Gabbioneta et al., (2014), who noted that, in the Parmalat fraud, the institutional processes themselves opened opportunity structures for fraud and sustained concealment. Some researchers have noted that employees within an organization that are socialized with pro-fraud attitude coupled with a culture that encourages such behavior, will conceive these as opportunities to commit fraud (Davis and Pesh, 2013; Lokanan, 2014; Schuchter and Levi, 2015).

The Rationalization to Commit Fraud

While perceived pressure and opportunity are generally accepted as predictors of fraud (Erickson et al., 2004, 2006; Graham, Harvey, and Rajgopal, 2005; Hogan et al., 2008; LaSalle, 2007), the rationalization leg of the fraud triangle remains a contentious issue in fraud research (Crumbley et al., 2017; Lokanan, 2015; Morales et al., 2014; Murphy, 2012; Murphy and Dacin, 2011). Various definitions have been put forward to conceptualize rationalization. Earlier research defines rationalization as "the mental process of justifying conduct by adducing false motives'', to provide "justification for our opinions and theories as well as for our conduct" (Sloane, 1944, 12). Fointiat (1998) took a more social psychology stance and viewed rationalization as "a post-behavioral process through which a problematic behavior becomes less problematic for the person who has displayed it" (Fointiat, 1998, 471).

Perhaps the definition that has had most impact on fraud research comes from Sykes and Matza's (1957) work on the "techniques of neutralization" in the criminology literature. Sykes and Matza (1957) laid out several "techniques of neutralization" that adolescents used to justify their behavior. As with Cressey's (1953) conceptualization of rationalization of embezzlement, Sykes and Matza's (1957) definition is conducive to delinquent behavior because they allow the individual to "neutralize" and justify his or her misconduct without any damage to their self-image (Sykes and Matza, 1957, 667). Taken together, the common element in these definitions is that rationalization is generally defined to justify and sanitize an action that is inconsistent with the individual's moral conscience to reduce the negative consequences that accompanies such action (Murphy, 2010; Murphy and Dacin, 2011; Schuchter and Levi, 2015).

Studies done on rationalization have found that the perpetrators usually adjusted their construction of the fraud to internalize their guilt. Placed in the context of occupational fraud, Festinger (1957) argued that individuals who consider circumventing regulation will anticipate feeling bad, either because of their belief system or because their action is against conventional societal norms. Bandura (1999) noted that, to sanitize their conscience, individuals usually employ socially acceptable rationalizations to erase the guilt associated with their actions. Some common rationalizations used in the corporate world are as follows: this is the normal course of business around here; all companies are involved in aggressive accounting practices; senior management is doing it, so us entry level managers can do it too; and, manipulating the books will keep the corporation afloat and save jobs (e.g., Albrecht et al., 2004; Brytting, Minogue, and Morino, 2010).

Others expand on the various techniques and pathways used to gain further insights into understanding the rationalization element of the fraud triangle. Sykes and Matza (1957) argued that offenders usually employ various techniques of neutralization to rationalize their delinquent actions. Ashforth and Anand (2003) built upon Sykes and Matza's (1957) findings and argued that fraud becomes the normal course of action in organizations once there is an established criminogenic culture that is supported by the top brass of the company. Murphy and Dacin (2011), building on the earlier work of Festinger (1957) (cognitive dissonance theory) and Bandura (1999) (theory of moral disengagement) found that, when individuals are confronted with the opportunity structures and pressure/motivation to engage in fraudulent activities, they use three psychological pathways to rationalize their behavior: (1) lack of awareness, (2) intuition coupled with rationalization, and (3) reasoning, because they see them as necessary to be successful in their jobs (Lokanan, 2015, 205). This point is well-documented in the literature on white-collar criminals (Murphy and Dacin, 2011; Neu et al., 2013a; Palmer, 2012). It is not unusual to find a rational calculation executive (with a facility for rationalization) pursuing private as well as corporate interests at the same time (Choo and Tan, 2007; Cohen et al., 2010; Cooper et al., 2013; Dunn, 2004), which, often, triggers a cascade of behavior conducive to fraudulent conduct (Erickson et al., 2006; Morales et al., 2014).

Others found that employees are quick to learn from management's actions and model their behaviors accordingly (Anand, Ashford, and Joshi, 2004; Ashforth and Anand, 2003; Bandura, 1999; Mayhew and Murphy, 2014). Choo and Tan (2007) noted that, given the proclivity to perform and meet analysts' expectations and satisfy senior management's performance targets, lower-level employees will use rationalization techniques to rationalize their non-compliance with rules and regulation. Others found that a significant proportion of employees in their study were willing to follow the unethical actions of an authority figure of the company and circumvent regulation (Ashforth and Anand, 2003; Mayhew and Murphy, 2014; Murphy and Dacin, 2011; Murphy and Free, 2016).

Considering the above discussion, this research attempts to apply the fraud triangle to banking fraud by asserting that: Fraud = f (pressure, opportunity, and rationalization). The following hypothesis is posed:

> **Ho**: The hypothesis is that pressure, opportunity and/or rationalization are positively related to fraud in banks. The use of and/or is common and it represents the primary research question when there are multiple sub-parts. The use of "and" by itself implies that all three components are necessary.

III. Research Methodology

Research Design

The study employs a quantitative research design to test the causal relationship between fraud risk factors and fraud. A logistic regression is used to examine the relationship between the predictors' variables (pressure, opportunity, and rationalization) and the dependent variable fraud, because the indicators used to measure these risk factors are both continuous and categorical. Logistic regression is the preferred method when the outcome variable is dichotomous (Hayes and Matthes, 2009).

Variables and Measurements

Research on the fraud triangle has yet to develop proxies to measures pressure, opportunity, and rationalization (Dorminey et al., 2010; Lokanan, 2015; Murphy and Dacin, 2011). To measure the legs of the fraud triangle, a set of proxy measures were developed in accordance with AU Section 316 (see also Skousen, Smith, and Wright, 2015) and informed by the literature on fraud (Beasley, 1996; Beasley et al., 2000; Carcello and Nagy, 2004; Farber, 2005; McNulty and Akhigbe, 2016; Skousen et al., 2015). A list of these proxies can be seen in Appendix A and they are further described below. Proxies representing pressure, opportunity and rationalizations are the independent variables and fraud is the dependent variable.

Pressure

AU Section 316 identified the four types of pressure that leads to fraudulent reporting. They are financial stability, excessive pressure on management, managers' personal financial situations are threatened, and the ability to meet financial targets by those in charge of governance (AICPA, 2002, 1749–1750). Proxy variables and their measurements for each of these pressures are identified below.

