


# The Effect of Agency Problem and Internal Control on Credit Risk at Commercial Banks in Vietnam

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## ABSTRACT

This study examines the effect of agency problem and internal control on credit risk under corporate governance theory at Vietnamese joint-stock commercial banks. Using the quantitative methods, including pooled Ordinary Least Squares, Fixed Effect Model, and Random Effect Model, this paper shows that the agency problem is a statistically significant variable. That means it is considered the most practical mechanism in corporate governance for controlling credit risk. Besides, the findings also highlight the importance of internal control components to monitor and mitigate credit risk.

## KEYWORDS

Agency Problem, Credit Risk, Joint-Stock Commercial Banks, Ownership, State-Owned Banks, Vietnam

## 1. INTRODUCTION

Commercial banks are the crucial financial intermediary, which their operation will significantly affect the benefits of stakeholders. Therefore, when making investment activities, such as lending, leasing, commercial banks need to ensure the interests of related parties, especially owners, managers, and other parties. Empirical research studies tend to focus either on the disciplinary in extending shareholders' value or owner-manager agency problems because these issues may lead to the consequences of inefficiency and bankruptcy in the banking sector. From the practical point of view, owners' constraints have related to management and operation ability. It is compulsory to hire managers to deal with entity activities, including increasing performance and earning per share steadily. The managers' presence in the entity has accelerated the conflicts of interests between owners and managers (Shah, 2014). That is considered a platform of agency theory found by Jensen and Meckling (1976) and developed later by Fama & Jensen (1983). A bank manager is appointed to run day-to-day business operations through the management and supervision of risks incurring in those activities.

Credit granting to customers is one of the important activities in the banking sector. Although there has been a shift from credit activities to non-credit activities, the generated income from loans still substitutes a large proportion of the total income. Therefore, credit risk is always a concern of bank managers, economists, and researchers. According to Arunkumar and Kotreshwar (2005) study, credit risk accounts for 70% of bank risk in general, while the remaining balances include market risk

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and operational risk. So, credit risk has raised a big concern for the managers and regulators because it has created a significant domino effect on the economies in the world.

The banking system of many developed and developing countries has implemented strategies to manage and control credit risk prudently. The management objective of banks is to maximize risk-adjusted returns by maintaining credit risk at an acceptable level. The regulatory approach to credit risk management (CRM) is not always perfect; therefore, the banks need to enforce the managers' self-management rules to increase the owners' and investors' value. Besides, many studies have analyzed the impact of factors on credit risk, which are divided into two groups: macro factors and bank-specific factors. For the macro-factors, a number of domestic and foreign studies have mentioned their influence on credit risk, including gross domestic product growth, unemployment rate, industrial production index, consumer price index (inflation rate), interest rate, and growth rate of the money supply. In terms of bank-specific factors, the following factors have a significant impact on credit risk are the latency of credit risk, capital adequacy ratio, bank performance, management policies, the rule of law, accountability, credit growth, loan loss provision, quality of the bank's debt management, ownership characteristics, bank size, bank age, competition, credit risk latency, liquidity ratio, leverage, personal loan balances, total savings deposits, operating expenses.

In Vietnam, credit risk has arisen for many years and is always the top concern of researchers and banking leaders. After the global crisis, Vietnam's financial system was also affected, and credit risk increased sharply from the end of 2011 (Chau, 2017) to 2020. As of August 2019, the credit risk ratio of banks' balance sheets was 1.91%. By the end of 2019, the economy has been going down because of the impact of the infection SARS-CoV-2 (COVID-19). Since then, the ability to repay loans and cash flows in the businesses of bank-borrowing customers has been significantly impacted. Specifically, according to the State Bank of Vietnam (2020), under the impact of the COVID-19 epidemic, the non-performing loan ratio increased to 3.67% by the end of 2020 from 1.89% in 2019 (Phu Hung Fund Management Joint Stock Company, 2020). This proves that credit risk can be a danger and affect the stability and financial health of the Vietnamese banking system. So, the government issued a circular about the internal control and internal audit requirements on March 30, 2020 (Circular 06/2020/TT-NHNN) to establish effective monitoring, reporting, and internal information exchange mechanism to prevent risks and serve the appropriate and effective management and administration of credit activities.

Stemming from that problem, many studies have been conducted about factors that affect credit risk. One of those factors that plays the important role in controlling and supervising credit risk is internal control. However, the effect of agency problems on credit risk has been rarely considered, except for the study by Ellis & Jordi (2016) on European banks. They investigate the agency problem and state that corporate governance is a mechanism for improving business performance. On the platform of Ellis and Jordi's (2016) study, especially the agency problem that is still not a concern in developing countries, such as Vietnam, this paper estimates how the agency problem and internal control affect credit risk at Vietnamese commercial banks by considering the role of corporate governance, agency theory and asymmetric information theory.

In order to obtain the objective, the author tries to answer the research questions: "how do agency problem and internal control affect credit risk at joint-stock commercial banks in Vietnam? Therefore, the relevant hypotheses are as follows: agency problem positively influences on credit risk at joint-stock commercial banks in Vietnam; and internal control affects credit risk at joint-stock commercial banks in Vietnam positively.

The study is structured as follows. The first section of the research presents the theoretical framework that establishes indices for measuring the research model variables. Hence, the proposed model and research method are designed to estimate the effect of agency problem and internal control on credit risk. Based on the research findings, the conclusions are drawn. Finally, there are some limitations in this research, which creates orientation for future research.

## 2. LITERATURE REVIEW AND EMPIRICAL STUDIES

### 2.1 Literature Review

#### 2.1.1 Corporate Governance

Corporate governance is a mechanism to describe and evaluate the performance of an organization and the reliability of its management, especially in the current dynamic and globalized economic environment (Suhaimi et al., 2017). Poor corporate governance, including lack of responsibility, lack of risk management skills, low corporate social responsibility, tax non-compliance, and weak internal control, will pose risks to the organization that reduces the reputation of the organization and increase fraud and moral hazard (Salin & Abidin, 2011; Omar et al., 2016; Norbit et al., 2017; Salin et al., 2017; Nawawi & Salin, 2018; Karim et al., 2018). On the other hand, an effective corporate governance mechanism will promote transparency and reliability of financial statements as well as improve the quality of financial statements, thereby improving investment efficiency (Jais et al., 2016; Husnin et al., 2016; Salin et al., 2017). It means that effective corporate governance will lead to better economic and investment decisions, which will raise the company's value (Chen & Shapiro, 2011).

