

## DOCTOR OF PHILOSOPHY

### Three essays on institutions and banking

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**Three essays on  
institutions and banking**



**By**

**Eun Kyoung Lee**

**PhD**

**July 2022**

# **Three essays on institutions and banking**

**By  
Eun Kyoung Lee**

*A thesis submitted in partial fulfillment of the University's  
requirements for the Degree of Doctor of Philosophy*

**July 2022**



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## **Abstract**

The performance of banks and their level of growth have a significant impact on the entire economy. However, only a few countries have a developed banking system and economic development. Political economy emphasises the importance of the institutional environment of each market on economic and banking performance. In particular, the theory of political institutions and the hierarchy of institutions hypothesis (HIH) refer to the role of political institutions as ultimate institutions that determine and affect other institutions, such as economic and regulatory, and their critical impact on economic and banking performance.

To investigate the relationship between institutions and banking, this study first identifies the theoretical differences between conventional and Islamic institutions; theoretical relationships between institutions and banking sectors; and the existing research performance on this topic using a systematic literature review method. Second, it empirically examines the impact of institutional environments, including political, economic, regulatory, and Islamic institutions, on bank efficiency. By conducting a panel regression analysis with a sample of 594 banks in 18 countries from 2005 to 2020, this study ascertains the connection between institutions and bank efficiency. Finally, it explores the association of institutional environments and bank liquidity creation. To achieve this aim, this study employs a cross-country analysis of 584 banks from 18 countries from 2000 to 2020.

This study offers several interesting results. First, although Islamic institutions share common aspects with conventional institutions, such as the acknowledgement of democratic values in society, they have distinct and additional institutional features. For instance, aspects such as definition, features, elements, and requirements differ in Islamic views from the conventional ones because of their sources and purposes. Consequently, the Islamic perspective on democracy is derived from the ultimate religious sources of Islam. Second, while there have been clear theoretical relationships between political, economic, and regulatory institutions and banking performance, empirical research on this issue has not been conducted well in the conventional and Islamic banking literature. Third, by means of a quantitative methodology, this study finds that political institutions positively affect both bank efficiency and liquidity creation. Fourthly, the impact of economic and regulatory institutions varies according to the presence of high-quality political institutions. This result empirically reinforces the theory of the hierarchy of institutions hypothesis (HIH) by confirming the vital and ultimate role of political institutions and their binding effect on bank performance. Finally, this study finds

that Islamic institutions positively influence Islamic bank efficiency and liquidity creation. This result empirically supports the theory of political economy and new institutional economics, which stresses the role of proper institutional environments.

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## **CHAPTER 1: INTRODUCTION**

## **1.1. Research background and motivation**

The performance and stability of the banking sector are crucial to determine the growth and development of a country's economy. (Braun & Raddatz, 2010; Imam & Kpodar, 2010; Sufian & Habibullah, 2010). However, only a few countries in the world have developed financial systems and markets and, consequently, benefit from higher economic development (Braun & Raddatz, 2010; Quintyn & Verdier, 2010). Currently, various forms, sizes, and degrees of the evolution of the banking sector are found worldwide, which are determined by various political economy factors. Political economy is an interdisciplinary field that encompasses diverse aspects of society such as sociology, history, psychology, philosophy, culture, and law (Haqqi, 2015; Rosdi, 2015). From the political economy perspective, a country's economic and financial systems should be understood within an extensive environment of society (Arndt, 1991). Since the performance, stability, and evolution of banking sectors and financial markets do not solely rely on economic factors and institutions; but instead engage broader environments and institutions of society, each country and market's political and institutional environments are the key determining factors (Quintyn & Verdier, 2010).

In the political economy framework, an understanding of any system of economics and finance should be accompanied by an extensive analysis of society (Arndt, 1991). The performance, stability, and development of financial markets and the banking sector do not solely rely on economic variables and institutions but engage broader environments and institutions (Quintyn & Verdier, 2010). New institutional economics (NIE) is an institutional articulation of the new political economy that primarily focuses on the pivotal role and impact of institutions in diverse avenues, including the social, political, and legal, among others (Ahmed, 2012; Joskow, 2004; Klein, 1999; Lee, 2017). The institutions of each society are created and developed based on its values; thus, a country's successful institutions might not be appropriate in others (Roland, 2004). The theory of political economy and new institutional economics (NIE) argue that implementing and equipping appropriate political and institutional environments are essential for deepening financial sectors, which eventually leads to the nation's overall development.

Particularly, the theory of political institutions advanced by North (1990) and the Hierarchy of Institutions Hypothesis (HIH) proposed by Acemoglu et al. (2005), refer to the importance of political institutions among other institutions. According to the above theories, political

institutions are ultimate institutions that form subordinate institutions, such as economic and regulatory institutions, and impact economic performance and outcome.