Financial Stability

AU Section 316 states that an entity's financial position is threatened when there is a decline in its financial margins, profitability, and cash flow from operations (AICPA, 2011, 1749). Management may resort to fraud when financial growth in these areas is below similar companies in the industry (Loebbecke, Eining, and Willingham, 1989; Lokanan, 2014). In such situations, management may be inclined to manipulate the financials to present a picture of stable and robust financial health of the company (Skousen et al., 2015; Lokanan, 2017). Thus, financial stability is operationalized by profit margin and growth in sales (Beasley, 1996; Skousen et al., 2015; Summers and Sweeney, 1998), growth in asset (Beasley et al., 2000; Beneish, 1997; Erickson et al., 2006) and operating cash flow (Banker, Huang, and Natarajan, 2009; Dechow, Kothari, and Watts, 1998; Skousen et al., 2015). These ratios are computed as follows:

PROF_MARGIN = Net Income / Net Revenue *100
SALES_GROWTH = Revenue Growth Year Over Year
ASSET_GROWTH = Assets - One Year Growth
BS_TOT_ASSET = Total Assets
NET CHANGE IN CASH-FLOW = Net cash provided by operating activities/Average current liabilities

External Pressure

AU sec. 316 states that management face external pressure to meet its outstanding obligations (AICPA, 2011, 1749-1750). The ability to meet financial analysts' expectations, pay off liabilities and attract investors are financial

pressures that managers experienced (Crumbley et al., 2017). In situations where managers cannot meet these payments, they are more likely to engage in unethical financial conduct (Dechow et al., 1996; Lokanan, 2014; Vermeer, 2003). High leverage and debt covenants can serve as motivation for banks to manipulate their earnings (Dechow et al., 1996; Duke and Hunt, 1990). To measure leverage, the debt to total asset ratio was used as a proxy for external pressure (Dechow et al., 1996) and computed as follows:

TOT_DEBT_TO_TOT_ASSET = Total Debt *100 / Total Assets

Persons (1995) employed financial ratios to detect fraudulent financial reporting and noted that financial leverage is one of the factors that relates to fraud in organizations. Others, such as Dechow et al., (1996), Press and Weintrop (1990) and Skousen et al., (2015) found that, when a company is highly leveraged through equity financing, this serves as a key motivational factor for fraudulent reporting. The equity (debt leverage) ratio is computed as follows:

FNCL_LVRG = Average Total Assets / Average Total Common Equity

Managers' Personal Financial Situations

Previous research found that, when executive compensations are tied to a company's financial performance, they may feel threatened when they fail to reach financial targets (Beasley, 1996; Dunn, 2004; Erickson et al., 2004). Accordingly, the cumulative percentage of shares owned by insiders is used as a proxy measure (Skousen et al., 2015). Other research found that CEOs' compensation is directly related to the net income of a company (Banker et al., 2009). When net income is threatened, the likelihood of financial statement manipulations increases (Crumbley et al., 2017; Erickson et al., 2006). More recent research found that return on common shareholders equity (ROCE) may have an influence on managers' financial conditions. The argument here is that managers are motivated by their own self-interests and can use ROCE as a driver to maximize their net utility (Albrecht et al., 2004; Choo and Tan, 2007). The percentage of insider shares outstanding, net income and ROCE is computed as follows:

PCT_INSIDER_SHARES_OUT = Percentage Insider Shares Outstanding or Five Percent Insider Ownership
NET_INC = (Trailing 12M Net Income / Average Total Assets) * 100
ROCE = Return on Common Equity

Financial Targets

To examine whether the banks were under financial pressure to meet their targets at the time of the scandal, data on two profitability measures are used in the research: Return on Equity (ROE) and Return on Asset (ROA). ROA and ROE are measures of after-tax return and "are widely used to assess the performance of commercial banks" (Guesmi, Youcefi, and Benbouziane, 2012, 252). Bank officials and analysts have historically used ROA and ROE as measures "to assess industry performance" and predict bank failures (Guesmi, Youcefi, and Benbouziane, 2012, 252). ROE is an established

> internal performance measure of shareholders value. It is by far the most efficient measure that banks use since: (i) it proposes a direct assessment of the financial return of a shareholder's investment; (ii) it is easily available for analysts, only relying upon public information; and (iii) it allows for comparison between different banks (European Central Bank, 2010, 8–9).

Since many bankers share the belief that ROE equates to shareholders' value, it is "the primary performance measure to which senior management incentive compensation is tied" (Rizzi, 2013, para. 1). The "competition among banks has often led to the ROE race in which targets of twenty percent or more are set" (Rizzi, 2013, para. 1). Achieving high targets in a "low-rate environment is likely to be difficult without incurring significant business and financial risk and raising the concern of regulators" (Rizzi, 2013, para. 1).

The formula for ROE is as follows:

ROE = Net Income / Average Total Equity

However, ROE as a financial performance measure is at times criticized for leading banks to chase return without considering the risk involved (Bonin, Hasan, and Wachtel, 2005). For this reason, ROA is advocated as a much more useful measure of banks' financial performance because it takes into consideration the total returns the bank made from all its assets and would give a better indicator of the bank's overall performance (Gilbert and Wheelock, 2007). The formula for ROA is as follows:

ROA = Net Income / Average Total Assets

The usefulness of these two measures is that they both complement each other. Although ROE is concerned with how much the bank is earning from its equity investment, the ROA is a standard measure of financial performance and measures how the bank is utilizing all its assets to generate revenues.

Opportunity

The opportunities to commit fraud can be classified into four categories: nature of the industry, ineffective monitoring by management, complex or unstable organizational structure, and internal control components (AICPA, 2002, 1750–1751).