The Basel Committee on Banking Supervision (BCBS) (2010) emphasized that "the practice of effective corporate governance is essential to achieving and maintaining public confidence in the banking system." To date, most of the research has focused on developed countries, and relatively little is known about corporate governance and its role in the banking industry. Donaldson (1990) asserts that corporate governance is the structure whereby the board of directors' management controls the top level of management in an organization through monitoring programs and other binding policies. Tricker (1994) also argues that a board of directors should include the owners and all those interested in a company's work or financial health, such as creditors, loan funders, analysts, and business managers. Shleifer and Vishny (1997) argue that a specific corporate governance structure represents how the sponsors (creditors, shareholders, investors) invest. Monks and Minow (2012) argue that corporate governance is the relationship between different participants of an organization, affecting the direction and effectiveness of the corporation. The main participants in the company are the stakeholders, the management, and the board of directors. According to independent resource theory and management theory, the purpose of corporate governance is to ensure that resources are used as efficiently as possible by the responsibilities and interests of individuals, corporations, and communities. Corporate governance is a system or structure that provides guidelines for directing and controlling business activities.

#### 2.1.2 Agency Theory

The agency theory suggests that corporate governance can reduce agency costs, which in turn leads to aligning the interests between the principals and agent, hence bank performance can be improved. In the entity, the managers' presence has accelerated the conflicts of interests between owners and managers (Shah, 2014). That is considered a platform of agency theory that Jensen and Meckling has found (1976) and developed later by Fama and Jensen (1983). They have empirically shown how to assign shares between managers and owners. It means the managers must reconcile the shareholders' different interests.

However, the problem of representatives is not only limited to the relationship between the owner and the manager, but it also involves other parties (stakeholders). So, finding out actual causes and remedies for this problem is a concern by researchers. Jensen and Meckling (1976) argue that it could minimize the agency problem if the owners and managers can cooperate for supervision and closely control the organizational operations; otherwise, this problem can negatively affect organizational value (Ang, Cole & Lin, 2000). Eisenhardt (1989) emphasizes that an appropriate governance system can reduce conflicts that belong to the agency problem. Some of the regimes are applied to

minimize inconsistencies in the relationship between owners and managers includes leverage ratio and debt (Frierman & Viswanath, 1994); executive compensation (Core, Holthausen & Larcker, 1999); blockholders (Burkart, Gromb, & Panunzi, 1997); and dividends (Jensen, 1986; Myers, 2000; Park, 2009). One of the significant regimes to deal with agency problems that the author uses for this research study is the convention of third-party (leverage or debtholders) because it can reduce the agency costs, which affect the stakeholders' interests.

According to Letza et al. (2008), managers focus on maximizing shareholder value if it does not conflict with their interests. Therefore, this pushes managers easily to violate business ethics and frauds during their management. To prevent such events, the banks need to enforce internal control rigidly. When this system works effectively, it can minimize the losses and risks that occur in the bank.

Both principals and agents have different interests in the corporation, and this issue could be minimized by using appropriate mechanisms to limit the conflict of interest between the two parties. Also, the banks can establish appropriate remedies for managers and set up effective monitoring mechanisms to limit the managers' abnormal behaviors and self-interest. Most research studies about credit risk in the banking sector focus on CRM with different models to evaluate credit risk rather than internal control mechanisms (Ellis & Jordi, 2015).

According to the agency theory, creditors or related parties will have mechanisms to control and supervise, even participate in the bank's board of directors, and monitor and supervise performance efficiency. Credit granting is one of the most profitable investment activities for banks, so banks are forced to be more cautious in the lending process under those strict inspection and supervision mechanisms. It means that the banks will reduce the credit risk arising in lending to their customers as much as possible. Effective risk management means:

1. The bank has a good debt management and control process.
2. The review and appraisal process must be specific and rigorous, and the credit officers performing this task must be seasoned, prudent, and independent from the economy or with customers when participating in appraisal (control procedures in internal control).
3. All levels of management (head of the department, head/deputy head of department, and board of directors) must be capable and skilled in checking, monitoring, and approving loans.

### **2.1.3 COSO Framework**

However, currently, the benefit of stakeholders could be ensured if internal control is implemented effectively. It means using a combination of the five components of internal control could enhance information more reliably and transparently. Besides, stakeholders must be more cautious about their investments to avoid losing the owners' value in a case lacking reliable information disclosure because of fraud, error, or collusion in any organization (Rittenberg & Schwieger, 2001).

In 1992, COSO mentioned an internal control framework. Internal control provides a reasonable assurance of achievement, efficient operations, reliable financial reporting, and compliance with laws and regulations influenced by the board of directors, managers, and other organization staff (COSO, 1992). Based on Basel, Lakis and Giriunas (2012) define internal control as part of corporate governance systems that enhance the organization's success and eliminate fraud and mistakes in banks. With the overwhelming number of unintentional and fraudulent errors in organizations, all five internal control components, such as environment control, risk assessment, control activities, information and communication, and monitoring, become valuable instruments. Besides Basel (2010), international auditing standards have stated that internal controls are a process developed by the board of directors, executives' officers, managers, and authorities. The process has ensured that all organization objectives for preparing the financial statements and other reports are accurate, reliable, and effective. All activities and personnel in banks must adhere to laws and regulations (Briciu et al., 2014).

Generally, internal control aims to minimize the loss of revenue, waste of resources, and unforeseen losses in the future (Abbas & Iqbal, 2012). Internal control can reduce information asymmetry, promote transparency, and provide shareholders with protection against the power of managers (Salhi & Boujelbene, 2012). Ellul and Yerramilli (2011) argue that institutions with substantial internal risk control could survive financial crises. Banks' managers often aim to follow and invest in risky assets (such as credit activities) to get higher expected returns. According to the rule of thumb, higher expected returns are associated with higher risks in an investment (Cowen & Tabarrok, 2018). Particularly in the banking sector, lending activity is considered one of the riskiest investment businesses. When credit risk occurs in various forms, it will affect the banks' performance at different levels. Although many solutions overcome and mitigate credit risk, which commercial banks implement, credit risk still exists. Therefore, the most efficient way bank managers limit and control credit risk are by strictly applying the internal control protocols. Also, internal control will become a valuable tool to alleviate an agency problem within the organization in several fields, including the banking sector.