Moreover, the banking sector is more interconnected with politics in a sophisticated manner than other sectors (Jackowicz et al., 2013) in the economy. This is because banks provide a source of government income and impact the regulation and supervision of the government through political connections (Jackowicz et al., 2013). Moreover, the banking sector consists of various parties, such as the government, regulators, and borrowers, each with their interests (Haber et al., 2008). To prevent strong ties with politics and to address conflicts among the parties involved, appropriate institutions that can limit authority and discretion are necessary. Thus, examining the political and institutional determinants of banking performance is crucial for developing the banking sector and economy.

There have been many measurements for banking performance, such as profitability, efficiency and productivity. Among various banking performance measurements, efficiency has emerged as the main yardstick, defined as a firm's ability to maximise its profits by minimising costs (Aigner et al., 1977; Coelli et al., 2005). The banking efficiency issue has taken prominence because of the growing population and relatively scarce resources (Avkiran, 2013). Moreover, after the financial crisis in 2008, many regulations have changed, such as the introduction of Basel III regulation. Changing regulations and operating environments have made banks to focus more on controlling their costs and optimising revenues and profits (Chortareas et al., 2013). Firms and banks needed an efficient management strategy to survive in a market. Thus, bank efficiency measurement is widely used in academic research as a measure of banking performance (*see*: Barth et al., 2013; Chortareas et al., 2012; Johnes et al., 2014).

As another measurement of banking performance, liquidity creation has been widely used in recent academic research. Banks, as financial intermediaries, play a vital role in liquidity creation. By providing liquidity, they satisfy the liquidity demand from depositors and borrowers. This function of the bank is to contribute to capital allocation in the market and, consequently, improve economic growth (Berger et al., 2019; Bouwman, 2018; Casu et al., 2019; Diaz & Huang, 2017; Jiang et al., 2019). However, excessive bank liquidity creation may harm banks and the overall economy. Banks reduce their liquidity positions to create and provide liquidity to the market (AbdulGaniyy et al., 2017; Bouwman, 2013, cited in Diaz & Huang, 2017). Banks' liquidity risk may adversely affect the stability of entire financial and economic sectors, as witnessed in the 2008 financial crisis (Bandt et al., 2021; Berger et al.,

2019; Diaz & Huang, 2017). Moreover, an excessive level of liquidity in a market causes an asset bubble, which can also lead to a financial crisis (Berger et al., 2019). Some empirical studies find a negative impact of bank liquidity creation on the stability of banks and the market (Bouwman, 2017). Therefore, banks' liquidity creation function needs to be carefully used and managed. Therefore, it is crucial to identify the determinants of bank liquidity creation. Most of the earlier studies focused on the bank level and macroeconomic level determinants of bank efficiency and liquidity creation (Dang & Dang, 2021; Pasiouras et al., 2009). However, empirical research investigating the impact of institutions such as political and economic institutions on bank efficiency and liquidity creation is scarce. This situation is due to the difficulty in obtaining country-level institutional data, which is a challenge in conducting political economy research by identifying and measuring the institutional variables of a country (Archer et al., 2007), and altering the model to accord with the data (Pagano & Volpin, 2001). Considering the importance of the banking sector, particularly bank efficiency and liquidity creation, in terms of its critical role and effect on banking performance and the importance of political economy studies examining the more comprehensive institutional impact, more theoretical and empirical research on this issue is warranted. The growing importance of research on banking performance from the political economy perspective and the current research gap between the performances of conventional and Islamic banks that operate under different political and institutional environments motivates this study.

As another dimension of this study, the Islamic banking and finance industry, based on Islamic economic and financial principles derived from Islamic law (*shariah*) (Farak et al., 2018), has a distinctive feature in general banking practice. This industry has grown rapidly recently (Safiullah & Shamsuddin, 2018). According to S&P Global's Islamic Finance Outlook 2022, Islamic finance's total assets hit \$2.2 trillion in 2020 and continue to grow at an expected growth rate of 10%–12%. Moreover, in the wake of the global financial crisis in 2008, the relative resilience of Islamic banks compared to their conventional counterparts aroused interest in Islamic banking performance and its risk-taking not only in the Muslim world but also in non-Muslim nations (Ahmed, 2009; Asutay & Sidek, 2020; Asutay & Turkistani, 2015; Belal et al., 2014). Consequently, substantial comparative research on Islamic and conventional banking performance, including profitability, efficiency, and stability, has been conducted recently. However, little research examines the political and economic institutions in relation to the performance of both banking system.