Nature of the Industry

One of the hallmarks of the LIBOR fraud was that some banks underreported their rates to appear financially sound to analysts (Monticini and Thornton, 2013). This was an industry-wide practice and may have benefited banks with large portfolios exposure to the LIBOR (Snider and Youle, 2010). To capture the sensitivity to changes in interest rates, net interest income ratio is used in the model. The net interest ratio is the revenue generated from a bank's asset portfolio and the revenue incurred by paying off the bank's liabilities. Net interest income is computed as follows:

NII PRIOR YEAR= Interest Received – Interest Paid

Another core industry-wide measure in the banking industry is Tier 1 Capital Ratio. Demirguc-Kunt, Detragiache, and Merrouche (2013) argued that a strong Tier 1 Capital Ratio is a sign that a bank is financially sound. In times of financial shocks, Tier 1 capital is the first to absorb the loss, followed by investors and lenders (Tong and Wei, 2010). To this end, the Tier 1 Capital Ratio will be use as a proxy measure to verify the financial position of the banks. It is computed as:

T_1_CAPITAL = Tier 1 Capital Ratio % represents Tier 1 Capital as a percentage of Total Risk-Weighted Assets of the Bank

Ineffective Monitoring by Management

Research on ineffective monitoring of corporate affairs suggests that firms that are engaged in fraudulent conduct have fewer outside directors than firms that are not engaged in fraud (Beasley et al., 2000; Dunn, 2004; Erickson et al, 2006; Skousen et al., 2015). To account for the proportion of outside directors between fraud and non-fraud banks, the variable OUT_DIR was included in the model as:

OUT_DIR = Percentage of outside directors in the banks

Beasley et al., (2000) and Mardjono (2005) noted that fraud companies have weak corporate governance mechanisms relative to non-fraud companies. Farber (2005) also found that fraud firms have weak governance mechanisms relative to non-fraud firms. Other studies have found reduced incidence of fraud in companies that have established and qualified audit committees (Beasley et al., 2000; Knaap and Knaap, 2001). To measure the composition of the audit committee and governance, the following variables were added to the model:

FIN_EXP_AC = Indicator variable 1 if the bank's audit committee includes a director with accounting (Chartered Accountant) and finance (Certified Financial Analyst) qualification and 0 otherwise
BOM_AUD_COM = Number of board members on the bank's audit committee
IND_AUD_MEM = the percentage of audit committee members who are independent of the bank

Complex Organizational Structure

Mardjono (2005) highlighted the importance of following best practice for effective corporate governance within an organization. According to Mardjono (2005), two areas of major concern are when the chairperson of a corporation serves as the chief executive officer (CEO) and when he or she sits on other committees with significant influence over strategic decision- making (see Linck, Netter, and Yang, 2008). The dual role that characterizes the former gives rise to the duality problem (Jo and Harjoto, 2012), while the latter is known as the contagion problem (Bouwman, 2008). In both situations, a CEO in these positions can dominate decision-making (Loebbecke et al., 1989). Since this dominance may provide an opportunity to engage in fraudulent conduct, a dummy variable was created to include:

CEO_CHAIR = equals 1 if the CEO was also the chair of the bank (Duality) and 0 if the CEO was not the chair

A dummy variable also was created to include:

> CEO_COMM = equals 1 if the CEO was on any other committee (risk, compensation, audit, and regulatory oversight committees, etc.) and 0 otherwise

Internal Control Deficiencies

McNulty and Akhigbe (2016) noted that legal expenses are strong indicators of weak internal controls. According to McNulty and Akhigbe (2016), banks that are sued or are involved in court proceedings have weak controls or operational risks mechanisms in place. Following on from the associated link between legal expenses and control deficiencies, Dyck, Morse, and Zingales (2010) found that fraud detection does not rely solely on standard setters and regulators, but also from whistle-blowers, such as employees, media, industry professionals and so on. As such, proxy measures were used for legal expenses and whistle-blowing and are included in the model as follows:

> LEG_PRO = An indicator variable with a value of 1 if the bank is involved in litigation and 0 otherwise
> WHIS_ BLOW_ POL = An indicator variable with a value of 1 if the bank has a whistle-blowing policy and 0 otherwise

Rationalization

Rationalization, because it is an unobservable construct, is difficult to measure (Cooper et al., 2013; Donegan and Ganon, 2008; Lokanan, 2015; Morales et al., 2014). That said, rationalization has been operationalized by using incidents of corporate failure after audit change (Skousen et al., 2015) and whether the auditor gives an unqualified opinion in the year in which the fraud was detected (Abbott, Parker, and Peters, 2004; Beneish, 1997; Vermeer, 2003). The following variables were used as proxies for rationalization:

> AUD_CHANGE = a dummy variable = 1 if there was a change of auditors in the two years prior to fraud and 0 if there was no change in auditors in the year in which the fraud occurred
> UNQUAL_OPIN = a dummy variable = 1 if the auditors give the banks an unqualified opinion and 0 if there was an unqualified opinion with additional language in the year the fraud was discovered

Dependent Variable

The dependent variable is fraud. Fraud is measured as a dichotomous variable and takes the value of 1 for banks implicated in fraud and a value of 0 for the matched sample of banks that were not implicated in the fraud (e.g. see Brazel et al., 2009; Erickson et al., 2006).

Population of Fraud and Control Banks

The population of interest for this study is the sixteen banks that make up the LIBOR. The LIBOR banks are labeled as (fraud banks) and matched with a controlled sample of banks that were not involved in the fraud (i.e., non-fraud banks). Each fraud bank in the population was matched with a control bank, which was not cited by regulators for engaging in the LIBOR fraud or other scandals. Matching was done based on the size and revenue of the banks and their four-digit—Standard Industrial Classification (SIC)—industry code. If a four-digit SIC match could not be found, then a three-digit SIC match within the same size range was used as a substitute.[2] In the final sample, the fraud banks were matched with the LIBOR banks within 25± percentage of their asset (size) and sales revenue (see also Farber, 2005).

Matching allowed for a comparison of the risk factors that were present between the fraud banks and the non-fraud banks. Matching also has many advantages over a longitudinal approach. One obvious advantage is that it effectively differences out unobserved characteristics that are similar across banks (e.g., see Abbott et al., 2004; Farber, 2005). In doing so, matching can control for the characteristics that are similar across banks, but, at the same time, have unknown relations (e.g., linear or nonlinear) with the dependent variable, fraud (see Erickson et al., 2006; Farber, 2005; Johnson et al., 2009).

To secure the closest matches possible, one control bank was chosen (Dechow et al., 1996; Erickson et al., 2006; Farber, 2005; Skousen et al., 2015). Some may argue that inferences cannot be made with only one matching bank. In fact, more matches will increase the power of test; but, at the tradeoff of matches that are not exactly like the fraud

[2]The accounting literature on matching is well developed. Dechow et al., (1996), Erickson et al., (2006) and Farber (2005) utilized a similar matching approach in their examination of earning manipulations and equity compensation and fraud.

banks (see Farber, 2005; Johnson et al., 2009). Obviously, the second-best match would be less like the fraud bank than the first best match. To increase the matching of control banks will, therefore, be a bad trade, because power is not an issue here, since I will be utilizing the entire population of banks that were involved in the LIBOR fraud and not a sample of the banks.

Data Collection

The data for this research were collected from S&P Capital IQ, a financial database operated by Standard & Poor. S&P Capital IQ consists of historical and real-time data on companies and banks' financials and corporate governance records. S&P Capital IQ indicates that it collects corporate governance data from a variety of sources, namely, corporate by-laws and charters, proxy statements, annual reports and the Securities and Exchange Commission (SEC) 10-K and 10-Q filings. The corporate governance and financial dataset are coded into an electronic format and developed into indexes that can be uploaded in Excel for further statistical analysis.