#### **2.1.4 Asymmetric Information**

Agency problems are caused by a misalignment of interests between principals and agents (Jensen & Meckling, 1976). Because of asymmetric information, the principals are unable to monitor and measure their agents' behavior, so agency problem cannot be solved perfectly. Information asymmetry is defined by Klein et al. (2002) as the amount of unbalanced information managers have in comparison to other outside parties. As a result, this problem creates differential competing interests among the various groups (Morgado & Pindado, 2003). Therefore, corporate governance, which is a mechanism to execute the ultimate power of the board of directors, aims to limit agency costs through the control of managerial actions and the reduction of information asymmetry borne by them (Deshmukh, 2005; Rutherford & Buchholtz, 2007; Chen et al., 2007, 2010). They point out that shareholder benefits are impaired in companies with ineffective corporate governance from boards of directors. Consequently, they attempt to seek the appropriate corporate governance to increase information transparency and enhance the efficiency of their investments.

### **2.2 Previous Research Studies**

Olatunji's (2009) study in Nigeria focused on the impact of internal control systems in the banking sector. The center of the article is internal control and frauds found to be related to operational risk. Lakis & Giriunas (2012) did a similar study and concluded that internal control is a measure to deal with fraud.

The research conducted by Ellis and Jordi (2015) outlined the impact of internal controls on credit risk at banks listed in Spain. Afterward, they concluded that internal control systems were applied, but their effects were not guaranteed.

After the study was conducted in 2015, Ellis and Jordi (2016) continued to research a broader scope in European banks to investigate the relationship between internal control and credit risk. This study aimed to look for the effectiveness of internal control mechanisms and make the investigation whether there is evidence of agency problems that occur in banks in Europe or not. Research has also identified the effectiveness of internal controls. Moreover, internal controls have been identified as a valuable tool to reduce credit risk. Moreover, statistically significant variables (agency problem) were confirmed to correlate with credit risk positively.

## **3. RESEARCH METHOD AND PROPOSED MODEL**

### **3.1 Research Method**

The study applies the least-squares methods of fixed effects (FE) and random effects (RE) models for measuring the effect of agency problems on credit risk at Vietnamese joint-stock commercial

banks. Then, the author applies Hausman Test to decide whether the FE model has been preferred over the RE model or not.

For this research, secondary data is used for data collection of selected joint-stock commercial Banks in Vietnam. We focus on a total of 31 joint-stock commercial banks in Vietnam from 2009 to 2019. Hence, a panel data includes 341 observations ( $11 * 31 = 341$ ). Besides, the data uses in our research are obtained from the consolidated financial statements and annual reports of those banks and Fiinpro database.

### 3.2 Proposed Model

The research paper applies a quantitative approach to empirically examine the possible nexus between internal control and credit risk. Based on the earlier research, e.g., Ellis and Jordi (2015, 2016), the author constructs a model in which credit risk is a function of internal control and other explanatory variables. In addition to internal control, the author also includes the function and the factors that may affect credit risks, such as agency problem, bank-specific factors, and macroeconomics factors. The proposed model is as follows:

$$Credit\ risk_{it} = \alpha_0 + \alpha_1 Agency\ problem_{it} + \sum \alpha_i Internal\ control_{it} + \sum \alpha_j Bank\ characteristics_{it} + \sum \alpha_k Macroeconomics_{it} + \varepsilon \quad (1)$$

The proposed model 2 is modified from the equation 1 as follows:

$$cr_{it} = \alpha_0 + \alpha_1 ap_{it} + \alpha_2 ce_{it} + \alpha_3 ra_{it} + \alpha_4 ca_{it} + \alpha_5 ic_{it} + \alpha_6 mo_{it} + \alpha_7 cir_{it} + \alpha_8 size_{it} + \alpha_9 lev_{it} + \alpha_{10} gdp_{it} + \alpha_{11} inf_{it} + \varepsilon \quad (2)$$

where *cr* is credit risk; *ap* is agency problem; *ce* is control environment; *ra* is risk assessment; *ca* is control activities; *ic* is information and communication; *mo* is monitoring; *cir* is cost-to-income ratio; *size* is bank size; *lev* is leverage ratio; *gdp* is gross domestic product; *inf* is inflation rate.

#### 3.2.1 *cr: Credit Risk*

Credit risk is defined as the risk of a borrower cannot pay principals and interests on time. According to Kolapo et al. (2012), credit risk plays such an important role in banks' financial performance since an enormous chunk of banks' revenue accrues from loans that will generate the interest margin. This risk includes the level of non-performing loans, problem loans, or loan loss provision (Jimenez & Saurina, 2006).

Credit risk is the possibility that a bank borrower or counterparty will default on agreed-upon terms. There is always a chance that a bank borrower will default on his or her loan, resulting in credit risk exposure or financial losses, referred to collectively as non-performing loans (Nocco & Stulz, 2006). Credit risk is also defined as the possibility that a contractual party will fail to fulfill its obligations under the agreed terms. Credit risk is referred to as counterparty risk, default risk, or performance risk (Brown, Ken & Moles, Peter, 2016). According to Rufai (2013), non-performing loan ratio (NPLR) proxied credit risk. Consistently, the most common measure used to measure credit risk is the non-performing loans ratio (Thalassinios & Stamatopoulos, 2015; Rupeika-Apoga et al., 2018; Morina, 2020).