It is important to note that the Islamic perspectives on political and economic institutions differ from the conventional ones. For instance, whereas the Islamic perspective on democracy originates from the ultimate religious sources of Islam, Western democracy, which is normally known as democracy, is primarily rooted in the philosophy of Europe and America (Yusof et al., 2014). Thus, although Islam shares the common features of political and economic institutions with conventional perspectives, aspects such as meaning, features, elements, and requirements differ as they result from the fundamental differences of Islam, such as its sources and purposes. Thus, there is a need to clarify these disparities between conventional and Islamic institutions before conducting empirical and comparative research. The existing literature on Islamic banking mostly shows the authoritarian setting (Apaydin, 2018); the impact of conventional political institutions on Islamic banking performance (Asutay & Sidek, 2020); or a comparison of the impact of political institutions and legal systems, and their effect on Islamic banking soundness (Bitar et al., 2017). This study extends the literature on the political economy of Islamic banking performance by employing both Islamic and conventional political and economic institutions.

Furthermore, the emergence, development, and diffusion of Islamic finance have been closely related to political factors in history and country-specific research (*see*: Asutay, 2013; Asutay & Turkistani, 2015; Baskan, 2004; Imam & Kpodar, 2010; Mishrif, 2015; Stiansen, 2004; Warde, 2004). However, Islamic perspectives on political and economic institutions differ from conventional ones. For instance, whereas the Islamic perspective on democracy originates from the ultimate religious sources of Islam, Western democracy is primarily rooted in the philosophies of Europe and America (Yusof et al., 2014). Thus, although Islam shares the common nature of political and economic institutions with conventional perspectives, aspects such as meaning, features, elements, and requirements differ, resulting from the fundamental differences in Islam, such as its sources and purposes. Considering the potential and rapid growth of the Islamic banking and finance industry globally, it is vital to examine the performance of Islamic banking from a political economy perspective by using Islamic institutions.

## **1.2. Research objectives and questions**

This study has five objectives. Firstly, it aims to identify the differences between conventional and Islamic institutions with a particular focus on political, economic, and regulatory institutions. Secondly, this study seeks to figure out the ways different institutions influence banking. Thirdly, this study intends to find out the research gaps by critically



reviewing the extant literature on various institutions and banking. Fourthly, this study targets to examine the impact of political, economic, and regulatory institutions on bank efficiency. Finally, this study aims to explore how political, economic, and regulatory institutions can influence bank liquidity creation. For this purpose, the following research questions are posited:

1. *What are the theoretical background and research gaps in institutions and banking?*
  - 1a. *What are the theoretical differences between conventional and Islamic institutions?*
  - 1b. *What are the theoretical relationships between institutions and banking performance?*
  - 1c. *What are the existing research gaps in institutions and banking performance based on the extant literature?*
2. *What are the impacts of political, economic, and regulatory institutions on bank efficiency?*
  - 2a. *How do these institutions affect conventional and Islamic banks' efficiency?*
  - 2b. *How does bank efficiency vary when institutions interact with each other?*
3. *What are the impacts of political, economic, and regulatory institutions on bank liquidity creation?*
  - 3a. *How do these institutions affect conventional and Islamic banks' liquidity creation?*
  - 3b. *How does bank liquidity creation change when institutions interact with each other?*

### **1.3. Significance and contribution of the study**

The current study contributes to the existing research on the political economy of banking, finance, and Islamic finance by filling certain research gaps. First, it provides comprehensive conceptual knowledge of conventional and Islamic institutions. To the best of the author's knowledge, there is hardly any study that attempts to examine the theoretical differences between conventional and Islamic institutions. This study splits institutions into political and economic institutions and identifies the commonality and differences between those institutions from both conventional and Islamic perspectives. Despite having some common aspects of conventional institutions, such as the nature of democracy, Islamic institutions have several distinct and additional features. This study also analyses the underlying theories (political economy and new institutional economics) from the Islamic perspective. Second, by exploring and summarising current theoretical and empirical research on the impact of institutions on banking performance, this study identifies the current research gaps in this

area. Despite the growing importance of bank efficiency and liquidity creation as a banking performance measurement, empirical research on this issue in relation to institutional environments is insufficient. Moreover, there has been no research that employs both conventional and Islamic institutions and investigates their impact on both conventional and Islamic banking performance.