The financial performance data are both in quarterly and annual formats and contain information on income statements, balance sheets and statements of cash flow. There is also key statistical information on financial ratios, company aggregates, industry segments and stock prices. S&P Capital IQ also has data such as bank size and industry type. Financial performance data were collected from 2005, when the traders started to manipulate the LIBOR rates, to 2008, when the fraud was discovered.[3] The data for all the performance measures were computed separately for each year and then averaged for the logistic regression analysis (e.g., see McNulty and Akhigbe, 2016).[4]

Reliability and Validity Concerns

We expect the data to be valid and reliable, but, given the fact that they are obtained from secondary sources, they must be interpreted with caution. Banks can misreport their information. As such, one of the weaknesses of the data is that S&P Capital IQ relied on the data the banks reported to build their database. To address this concern, we selected a random sample of banks from both the fraud and control groups and rechecked their financial and governance data from their proxy statements submitted to the SEC and other financial authorities. These filings are also available from S&P Capital IQ database.

IV. Empirical Findings

Descriptive Statistics

The characteristics and variable types are listed in Table I. There are thirty-two observations in the dataset with twenty-four columns. The mean (average) for each variable is displayed, along with the minimum value, maximum value, and standard deviation. The minimum, maximum and standard deviation portray how "spread out" a variable is, in relationship to the average. Large standard deviations in relationship to the average indicate a highly-dispersed variable or a variable with large variability. A closer look at Table I shows that the average profit margin is 16.6% with a standard deviation of around twenty percent. A large negative value at -71% (WestLB) causes the relatively large deviation. Average sales growth is 14.6%, with standard charter having a high value at sixty-four percent. Average asset growth is seventeen percent, with WestLB again experiencing a negative value at -0.35%. Total assets vary widely, from the low value at thirty-two thousand dollars (Julius Baer Group) to a high value at over sixty-five million dollars (Norinchukin Bank), with an average of around four million dollars. The average net change in cash flow is negative at -20K, driven negative by the large negative value of -382K (Resona Bank).

Table I also indicates that financial leverage, board members on audit committee, independent audit members, total debt to total assets and percent outside directors are evenly distributed, while return on common equity and return on equity are clustered around their respective means (ten and eleven percent). Percent insider shares outstanding, net income, and return on assets all have large positive values corresponding to values for Santander, Resona Bank, and Credit Suisse. The average net income is around eighteen percent with two high values of 112% and 165% for Julius Baer Group and BayernLB, respectively. Auditor change has possible values of "0" (no change) and "1" (change), and with an average at 0.812, which indicates that many of the banks have had auditor changes in the two years prior to fraud. [see Table I, pg. 209]

[3] Not until 2013 did most of the banks admitted to the manipulation and settled with regulators.

[4] McNulty and Akhigbe (2016) employed a similar approach in their study of legal expenses and operational risks in banks. They averaged the performance data from 2002 to 2006 then built a regression model to test the relationship between legal expenses and banks' financial performance.

In Table II, the means and standard deviations for the independent variables are separated and compared by non-fraud banks and fraud banks. There are an equal number of observations for each category (n=16 for non-fraud, n=16 for fraud banks). The differences in means and standard deviation equal to the non-fraudulent value less the fraudulent values. A negative value indicates that the fraudulent value is greater than the non-fraudulent value, as the difference is calculated by subtracting the fraud value from the non-fraud value. The mean profit margin is higher in non-fraud banks, at around twenty-three percent compared to ten percent, while the standard deviation is much smaller for non-fraud banks. This indicates that the profit margin for non-fraud banks is less dispersed with a higher average, while the observations for fraud banks are more variable. In other words, the values of profit margin in fraud banks are more "spread out" than the values of profit margin for non-fraud banks. The mean percent outside directors is lower in non-fraud banks, at around fifty-six percent compared to eighty-one for fraud banks, while the standard deviation is also higher for non-fraud banks. This indicates that the percent outside directors for non-fraud banks is more variable, with a lower average, and the observations for fraud banks have a higher mean and are less variable. Sales growth, net change cash flow, total debt to total assets, percent insider shares outstanding, return on common equity, return on equity, net income, net interest income, financial experience accountant, and board members on audit committee have higher means for non-fraud banks than fraud banks. [see Table II, pg. 210]

Testing Equality of Means for Fraud/Non-Fraud

Equality of means testing is performed to determine where there are significant differences in each variable's mean when the mean for fraud banks is compared to the mean for non-fraud banks. When a mean (average) for an independent variable is the same, regardless of the value of the dependent variable, then that independent variable is not likely to be valuable in predicting the dependent variable. As the means for an independent variable are not likely to be exactly equal for fraud and non-fraud observations, a test is performed to determine if the means are statistically different. A value that is >0.9 will be considered marginally important (or marginally significant), and a value that is >.95 will be considered important. These are standard cut-offs for the significance testing of equal means.

For example, in Table III, the mean for profit margin for non-fraud banks is 22.925 and the mean profit margin for fraud banks is 10.194. This seems like a large difference and profit margin is considered marginally important when the statistical test of equal means is performed. The mean asset growth for non-fraud banks is 16.825, while the mean asset growth for fraud banks is 17.234, which makes the means not very different. When testing for significance, the value is 0.061, or very low, and is, therefore, considered not important. In general, when there are large differences in the means for an independent variable when grouped by the dependent variable, the variable is likely to provide value in predicting the dependent variable.

The means that were found to be "different enough" to be significant are profit margin, percent outside directors, board members on audit committee, and legal process. Significance for a test of equal means indicates that the means are different statistically and are likely to provide value in fraud prediction of banks. For variables that are not significant, it is unlikely that they will provide value in predicting fraud in banks. The mean for percent outside directors is around fifty-six percent for non-fraudulent banks, while the mean for fraudulent banks is eighty-one percent, indicating fraudulent banks had a significantly higher percentage of outside directors. Alternately, the mean for board members on audit committee is around 4.4 for non-fraudulent banks, while the mean for fraudulent banks is 2.8, indicating fraudulent banks had a significantly lower number of board members on the audit committee. The mean legal process for non-fraud banks is 0.562, while fraud banks had a mean of 0.875, indicating that fraudulent banks were involved in litigation over eighty-seven percent of the time (on average) and this is significantly higher than non-fraudulent banks. The remaining variables may have differences in their means between fraudulent and non-fraudulent banks, but these differences are not considered "different enough" to be statistically significant. As can be seen in Table III, the variables that are either marginally important or are important are profit margin, percent outside directors, board members on audit committee, and legal process. [see Table III, pg. 211]

The next step in the analysis is to run a logistic regression of the data. The logistic regression is used for categorical dependent variables and a binomial logistic regression can be used when the dependent variable, in this case FRAUD, has only two possible outcomes. Initially, all twenty-four independent variables were input into the regression, but there are not enough data to allow for that many variables. The algorithm to do matrix manipulation reliably requires a certain number of observations to resolve the twenty-four variables; thirty-two observations are not enough, and SPSS returns an error to reduce the number of input variables. As an alternate approach, the variables that were considered important or marginally important are used in the analysis.