#### 3.2.2 *ap: Agency Problem*

From a practical standpoint, owners' constraints are related to their ability to manage and operate their businesses. It is mandatory to hire managers to oversee entity operations, including steadily increasing

performance and earnings per share. The presence of managers within the entity has exacerbated conflicts of interest between owners and managers (Shah, 2014). That is regarded as a foundation for agency theory established by Jensen and Meckling (1976) and later developed by Fama & Jensen (1983). The complications that arise when a principal assigns a task to an agent. The agency problem occurs when the principal and agent have conflicting objectives, there is asymmetry of information, and the contract is incomplete. Due to the asymmetry of the information, the principal can not monitor the agent ideally, and the incomplete contract makes it impossible to predict what will happen in all possible contingencies. As a result, the principal can not ensure that the agent always chooses the action the principal desires. Agency theory dictates how contracts should be structured to mitigate these issues to the greatest extent possible.

Additionally, Jensen & Meckling (1976) demonstrated empirically how to allocate shares between managers and owners. This requires managers to reconcile the shareholders' conflicting interests. There are two types of shareholders: insiders who control the company and have exclusive voting rights and non-voting shareholders. Additionally, these categories received equal dividends per share. On the other hand, insider shareholders always hold a more significant percentage of shares, thereby creating disparities between insider and outsider interests under insider control, enhancing their benefits (Han & Suk, 1998). Insiders with significant equity stakes (institutional and individual investors) acquire more influential and critical voting rights, enhancing their ability to pursue personal goals. Managers are concerned with allocating resources so that the organization's strength, prestige, and advantages are maximized. As a result, these elements contribute to causes of interest misalignment between internal and external shareholders. In comparison, insider ownership serves a secondary purpose of resolving disputes with those agencies.

Insider or managerial ownership refers to the executives' or management's ownership of the company's stock or shares. Management may take moral risks by pursuing personal interests or making suboptimal investments and other asset protection forms. Insider ownership (alternatively called managerial ownership) is a type of compensation used to align the conflicting interests of the firm's principal (shareholders) and agent (management) (Darabos, 2014; Fama & Jensen, 1983; Hagendorff et al., 2010). Loans have been the single largest contributor to assets on the balance sheets of the majority of banks (Beck & Demircuc-Kunt, 2006). Gulamhussen, Pinheiro, and Sousa (2012) discovered a non-linear 'U' shape relationship between managerial ownership and bank risks among 123 banks included in the STOXX Global Index. The researchers provide additional support for the agency theory by elucidating the relationship between managerial ownership and risk. When managers engage in such critical asset-generating activities as loan creation, they may exhibit some negative behaviors, resulting in a high level of non-performing loans on the bank's books (Andreou et al., 2017; Elyasiani & Zhang, 2018; D. Zhang et al., 2016). The authors discuss moral hazards such as how loan losses are treated in accounting, managerial trust, exploitation of a weak supervisory banking environment, and top management entrenchment. Tanaka (2016) argues that firms with a high level of managerial ownership demonstrate superior performance, have risk-taking incentives and benefit from higher yield spreads. The author concludes that the risk-shifting and entrenchment hypotheses are consistent. Darabos (2014) argues that managerial ownership is an effective strategy for balancing the owner's and manager's conflicting interests but cautions that in the long run, it may result in the over-entrenchment of executive powers in order to consolidate their position.

The agency theory explains why insider/managerial ownership is used to circumvent the agency problem. Making managers equity owners reduces the conflict of interest between agent and principal (Jensen & Meckling, 1976), which is also beneficial to the firm's value (Jensen & Meckling, 1976; Gulamhussen et al., 2012). Earlier research indicates that firms with a higher percentage of insider ownership invest in assets with lower systemic risk and rely less on debt as a component of their capital structure (Capozza & Seguin, 2003). According to Lugo (2019), the effectiveness of insider owners in minimizing agency costs and exerting control over firm resources is positively related to the extent of their ownership. According to the author, there is an inverse U-shaped relationship

between insider ownership and debt costs. Based on the preceding, we hypothesize that the agency problem has a negative correlation with non-performing loans.

In this paper, agency problem is measured by insider ownership which is the ratio of shares held by insiders investors to total number common shares issued (Ellis & Jordi, 2016).

### 3.2.3 *ce: Control Environment*

The term “control environment” refers to the integrity, system of values, and fundamental attitudes of employees toward control and management. The management philosophy, leadership style, and attitudes toward sharing and accepting responsibility are all given special consideration (European Confederation of Institutes of Internal Auditing, 2007). The control environment describes a set of standards, processes, and structures that provide the basis for carrying out internal control across the organization (Committee of Sponsoring Organizations of the Treadway Commission, 2019). Establishing an effective control environment by demonstrating integrity and ethical values, appropriate monitoring processes, adequate job segregation, and a sense of accountability for achieving objectives affects the company’s ability to withstand internal and external pressures (Ivana & Boris, 2016). The control environment establishes the tone for people within the organization to adhere to best practices, conduct business ethically, and operate within the confines of rules. According to Baysinger and Hoskisson (1990); Lipton and Losch (1992); Ahmad et al., (2015); Ahmad et al., (2015); Ellis and Jordi (2016); Lestari (2018), the author quantifies the control environment in terms of board size which will improve the enforcement of internal control mechanisms and contribute to the reduction of firm risk behavior. Board size affects the effectiveness of the supervisory board or senior management, with some reports advocating for a giant board (Chen & Al-Najjar, 2012; Uwuigbe & Fakile, 2012). As a result, the hypothesis is: “the control environment has a negative correlation with non-performing loans.”

In this paper, the control environment is measured by the size of board of directors (Baysinger & Hoskisson, 1990; Lipton & Losch, 1992; Ahmad et al., 2015; Lestari, 2018).

### 3.2.4 *ra: Risk Assessment*

Risk assessment is how businesses determine the relative importance of individual risks to achieve their overall goals. Risk assessment is all about quantifying and prioritizing risks to keep them within defined tolerance limits without sacrificing desirable opportunities. An effective risk assessment considers the extent to which identified risks affect the entity’s strategy and business objectives. The organization conducts comprehensive fraud risk assessments to identify specific fraud schemes and risks, determine their likelihood and significance, evaluate existing fraud control activities, and implement measures to mitigate residual fraud risks (Deloitte & Touche et al., 2012). According to Ellis & Jordi (2015 and 2016), risk assessment is measured by management experience, as management and board members’ expertise and experience, as well as their ability to identify, measure, monitor, and evaluate risks, go a long way toward mitigating bank risks’ consequences. So, the author hypothesizes that: risk assessment has a negative correlation with non-performing loans.

In this paper, risk assessment is measured by management experiences - Number of board members with background in finance and banking (Ellis & Jordi, 2015, 2016).

### 3.2.5 *ca: Control Activity*

Control activities are actions (generally defined in policies, procedures, and standards) that assist management in mitigating risks and ensuring objective achievement. Control activities may be proactive or investigative and may be carried out at all organizational levels. When an organization conducts a review of its process control structures, it should consider various control activities such as reconciliation, supervisory, physical, and verification controls to determine the optimal balance or combination of controls that will mitigate identified risks. Each of these control types can be designed to be either preventative or detective in nature. Mishkin (2006); Ellis and Jordi (2015



and 2016) quantified control activities using a staggered board composition policy, which aims to minimize board composition dilution, with the hypothesis that control activities have a significant adverse effect on credit risk.

In this paper, control activity is measured by credit Compliance which equal to total loan divide total deposits (Mishkin, 2006; Ellis & Jordi, 2015, 2016).

### **3.2.6 *ic: Information and Communication***

Management collects or generates information from both internal and external sources. Internal and external communication channels are used to disseminate critical information throughout and outside the organization, as necessary to respond to and support meeting requirements and expectations (Committee of Sponsoring Organizations of the Treadway Commission, 2019). Internal communication within an organization also enables senior management to demonstrate to employees the importance of control activities. The following internal control element is information and communication, which includes utilizing pertinent data and communicating both internally (to functional areas) and externally (to stakeholders) via various reports (Abbas & Iqbal, 2012). Banks build reputational capital when they are able to provide reliable information to internal and external stakeholders on time (Zhang, Zhou & Zhou, 2007). Ellis and Jordi (2015 and 2016); Zhang et al. (2007) quantify this variable by examining how quickly companies release annual reports. This means that information and communication reflect the Financial Statements' timeliness. The hypothesis is proposed that information and communication have a significant negative effect on credit risk.

In this paper, information & communication is measured by reliability of financial statement - Measured by the end of the fiscal year to the date of signing the audit report (Zhang et al., 2007; Ellis & Jordi, 2015, 2016).

### **3.2.7 *mo: Monitoring***

Monitoring activities are periodic or ongoing assessments to ensure that each of the five components of internal control and the controls affecting the principles contained within each component is present and functioning correctly. A continuous monitoring process may provide more support for assessing the adequacy and effectiveness of internal controls than scheduled monitoring that occurs periodically. Continuous monitoring typically entails automating the testing of all transactions and system activities within a given business process area instead of testing based on sampling criteria. It thus provides a more comprehensive view of portions of the control environment's status. (Committee of Sponsoring Organizations of the Treadway Commission, 2019). Monitoring entails conducting periodic and/or independent evaluations and evaluating and communicating deficiencies (McNally, 2013). Managers and the board of directors are expected to demonstrate the capacity to ensure that internal control systems are followed. The reporting of material internal control weaknesses is the managerial tool used to monitor the organization (Basel Committee on Banking Supervision, 2010). According to Ellis and Jordi (2015 and 2016); Zhang et al. (2007), this variable is examined by audit quality. The hypothesis is proposed that information and communication have a significant negative effect on credit risk.

In this paper, monitoring is measured by audit quality which is dummy variable. The variable equals 1 if audit firms are big four, audit quality equals 0 otherwise (Zhang et al., 2007; Ellis & Jordi, 2015, 2016).

### **3.2.8 *cir: Cost to Income Ratio***

The cost-to-income ratio measures a bank's management performance (Lin & Zhang, 2009; Ozili, 2017). As for the management index, when the bank effectively manages, it will maintain its operating costs relative to its operating income of less than 1. It means that the costs associated with dealing with NPLs decrease. Efficient banks have lower NPL ratios than inefficient banks (Karim et al., 2010; Louzis et al., 2012). When the bank's operating costs were adequate, the banks could control their

costs and generate income. A high cost to income ratio shows that the bank's business is ineffective, resulting from poor management in the bank (Wachira, 2017). When evaluating banking performance, capital level, nature, and composition, and cost-to-income ratio are some of the main indicators used (Bourke, 1989; Berger, 1995; Navapan & Tripe, 2003; Hess & Francis, 2004; Giokas, 2008). Numerous studies have discovered an inverse relationship between the efficiency of banks' operating costs and the number of non-performing loans (Kwan & Eisenbeis, 1997). A positive relationship between asset quality and cost-effectiveness (Berger & DeYoung, 1997) suggests an inverse relationship between NPLs and cost-effectiveness. Research results are consistent with previous studies such as Lin and Zhang (2009); Karim et al. (2010); Louzis et al. (2012). Management efficiency and the bad management hypothesis yield negative and statistically significant results on a negative and statistically significant relationship between NPLs and cost-effectiveness.

### **3.2.9 size: Bank Size**

Bank size is a proxy for bank ownership. Increased asset ownership enables banks to offer a broader range of financial services at a lower cost (Mohamad & Saeed, 2019). Numerous authors have demonstrated a relationship between bank size and non-performing loans in their research, as Salas and Saurina (2002) discovered an inverse relationship between bank size (size) and loans. Non-publications. At the same time, the authors argue that as banks grow in size, they have more opportunities to diversify their credit. The larger the bank, the more resources and tools the bank will have to forecast customer defaults and develop strategies for controlling, monitoring, and managing NPLs. Additionally, Swamy (2012); Curak et al. (2013); and Koju et al. (2018) studies concluded that a bank's size is inversely related to non-performing loans.

### **3.2.10 lev: Leverage Ratio**

Leverage ratio is an indicator of optimal capital structure, showing that banks have equity ratios and creditors. Chaibi and Ftiti (2015) demonstrate the a positive correlation between leverage ratio and NPLs. A research model by Radivojevic and Jovovic (2017) has supported the above relationship. The amount of debt shown through the leverage ratio depends on the ability of the banking system to expand its credits. Banks with a high leverage ratio tend to have higher NPLs (Muratbek, 2017). These results are similar to the results of Waqas et al. (2017).