To tell how well the regression model fits the data, a classification table is produced that compares the predicted values to the observed values, as shown in Table IV. For example, the model is predicting that, of the sixteen non-

fraudulent banks, 81.3% of the time they are predicted correctly (value=0) and the other 18.7% are predicted incorrectly (value=1). The model correctly predicts fraudulent banks 68.8% of the time. Overall, the model predicts the values correctly around seventy-percent of the time, which is a pretty good fit. Because the fit is acceptable, the results of the regression analysis are determined to be valid and reliable predictors. If the classification table does not find that, the model can accurately predict fraudulent banks, then the regression analysis is not reliable and should not be used for prediction. Fortunately, the classification table produced by the regression reflects a good fit of the predictive equation, and, while it does not impact the hypothesis directly as the regression equation does, it provides confidence in the predictive equation's ability to support or not support the hypothesis that pressure, opportunity, and rationalization are positively related to fraud in banks. [see Table IV, pg. 212]

Another output from the regression model is pseudo R-square values. The R-square in a linear regression gives an idea of how good the model fits the data. The pseudo R-square value (Cox and Snell) for this logistic regression is 0.387, the Nagelkerke is 0.517 and the McFadden measure is 0.354, which could be interpreted to be very good (values > 0.2 are generally considered a strong fit). Generally, the classification table gives a better representation of the fit of a model than the pseudo R-square value. The pseudo R-square values are shown in Table V for Cox and Snell, Nagelkerke, and McFadden measures. [see Table V, pg. 212]

The parameter estimates (Column B in Table VI) in a logistic regression give an idea of the magnitude and direction of the important variables for predicting fraudulent banks and whether the variables are significant. For a variable to be significant, the standard error should be relatively small compared to the parameter estimate, as the Wald statistic tests this ratio. The column Exp(B) is e^B and considered the odds of the variable occurring when the bank is fraudulent. The parameter estimates for profit margin at -0.032 and board members on audit committee at -0.463 are negative, indicating a negative relationship with fraudulent banks. The parameter estimates for percent outside directors at 0.036 and legal process at 1.482 are positive, indicating a positive relationship with fraudulent banks. The percent outside directors and board members on audit committee are significant. A negative relationship means that, as profit margin goes up, the dependent variable (fraud) goes down. Since non-fraud is coded as 0, that implies that, as profit margin goes up, the value of the equation goes down, or moves towards 0, non-fraud. The opposite is the case for percent outside directors and legal process, so, as those values go up, so does the equation and moves towards 1, or fraud. The legal process variable has the largest coefficient but does not quite pass the Wald statistical significance test due to the relatively large size of its standard error. [see Table VI, pg. 212]

The "Sig." column in Table VI identifies whether the variable is significant. Percent outside directors and board members on audit committee are the two variables that are identified as significant in the regression. The parameter estimates form an equation for predicting a filer.[5] An equation can be written in the form of $Y_i=a + B_i(X_i)$, where a represents the intercept, as:

$$Y_i=-1.335 -.032*PROF\_MARGIN_i + .036*PERCT\_OUT\_DIR_i -.463*BOM\_AUD\_COM_i + 1.482*LEG\_PRO$$

V. Discussion and Conclusion

Summary of Findings

The AICPA, in adopting Cressey's (1953) version of the fraud triangle framework, gives credence to the proposition that pressure, opportunity and rationalization are consistently related to fraudulent behavior. While adopting the framework as it is stated in AU sec. 316 is broadly supported by standard setters, such as the International Federation of Accountants (IFAC), and anti-fraud organizations, such as the Association of Certified Fraud Examiner (ACFE) (Donegan and Ganon 2008, 3; O'Connell 2004, 733–784), very little empirical work has been done on linking Cressey's (1953) fraud risk factors to financial statement fraud (e.g., see Skousen et al., 2015; Wuerges and Borba 2010). In this paper, we attempted to fill this gap by linking Cressey's (1953) fraud risks factors to banks involved in fraud.

Using a sample of fraud banks with a match sample of non-fraud banks, we hypothesized that pressure, opportunity and/or rationalization are positively related to fraud in banks, and pressure and opportunity both have variables that contribute significantly to predicting fraud in banks. The regression using the four variables (PROF_MARGIN, PERCT_OUT_DIR, BOM_AUD_COM and LEG_PRO) deemed to be marginally important or important provides a good fit of the data in the model. The two proxies that belong to the rationalization category of variables (AUD_CHANGE and UNQUAL_OPIN) are not significant and are not contributing to the predictive value of the

[5] Calculation of the probability that a taxpayer will be a filer uses the equation generated by the regression in the following formula: 1/(1 + exp(-Bx))

model. Since the intent of the hypothesis is that any of the three variables are positively related to fraud in banks, then the hypothesis would be accepted, allowing that pressure and opportunity are both positively-related to fraud in banks.

Theoretical and Practical Contributions

There are a number of theoretical and practical contributions that have emerged from the stance taken on the genesis of the LIBOR fraud. The first relates to the pressure leg of the fraud triangle framework. The fraud triangle framework seeks to explain the content and process of the LIBOR fraud via the premise that financial pressure puts strains on managers to engage in fraudulent conduct. In this regard, the findings appear to lend credence to this argument that fraud stems from the banks' desires to appear financially healthy by putting pressures on managers to rig the rates and increase the banks' net profit (Agnew et al., 2009; Alexander and Cohen 1996; Donegan and Gagon 2008; Free et al., 2007; Keane 1993; Lokanan, 2017; Sutherland 1947). Perhaps the pressure to appear financially stable pervades the entire industry, whereby the bankers and traders who choose to accept unethical practices need to learn a specific set of values and techniques that support such practices (e.g., see Holm and Zaman 2012; Humphrey et al.2009; Murphy and Free 2016; Perols and Lougee 2011; Power 2013). By using potent socialization tactics, these values and techniques are all learned through a process of interaction in intimate groups (Agnew et al., 2009; Cohen et al., 2010; Johnson et al., 2009).