### **3.2.11 gdp: Gross Domestic Product**

GDP growth is defined as the annual percentage growth of gross domestic product at market prices based on a constant local currency (Waqas et al., 2017). Along with the inflation factor, GDP is a macro factor affecting organizations participating in the financial market. In this study, the author focuses on the relationship between GDP and NPLs. GDP growth is also mentioned in Mileris (2012) as a macro factor affecting NPLs. Alexandri and Santoso (2015); Chaibi and Ftiti (2015) have shown that the regression coefficient of GDP for the NPLs is negative, meaning that the relationship between GDP and NPLs is in the opposite direction. The relationship between GDP and NPL ratio of the above studies is consistent with Reddy (2015); Mohanty (2018).

### **3.2.12 inf: Inflation Rate**

The inflation rate is the annual percentage growth of several popular indexes of money prices, most commonly measured by the percentage increase in the consumer price index (White, 1999). The inflation rate represents the growth rate of the price level of the economy. Macroeconomic factors, including inflation rates, are signalers of uncontrolled failures that banks face because of changes. Research by Chaibi and Ftiti (2015) has noted that macroeconomic factors have a powerful impact on the economic environment where business entities and business entities are involved in currency activities. Also, Mileris (2012) found that macroeconomic factors also influenced the quality of loan portfolio management in banks, such as GDP, inflation, interest rates, money supply, index of the

manufacturing industry. These factors can also affect the quality of portfolios in banks and other microfinance institutions. However, in the short term, neither interest rates nor inflation rates will affect NPLs (Asari et al., 2011). Festic et al. (2011) confirm that changes in the macroeconomic environment changed the quality of the loan portfolio in banks. Favorable macroeconomic conditions lead to better customer repayment ability, lower probability of default, and lower NPLs. During the recession, the probability of default increases and ratings deteriorate. Alexandri and Santoso (2015) also prove in their study that the regression coefficient of the inflation rate against NPLs is positive, meaning that there is a positive relationship between the inflation rate and NPLs.

#### 4. RESEARCH RESULTS AND DISCUSSION

The first section is dealing with the descriptive statistics and shown in Table 1.

The table of descriptive statistics of all the variables is summarized in Table 1. The mean value of credit risk is 0.046, its standard deviation, the minimum and maximum value are 0.044, 0.010, and 0.230, respectively. Regarding the Agency problem (ap), its mean value is 0.174; its standard deviation is 0.267, its minimum is 0.000, and the maximum is 0.963.

The regression model with the existence of the multi-collinearity phenomenon will cause many indices to be biased, leading to unreliability results of quantitative analysis. So, this issue needs to be tested (see Table 2).

According to Hair et al. (2011), the VIF value exceeds 4.0, or by tolerance less than 0.2, there is a multi-collinearity problem. However, some other authors argued that multi-collinearity would occur when the VIF value exceeds 10 (Montgomery et al., 2001). In this paper, VIF is less than 4.0, hence in the model, the estimates of regression coefficients are reliable and stable. That means there is no multi-collinearity problem in the model.

The next section examines the existence of heteroscedasticity and autocorrelation phenomenon. The tests for autocorrelation and heteroscedasticity will be used to claim the residuals are independent of each other and no systematic change in the spread of the residuals over the range of measured values (see Table 3).

Regarding the Wooldridge test for autocorrelation in panel data, p-value is smaller than 5%; thus, we have enough evidence to reject  $H_0$ : “There is no autocorrelation”. It means the model contains the

Table 1. Descriptive statistics

| Variable | Obs | Mean   | Std. Dev. | Min    | Max     |
|----------|-----|--------|-----------|--------|---------|
| cr       | 341 | 0.046  | 0.044     | 0.010  | 0.230   |
| ce       | 341 | 8.540  | 2.537     | 3.000  | 17.000  |
| ra       | 341 | 6.732  | 1.625     | 3.000  | 14.000  |
| ca       | 341 | 0.832  | 0.218     | 0.370  | 1.810   |
| ic       | 341 | 76.328 | 31.616    | 4.000  | 200.000 |
| aq       | 341 | 0.639  | 0.481     | 0.000  | 1.000   |
| ap       | 341 | 0.174  | 0.267     | 0.000  | 0.963   |
| cir      | 341 | -0.533 | 0.150     | -1.120 | -0.160  |
| lev      | 341 | 11.416 | 4.643     | 2.010  | 27.880  |
| size     | 341 | 32.153 | 1.206     | 28.830 | 34.940  |
| inf      | 341 | 0.074  | 0.047     | 0.010  | 0.190   |
| gdp      | 341 | 0.064  | 0.012     | 0.030  | 0.090   |

**Table 2. Test of multi-collinearity**

| Variable | VIF  | 1/VIF |
|----------|------|-------|
| size     | 2.25 | 0.45  |
| lev      | 2.24 | 0.45  |
| ce       | 1.62 | 0.62  |
| ra       | 1.49 | 0.67  |
| aq       | 1.13 | 0.89  |
| inf      | 1.12 | 0.89  |
| ic       | 1.08 | 0.93  |
| gdp      | 1.06 | 0.95  |
| cir      | 1.04 | 0.96  |
| ca       | 1.04 | 0.96  |
| ap       | 1.02 | 0.98  |
| Mean VIF | 1.37 |       |

**Table 3. Test of autocorrelation and heteroskedasticity**

| No. | Test  | F-statistic | p-values | H <sub>0</sub> |
|-----|---|-------------|----------|----------------|
| 1   | Wooldridge test for autocorrelation in panel data         | 48.877      | 0.0000   | Reject         |
| 2   | Breusch-Pagan / Cook-Weisberg test for heteroskedasticity | 6.08        | 0.0137   | Reject         |

autocorrelation problem in the model. Furthermore, p-value of variance change test (Breusch-Pagan/ Cook-Weisberg test) has a value smaller than 5%; thus, H<sub>0</sub>: “Residuals with variance unchanged” has sufficient evidence to be rejected. Therefore, the heteroskedasticity phenomenon does exist in the model.

Table 4 shows the results of 3 methods, and after conducting the appropriate tests, the FEM model is chosen and its findings are presented concretely in Table 6.