The learning process within the groups involves the same mechanisms, whether a person is learning criminality or conformity (Donegan and Ganon 2008; Palmer 2012; Power 2013). Along these lines, the fraud triangle can be used to explain the scandal as pressure placed on managers and traders in intimate groups, and not simply as financial incentive to manipulate the rates to make the banks' financial statements appear stronger and more viable to their competitors and stakeholders (Agnew 1992; Brazel et al., 2009; Dechow 1996; Erickson et al., 2006; Johnson et al., 2009; Merton 1938; Schuchter and Levi 2015).

The second theoretical contribution, and an important first step in advancing the scope of the opportunity leg of the fraud triangle, is that analysis needs to step out of the ontological box of weak internal controls, delve into the control systems and peel back the layers to reveal the rot that lies beneath the surface (Albrecht et al., 2012; Bell and Carcello 2000; Dorminey et al., 2010; Fleak et al., 2010; Lokanan, 2015; Power 2013; Strand Norman et al., 2010). One such rot that was explicit in the LIBOR fraud is that the percentage of outside directors in the banks and number of board members on the banks' audit committee points to collusion to engineer a precise rate. The collusive nature of fraud can be thought of as "opportunity" (e.g., see Boyle et al., 2015; Davis and Pesch 2013; Free and Murphy 2013; Hogan et al., 2008; LaSalle 2007; Lokanan 2015; Murphy and Free 2016; Neu et al., 2013b; Trompeter et al., 2014). Being involved with a group that accepts fraud as part of the culture of the organization may predispose the individual to becoming criminogenic and commit a fraudulent act (Dellaportas 2013; Gabbioneta et al., 2013; Neu et al., 2013a; O'Connell 2004; Schuchter and Levi 2015). Collusion can provide important means through which opportunities for committing fraud become apparent to managers and traders (e.g., see Boyle et al., 2015; Braithwaite 2013; Brazel et al., 2009; Cullinan 2004; Dellaportas 2013; Knaap and Knaap 2001; Mitchell, Sikka and Willmott 1998; Stuebs and Wilkinson 2010). This embodies a reified view in which group trust and loyalty work to cement a group together and further equips individuals in the group with the general information and technical skills needed to commit fraud (Brazel et al., 2009; Dellaportas 2013; Gullkvist and Jokipii 2013; Murphy and Dacin 2011).

The third theoretical contribution "provides additional insights into the attitude/rationalization side of the fraud triangle" (Murphy and Dacin 2011, 614; also see Lokanan 2015; Murphy 2012; Schuchter and Levi 2015). The rationalization leg has long been an area of concern for fraud fighters (Dorminey et al., 2010; Lokanan 2015). Both the rationalization proxies (audit change and unqualified audit opinion) employed in this model were not significant in predicting fraud in banks. This finding points to other possibilities that may contribute to financial fraud in banks. One possibility is that the traders-submitters tasked with setting the LIBOR rate demonstrate a range of attitudes (some favorable and some unfavorable) towards obeying the laws and committing fraud. The analysis presented so far shows that when the motivation and opportunities are present, individuals may acquire attitudes that are favorable to rule breaking, rather than unfavorable ones, and rationalize their behavior as acceptable (Albrecht et al., 2004; Anand et al., 2004; Ashforth and Anand 2003; Mayhew and Murphy 2014; Neu et al., 2013a; Palmer 2012). In other words, rate rigging emerges when managers and their inner circle of traders, traders-submitters, and brokers are exposed to messages favoring fraud and provide easy rationalizations for them to justify their misconduct (e.g., see Choo and Tan 2007; Erickson et al., 2006; Neu et al., 2013a). As such, the paper contributes to a wider body of literature on fraud and further enhances our understanding of the constructs that can be used to measure the rationalization leg of the fraud triangle (Ashforth and Anand 2003; Dechow et al., 1996; Lokanan 2015; Morales et al., 2014; Murphy 2012; Murphy and Dacin 2011; Schuchter and Levi 2015).

Practically, the model could prove useful for auditors to predict fraud in banks. This can be done by employing the proxies for the pressure variable (profit margin) and the three opportunity variables (percentage of outside directors in the banks, number of board members on the banks' audit committee and the banks' involvement in litigation) with the understanding that the model is built on the total population of banks that make up the LIBOR and that its current accuracy is about 69% for prediction of fraud (based on the classification in Table IV).

In this regard, the logistic regression model employed in this paper aligned with other commonly used and researched fraud detection techniques (West, Bhattacharya, and Islam, 2015). Like decisions trees, neural networks, Bayesian models, and Benford's law for fraud detection (computational intelligence -based approaches), logistic regression is a well-established method because it allows investigators to use a control group to test for fraud. Whereas computational intelligence-based approaches scored high on accuracy, sensitivity, and specificity in fraud detection (West et al., 2015), Bhattacharyya, Jha, Tharakunnel, and Westland (2011) in their work showed that logistic regression, vector machines, and random forests all performed significantly better at detecting fraudulent transactions from legitimate ones and were slightly less sensitive. Even though their performance differs, both the statistical and the computational approach can detect financial frauds with reasonable accuracy and can adapt to situations, which take into consideration contextual factors to defeat the evolving tactics of prospective fraudsters (West et al., 2015).

In this regard, the paper expanded on the nuances of the elements of the fraud triangle towards fraud detection. The concern here is with knowledge and knowledgably of the external auditors who oversaw assessing the risk of material misstatement, fraud and illegal acts of the banks involved in the LIBOR fraud (Bell and Carcello 2000; Gabbioneta et al., 2013; Knaap and Knaap 2001; Mohd-Sanusi et al., 2015; Neu et al., 2013b; Rezaee 2005; Sikka 2010). The external audits of the banks' financial reports were performed by some of the most highly respected Big Four accounting firms. Yet, the audited statements raise questions about the audit techniques and assessment methodology employed by auditors in their engagements (e.g., see Boyle et al., 2015; Cullinan 2004; Knaap and Knaap 2001; McKenna 2012; Rezaee 2005; Sikka 2010). One would have thought that auditors "should have been alerted to the possibility of market manipulation from around 2008 but did not appear to raise the LIBOR submission process to a 'high risk' category in their audits" (McConnell 2013, 88). Why this is so true is not yet known. It could be that the auditors were negligent and performed no audit at all; the auditors had their heads in the sand all along; or the auditors were aware of fraud and illegal acts and chose not to report them (e.g., see Knaap and Knaap 2001; Sikka2010). If the external auditors were guilty of any one of the above, the audit profession in general will do well to move away from the narrow realist stance of what constitutes an audit and employ the proxies that were found to be significant in this paper in their engagement (also see Baucus and Near 1991; Beasley 1996; Beasley et al., 2000; Beneish 1997; Erickson et al., 2006; Farber 2005; Johnson et al., 2009; Murphy and Free 2016; Skousen et al., 2015).