**Table 4. Results from pooled OLS, FEM, REM**

| Model  | OLS                             | FEM                                   | REM                               |
|--|---------------------------------|---------------------------------------|-----------------------------------|
| Test   | F                               | Hausman Test                          | Breusch and Pagan test            |
| Choice   | OLS & FEM                       | FEM & REM                             | OLS & REM                         |
| Null hypothesis H <sub>0</sub>   | All fixed effects are jointly 0 | The preferred model is random effects | The error variances are all equal |
| Statistical value  | F(30, 218) = 4.86               | chi2(11) = 58.28                      | chibar2(01) = 0.00                |
| p-value  | Prob > F = 0.0000               | Prob>chi2 = 0.0000                    | Prob > chibar2 = 1.0000           |
| alpha  | 5%                              | 5%                                    | 5%                                |
| Decision   | Reject H <sub>0</sub>           | Reject H <sub>0</sub>                 | Accept H <sub>0</sub>             |
| Selection  | FEM                             | FEM                                   | OLS                               |
| Conclusion: FEM model is chosen and considered for further discussions |                                 |                                       |                                   |

According to Table 5, FEM regressions show six variables that statistically significantly affect credit risk at joint-stock commercial banks in Vietnam, namely control activities; risk assessment; control environment; agency problem; cost-to-income ratio; and inflation rate.

The control environment variable, risk assessment, which are the elements of internal control, positively influence credit risk, except the control activities. This result is consistent with Chen & Al-Najjar (2012); Salhi & Boujelbene (2012); Aliyu et al. (2014). The positive correlation between control environment and credit risk demonstrates that larger board sizes are critical for ensuring a sound control environment and reducing credit risk. The control environment is the number of standards, procedures, and structures that provide the basis and premium rules for implementing internal control throughout the organization. The board of directors and senior management will focus on the importance of internal control, including expected standards of conduct and code of ethics in business, to protect the owners' interest and limit the credit risk level at an acceptable level.

The risk assessment is indexed by board expertise in finance and management experiences. According to Abbas and Iqbal (2012), organizations must be aware of their risks to achieve their objectives because they are the hinder factor and are not easy to predict accurately. A risk assessment is controlled, and well-monitored by the top management will assist the organization to avoid non-performing loans that threaten the achievement of an organization's performance (Lock, 2014). This research result is also consistent with the study by Pham et al. (2020). To prevent and assess credit risk, the Board of Directors and senior management team should address it during the risk assessment to predict the probabilities and consequences of risk events if they were to occur compared to target credit risk levels and acceptable tolerance thresholds. By managing risks, banks can deploy the resources needed to mitigate the harmful consequences.

Under the regression method, control activity is also a statistically significant variable that affects credit risk. The coefficient shows that there is a reverse relationship between control activities and credit risk. For procedures of control (Control activities), when the bank has rigid control procedures, banks will limit the credit risk. The credit extension process and credit control must comply with specific steps and strict regulations issued by banks. Banks are the most tightly regulated financial institutions because of the risky nature of their business operations (Mishkin, 2006). Not all deposits are turned into loans, one of which must be backed up to secure liquidity issues. Bank governance should be prudent and ensure the safety of bank assets (Casu et al., 2006). The Internal Control system will help ensure compliance with such regulatory requirements. Thus, the Total Loan / Total Deposit ratio is a compliance and prudence variable found in the internal control framework's work-in-control section that clearly explains the changes in credit risk. Control activities include ensuring limits of approval are observed, minimizing conflicts of interest, and ensuring division of duties (Basel, 2010).

This paper has primarily concentrated on the correlation between agency problems and credit risk, demonstrated in Lee's study. Lee (2011) has proved that insider ownership will reduce risk-

**Table 5. Regression results from FEM**

| Variables | Coef.  | P>z   | Hypothesis |
|-----------|--------|-------|------------|
| ca        | 0.079  | 0.012 | Accept     |
| ra        | 0.285  | 0.000 | Accept     |
| ce        | -0.096 | 0.000 | Accept     |
| ap        | -0.785 | 0.000 | Accept     |
| cir       | -1.193 | 0.000 | Accept     |
| inf       | 0.261  | 0.002 | Accept     |

Note: ca is control activities; ra is risk assessment; ce is control environment; ap is agency problem; cir is cost-to-income ratio; inf is inflation rate.

taking behavior by the managers and increase the firm's value. Insider investors will follow and control the bank's activities more accurately and efficiently than external investors. So, internal investors can easily access information and financial reports of the bank, and hence they can make well-informed investment decisions before all information and reports published in the market. Obviously, if corporations are governed and controlled efficiently, shareholders' value will increase significantly; hence the expectations of the other stakeholders will be obtained more. Arun and Turner (2002) mention corporate governance is the mechanism through which shareholders are assured that managers will act in their interests. This also suggests that well-governance will lead to more effective ways for managers to increase firm value by making economic and investment decisions (Chen & Shapiro, 2011).

## **5. CONCLUSION**

Using the quantitative method (pooled OLS, FEM, REM), the author determines six statistically significant variables at 5%. Those variables involve three components of internal control such as the control environment, risk assessment, and control activities. In addition, the agency problem, bank characteristics (management efficiency), and macroeconomic (inflation rate) are also significant variables in the FEM method's estimation. The findings prove that internal control is a mechanism to deal with conflict in the interests of the principal and agent.

The agency problem is a statistically significant variable that hurts credit risk. This result contradicts the study by Ellis & Jordi (2016) because the author applies corporate governance theory to explain the agency problem-credit risk relationship, such as agency theory and information asymmetry. Obviously, effective corporate governance enhances investors' performance and protects their interests. Through corporate governance, organizations can build credibility and ensure transparency and accountability that promote the company's wealth. Therefore, the agency problem is considered a mechanism to strengthen banks' health. This mechanism clearly emphasises accountability, ownership, control, compensation, and incentives in the organization.