In fact, the understanding of the responsibilities of the auditor and the limitations of an external audit needs further clarifications. Auditors do not guarantee that there will be no errors of fraud in an audit. They do not check all transactions, balances, and disclosures; they make inferences based on data samples (Smieliauskas and Bewley, 2012, pp. 38-39). This exhibits the expectation gap between the public and auditors' responsibilities.[6] Internal auditing standards give broad outlines for audit procedures to gather evidence: inspection, observation, inquiry, and confirmation (p. 39). International Standards Auditing (IAS) and Generally Accepted Auditing Standards (GAAS) for example, clarify auditors' responsibilities in relation to fraud detection in their audit of financial statements. Auditors are responsible for performing procedures to obtain evidence about the amounts and disclosures in financial statements. The procedures selected, depends on the auditor's "professional judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error" (p. 40). GAAS requires auditors to exercise due diligence in their audit engagements; but, does not guarantee that the financial statements will be free from fraud.

This epistemic frame considers the autonomous calculation of financial reports as well as engages in more meaningful empirical analysis (Abolafia 1996; Ashford and Anand 2003; Carcello and Nagy 2004; Carrier 1997; Lie 1997; Skousen et al., 2016) of the items that shape banks' financial reporting (Beasley et al., 2000; Donegan and Ganon 2008; Farber 2005; Murphy and Dacin 2012). Along these lines, auditors are urged to place greater emphasis on these financial and governance measures to enhance their ability to detect and prevent fraud (Cohen et al., 2010; Martin 2007; Murdock2008). In doing so, auditors will not be simply signing off on "duff dockets" that produce narrowly hegemonic views of financial statements (Sikka 2010); rather, they are encouraged to use the fraud triangle in a manner that will allow them to become active players whose audit reports will shape the organizational culture, and

[6] I would like to thank one of the anonymous reviewers for this point.

focus on financial measures that have been tested and verified on issues related to fraud and fraud risks (Loebbecke et al., 1989; Moosa 2007; Mohd-Sanusi et al., 2015; Power 2103; Roussy 2015; Turner et al., 2002; Vermeer 2002).

Model Limitations and Suggestions for Future Research

The conclusion presented in this paper is subject to a number of limitations that provide opportunities for future research. First, most of the banks involved in the LIBOR fraud were some of the largest banks in their respective countries. As such, it was, at times, not at all possible to match these banks based on size and revenues. In cases where matching was not possible based on size, revenue, and industry code, the matching criteria were relaxed to include banks that were involved in interest rate submission and sold similar financial products (see Beasley 1996; Farber 2005). These processes allowed for a match of the LIBOR banks involved in fraud with a matched sample of banks not involved in fraud based on their contributed rates. For banks that fall into this category, matching was done based on a rate within ± 2 percent in the year preceding the fraud detection (e.g., see Erickson et al., 2006; Farber 2005; Johnson et al., 2009).

Moving forward, it would be useful for future research to investigate financial fraud in banks using the same methodology employed in this research. The article developed proxies for pressure, opportunity, and rationalization. Even though only two of the variables were statistically significant at (five and ten percent), the paper can pave the way for other researchers to develop measures for the elements of the fraud triangle, which can be expensive and logistically unattainable for empirical fraud research. Perhaps a larger set of data utilizing other proxies for pressure, opportunities, and rationalization, if available, that produced similar results would provide more confidence in the current model's accuracy. Because there are only thirty-two observations, this is considered a small set of data and if there were more fraud banks available matched with non-fraud banks, it is possible that the model might behave differently. In other words, this analysis only applies to the data for LIBOR, and may not apply to banks globally.

Second, one of the weaknesses of this study is our inability to come up with valid proxies to measure the rationalization leg of the fraud triangle. Research on the rationalization leg of the fraud triangle has often come up short in identifying the rationalization element (see Cooper et al., 2013; Dorminey et al., 2010; Hogan et al., 2008; Lokanan 2015). This lack of clarity has, in effect, offered little guidance to auditors in their engagement (Murphy 2012). The fraud triangle framework, as it is presented in this paper, seeks to measure the rationalization leg by using proxies such as audit change in two years prior to the fraud and unqualified or unqualified opinion with additional language in the year the fraud was discovered. However successful these measures have been in previous studies on financial fraud (Beneish 1997; Skousen et al., 2015; Vermeer 2003), much still needs to be done to fully comprehend the inherent relationship between rationalization and financial fraud in banks. Future research should take stock of these concerns and consider developing new insight into the characteristics of banks (and corporations) to identify measures that will serve as reliable and valid indicators of the rationalization leg of the fraud triangle.

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Appendix A

Fraud Risk Factors	Variables	SAS No. 99 Categories
Pressure	GPM	Financial Stability
	Growth in sales	
	Growth in assets	
	Total assets	
	Recurring cash flow	
	Total debt to total asset	External Pressure
	Leverage	
	Insider ownership	Personal Financial Need
	Return on common equity	
	Return on common equity	
	Return on asset	Financial Targets
	Return on equity	
Opportunity	Net interest income	Nature of Industry
	Tier 1 capital ratio	
	Percent outside directors	Ineffective Monitoring
	Financial experts on audit committee	
	Percent board members on audit committee	
	Independent audit committee members	
	CEO as chair (Duality)	Complex Organizational Structure
	CEO sits on other committees	
	Current legal proceedings	Internal Control Deficiencies
	Whistle-blowing policies	
Rationalization	Audit change	Quality of External Audit
	Unqualified opinion	