Despite obtaining specific results, the research still suffers from particular limitations. For example, this study does not consider the existence of bank control variables or profit measurement. Therefore, future research needs to clarify the bank control variables to be more reliable and unbiased. Besides, institutional ownership and other regimes should be added to the agency problem's relationship to clarify the agency theory and establish internal control and credit risk improvement in future research. It means that institutional ownership could significantly affect the bank's efficiency in satisfying these partner interests. Finally, many previous studies use the lag of dependent variables to overcome the endogeneity when estimating determinants of credit risk. Therefore, the author recommends using the generalized method of moments (GMM) with the identification instrument variables to solve the endogeneity in the following research. Finally, the data was collected from 2009 to 2019, so the impact of COVID-19 was not included, so in the future study, this factor should be considered to clarify its impact on credit risk better.

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## APPENDIX: ADDITIONAL ITEMS

Table 6. VIF Value

| Variable | VIF  | 1/VIF    |
|----------|------|----------|
| size     | 2.25 | 0.445254 |
| lev      | 2.24 | 0.447293 |
| ce       | 1.62 | 0.618597 |
| ra       | 1.49 | 0.672769 |
| aq       | 1.13 | 0.887841 |
| inf      | 1.12 | 0.894582 |
| ic       | 1.08 | 0.925981 |
| cir      | 1.06 | 0.947114 |
| gdp      | 1.04 | 0.958175 |
| ca       | 1.04 | 0.963822 |
| ap       | 1.02 | 0.978871 |
| Mean VIF | 1.37 |          |

Table 7. List banks in the research

| STT | Code | Bank name  |
|-----|------|--|
| 1   | ABB  | An Binh Commercial Joint Stock Bank                        |
| 2   | ACB  | Asia commercial joint stock bank                           |
| 3   | BAB  | Bac A Commercial Joint Stock Bank                          |
| 4   | BID  | Bank for Investment and Development of Vietnam             |
| 5   | BVB  | Bao Viet Commercial Joint Stock Bank                       |
| 6   | CTG  | Vietnam Joint Stock Commercial Bank for Industry and Trade |
| 7   | DCB  | Ocean Bank   |
| 8   | EAB  | Donga Joint Stock Commercial Bank                          |
| 9   | EIB  | Vietnam export-import commercial joint stock bank          |
| 10  | GDB  | Gia Định commercial bank                                   |
| 11  | HDB  | Ho Chi Minh City Development Joint Stock Commercial Bank   |
| 12  | KLB  | Kien Long Joint Stock Commercial Bank                      |
| 13  | LPB  | LienViet Post Bank   |
| 14  | MBB  | Military Commercial Joint Stock Bank                       |
| 15  | MSB  | Vietnam Maritime Commercial Joint Stock Bank               |
| 16  | NAB  | Nam A Commercial Joint Stock Bank                          |
| 17  | NVB  | National Citizen Bank                                      |
| 18  | PGB  | Petrolimex Group Commercial Joint Stock Bank (PG BANK)     |
| 19  | PVF  | Vietnam Public Joint Stock Commercial Bank                 |
| 20  | SCB  | Sai Gon Commercial Joint Stock Bank                        |
| 21  | SEAB | Southeast Asia Commercial Joint Stock Bank                 |
| 22  | SGB  | Saigon Bank for Industry and Trade                         |

*continued on following page*

Table 7. Continued

| STT | Code | Bank name   |
|-----|------|---|
| 23  | SHB  | Saigon Hanoi Commercial Joint Stock Bank                  |
| 24  | STB  | Saigon Thuong Tin Commercial Joint Stock Bank             |
| 25  | TB   | Construction Bank   |
| 26  | TCB  | Technological and Commercial Join-stock Bank              |
| 27  | TPB  | Tien Phong Commercial Joint Stock Bank (TPBank)           |
| 28  | VAB  | Viet A Commercial Joint Stock Bank                        |
| 29  | VCB  | Joint Stock Commercial Bank For Foreign Trade of Viet Nam |
| 30  | VIB  | Vietnam International Commercial Joint Stock Bank         |
| 31  | VPB  | Vietnam Prosperity Joint Stock Commercial Bank            |

Table 8. Fixed effect model regression

```

Fixed-effects (within) regression               Number of obs   =       336
Group variable: BANK                          Number of groups =        31

R-sq:                                          Obs per group:
    within = 0.6471                           min         =        10
    between = 0.0255                           avg          =       10.8
    overall  = 0.2367                           max          =        11

corr(u_i, Xb)  = -0.4246                      F(11,294)       =       49.01
                                          Prob > F        =       0.0000

```

| cr       | Coef.     | Std. Err.                         | t      | P> t  | [95% Conf. Interval] |           |
|----------|-----------|-----------------------------------|--------|-------|----------------------|-----------|
| ca       | .0794424  | .0314072                          | 2.53   | 0.012 | .017631              | .1412538  |
| ra       | .2848111  | .0679312                          | 4.19   | 0.000 | .151118              | .4185043  |
| ce       | -.0962143 | .0265499                          | -3.62  | 0.000 | -.1484663            | -.0439624 |
| ic       | .0103903  | .0057894                          | 1.79   | 0.074 | -.0010036            | .0217843  |
| aq       | .0226162  | .3828739                          | 0.06   | 0.953 | -.7309048            | .7761373  |
| ap       | -.7851667 | .0589359                          | -13.32 | 0.000 | -.9011564            | -.6691769 |
| cir      | -1.193392 | .0965055                          | -12.37 | 0.000 | -1.383321            | -1.003462 |
| leverage | -.0108545 | .0522753                          | -0.21  | 0.836 | -.1137357            | .0920267  |
| size     | .0162605  | .067544                           | 0.24   | 0.810 | -.1166706            | .1491915  |
| inf      | .2609257  | .0849235                          | 3.07   | 0.002 | .0937907             | .4280606  |
| gdp      | 1.789645  | 1.307754                          | 1.37   | 0.172 | -.784101             | 4.363391  |
| _cons    | -7.756973 | 2.288877                          | -3.39  | 0.001 | -12.26163            | -3.252313 |
| sigma_u  | 5.7205165 |                                   |        |       |                      |           |
| sigma_e  | 3.0808849 |                                   |        |       |                      |           |
| rho      | .77516071 | (fraction of variance due to u_i) |        |       |                      |           |

F test that all u\_i=0: F(30, 294) = 4.58                      Prob > F = 0.0000

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