Tables

Table I: Descriptive Statistics on Independent Variables in the Dataset

Field	Min	Max	Mean	Std. Dev	Valid
PROF_MARGIN	-71.000	45.600	16.559	20.115	32
SALES_GROWTH	-14.900	64.000	14.641	13.969	32
ASSET_GROWTH	-0.350	65.000	17.030	14.689	32
BS_TOT_ASSET	32042.000	65506814.000	4300330.228	13135722.456	32
NET_CHANGE_CF	-382444.000	52508.000	-20073.675	84142.589	32
FNCL_LVRG	1.900	55.000	24.158	15.095	32
TOT_DEBT_TO_TOT_ASSET	10.000	97.000	41.044	25.634	32
PCT_INSIDER_SHARES_OUT	0.000	0.850	0.106	0.173	32
ROCE	-9.100	26.700	10.400	7.709	32
NET_INC	-20.600	162.400	18.475	35.903	32
ROA	-0.200	11.300	1.060	1.979	32
ROE	-7.100	30.600	11.236	7.733	32
NII PRIOR YEAR	-14.100	65.800	14.431	16.016	32
T_1_CAPITAL	2.400	21.100	9.603	3.736	32
PERCT_OUT_DIR	13.000	100.000	68.312	28.384	32
FIN_EXP_AC	0.000	1.000	0.656	0.483	32
BOM_AUD_COM	0.000	8.000	3.594	2.408	32
IND_AUD_MEM	0.000	100.000	48.469	40.243	32
CEO_CHAIR	0.000	1.000	0.281	0.457	32
CEO_COMM	0.000	1.000	0.531	0.507	32
LEG_PRO	0.000	1.000	0.719	0.457	32
WHIS_BLOW_POL	0.000	1.000	0.312	0.471	32
AUD_CHANGE	0.000	1.000	0.812	0.397	32
UNQUAL_OPIN	0.000	1.000	0.562	0.504	32

Table II: Descriptive Statistics on Independent Variables in the Dataset—By Non-Fraud Banks and Fraud Banks

Field	Mean Non-Fraud	Mean Fraud	Difference in Means	Std. Dev – Non-Fraud	Std. Dev Fraud	Difference in Std. Dev
PROF_MARGIN	22.925	10.194	12.731	12.24	24.494	-12.254
SALES_GROWTH	17.037	12.244	4.793	16.564	10.8	5.764
ASSET_GROWTH	16.825	17.234	-0.409	15.31	14.54	0.77
BS_TOT_ASSET	3101762.4	5498898	-2397135.6	9849199.6	16016434	-6167234.2
NET_CHANGE_CF	30483.106	9664.244	-20818.862	107635.15	53060.943	54574.206
FNCL_LVRG	22.319	25.998	-3.679	15.107	15.346	-0.239
TOT_DEBT_TO_TOT_ASSET	45.5	36.588	8.912	29.566	21.013	8.553
PCT_INSIDER_SHARES_OUT	0.137	0.076	0.061	0.228	0.09	0.138
ROCE	11.731	9.069	2.662	7.994	7.426	0.568
NET_INC	23.856	13.094	10.762	48.037	17.165	30.872
ROA	0.744	1.377	-0.633	0.56	2.75	-2.19
ROE	11.681	10.791	0.89	7.298	8.361	-1.063
NII PRIORYEAR	17.85	11.013	6.837	19.098	11.852	7.246
T_1_CAPITAL	8.775	10.431	-1.656	2.97	4.308	-1.338
PERCT_OUT_DIR	55.75	80.875	-25.125	28.212	23.073	5.139
FIN_EXP_AC	0.688	0.625	0.063	0.479	0.5	-0.021
BOM_AUD_COM	4.375	2.813	1.562	2.029	2.562	-0.533
IND_AUD_MEM	43.625	53.312	-9.687	39.532	41.642	-2.11
CEO_CHAIR	0.188	0.375	-0.187	0.403	0.5	-0.097
CEO_COMM	0.5	0.562	-0.062	0.516	0.512	0.004
LEG_PRO	0.562	0.875	-0.313	0.512	0.342	0.17
WHIS_BLOW_POL	0.25	0.375	-0.125	0.447	0.5	-0.053
AUD_CHANGE	0.75	0.875	-0.125	0.447	0.342	0.105
UNQUAL_OPIN	0.5	0.625	-0.125	0.516	0.5	0.016

Table III: Means of Independent Variables by Fraud/Non-Fraud

Field	Non-Fraud Banks	Fraud Banks	Importance
PROF_MARGIN	22.925	10.194	0.927 Marginal
SALES_GROWTH	17.037	12.244	0.660 Unimportant
ASSET_GROWTH	16.825	17.234	0.061 Unimportant
BS_TOT_ASSET	3101762.425	5498898.031	0.386 Unimportant
NET_CHANGE_CF	-30483.106	-9664.244	0.507 Unimportant
FNCL_LVRG	22.319	25.998	0.500 Unimportant
TOT_DEBT_TO_TOT_ASSET	45.500	36.588	0.666 Unimportant
PCT_INSIDER_SHARES_OUT	0.137	0.076	0.669 Unimportant
ROCE	11.731	9.069	0.663 Unimportant
NET_INC	23.856	13.094	0.595 Unimportant
ROA	0.744	1.377	0.626 Unimportant
ROE	11.681	10.791	0.250 Unimportant
NII PRIORYEAR	17.850	11.012	0.767 Unimportant
T_1_CAPITAL	8.775	10.431	0.785 Unimportant
PERCT_OUT_DIR	55.750	80.875	0.990 Important
FIN_EXP_AC	0.688	0.625	0.279 Unimportant
BOM_AUD_COM	4.375	2.812	0.935 Marginal
IND_AUD_MEM	43.625	53.312	0.495 Unimportant
CEO_CHAIR	0.188	0.375	0.748 Unimportant
CEO_COMM	0.500	0.562	0.267 Unimportant
LEG_PRO	0.562	0.875	0.949 Marginal
WHIS_BLOW_POL	0.250	0.375	0.538 Unimportant
AUD_CHANGE	0.750	0.875	0.619 Unimportant
UNQUAL_OPIN	0.500	0.625	0.508 Unimportant

Table IV: Regression Classification Table for Fraud/Non-Fraud

Classification Table(a)					
			Predicted		
			FRAUD		Percentage Correct
	Observed		0.0	1.0	
Step 1	FRAUD	0.0	13	3	81.3
		1.0	5	11	68.8
	Overall Percentage				75.0

Table V: Pseudo R-square Values

Pseudo R-Square	
Cox and Snell	.387
Nagelkerke	.517
McFadden	.354

Table VI: Regression Parameter Estimates for Filing

Parameter Estimates									
								95% Confidence Interval for Exp(B)	
FRAUD(a)		B	Std. Error	Wald	df	Sig.	Exp(B)	Lower Bound	Upper Bound
1.0	Intercept	-1.335	1.793	.555	1	.456			
	PROF_MARGIN	-.032	.032	1.024	1	.312	.968	.910	1.030
	PERCT_OUT_DIR	.036	.019	3.836	1	.050	1.037	1.000	1.075
	BOM_AUD_COM	-.463	.254	3.327	1	.068	.629	.383	1.035
	LEG_PRO	1.482	1.070	1.919	1	.166	4.401	.541	35.825
a. The reference category is: 0.0.									