Third, this study contributes to the literature on the political economy of banking efficiency from both conventional and Islamic banking perspective. This study provides empirical research on banking efficiency from a political economy perspective by investigating political, economic, and regulatory institutions' impact on bank efficiency. Moreover, this study empirically supports the hierarchy of institutions hypothesis (HIH) theory by finding the importance of political institutions on bank efficiency. This study also provides empirical research on the political economy of Islamic banking performance. Existing literature on Islamic banking performance from a political economy perspective either examines the effect of conventional political institutions (*see*: Asutay & Sidek, 2020) or compares conventional political systems to *shariah*-based legal systems (*see*: Bitar et al., 2017). Considering the conventional and Islamic institutions, this study extends the existing literature by confirming the importance of Islamic institutional environments for Islamic bank efficiency. This finding provides empirical support for the political economy and new institutional economics (NIE) theory emphasising the need of proper institutional environments for bank performance. Lastly, this study contributes to the literature on the political economy of bank liquidity creation including conventional and Islamic banks. This study empirically demonstrates the importance and critical role of political institutions in bank liquidity creation, either directly or through their impacts on other institutions, which supports the hierarchy of institutions hypothesis (HIH). Moreover, the subsample analyses of the study find different impacts of political institutions on bank liquidity creation depending on the levels (low to high) of liquidity creation and country-level corruption. The study further demonstrates the importance and critical role of the Islamic environment in bank liquidity creation, particularly for Islamic banks. The findings further suggest that Islamic banks create higher liquidity in a stronger Islamic institutional environment. This finding empirically supports the political economy and New Institutional Economic theories. According to these theories, every organisation and firm requires a correct institutional environment, including a political system, laws and regulations, and enforcement institutions.

#### **1.4. Overview of research methodology**

First, this study employs a systematic literature review methodology to identify the existing research gap in institutions and banking performance. A systematic literature review consists of a comprehensive research of relevant theoretical and empirical studies on a specific topic and synthesises and appraises them in a critical and justified way (Schiehll & Martins, 2016; Tranfield et al., 2003).

Moreover, this study employs a quantitative research methodology that uses cross-country data. According to the diverse research objectives, it adopts different quantitative approaches. To investigate the impact of conventional and Islamic institutional environments on bank efficiency, this study employs a two-stage empirical approach: bank efficiency is calculated in the first stage, and panel regression analysis is conducted to identify the relationship between institutional environments and bank efficiency. This study employs the fixed-effects panel regression with annual data on 594 banks (468 conventional and 126 Islamic banks) from 18 countries from 2005-2020. To examine the impact of institutions (political, economic, and regulatory) on banks' liquidity creation, this study employs a two-stage empirical approach: the first stage measure bank's liquidity creation, and the second stage conducts a panel regression analysis to examine the impact of institutions and bank liquidity creation. For the fixed effect panel regression, the study uses a sample of 584 banks (468 conventional and 116 Islamic banks) from 18 countries from 2000 to 2020. The measurement of bank liquidity creation requires more bank balance sheet components than bank efficiency. Consequently, fewer banks are included in the bank liquidity creation study due to data availability. Instead, the bank liquidity creation study includes a more extended period for reliable results. Countries where both conventional and Islamic banks operate (and where there are more than two Islamic banks for a more accurate comparison) are chosen for a reliable comparison of conventional and Islamic banks.

For robustness test, this study firstly employs alternative efficiency measurement by using the stochastic frontier analysis, which is a another famous efficiency measurement. This study also uses alternative political, economic, regulatory and Islamic institutional variables. Secondly, this study employs propensity score matching (PSM) to address the imbalance problem between conventional and Islamic bank's sample. The number of conventional banks is much bigger than that of Islamic banks. Lastly, this study adopted the two-stage least square (2SLS) method to address the endogeneity problem.

## 1.5. Structure of thesis

This thesis consists of five chapters:

*Chapter 1 (Introduction):* This chapter provides an overview of the current study by including research motivation, objectives and questions, contribution, significance, and methodology.

*Chapter 2 (Systematic literature review on institutions and banking):* This chapter provides comprehensive analysis of conventional and Islamic institutions and the theoretical relationship between institutions and banking performance. It also summarises the existing theoretical and empirical studies on institutions and banking performance, and investigates the research gap.

*Chapter 3 (Institutions and bank efficiency):* This empirical chapter examines the impact of institutions on bank efficiency. By employing 594 banks (468 conventional banks and 126 Islamic banks) from 18 countries from 2005 to 2020, this study conducts various quantitative analyses, including sub-sample analysis, interaction effects, and endogeneity correction. Prior to the empirical analysis, this chapter provides a theoretical relationship between institutions and bank efficiency, along with the relevant literature.

*Chapter 4 (Institution and bank liquidity creation):* This empirical chapter investigates the impact of institutions on bank liquidity creation by using 584 banks (468 conventional banks and 116 Islamic banks) from 18 countries from 2000 to 2020. It also provides theoretical support for the relationship between institutions and bank liquidity creation with the relevant literature. By conducting various sub-sample analyses, this study finds how institutions affect bank liquidity creation differently according to various banking types, the liquidity creation status of banks, and the income and corruption status of a country.

*Chapter 5 (Conclusion):* This chapter summarises the objectives, significance, and overall findings of this study. It also outlines the policy implications derived from the research findings. Finally, it highlights the research limitations and offers suggestions for future research.

**CHAPTER 2: INSTITUTIONS AND BANKING: A SYSTEMATIC  
REVIEW OF THE EXISTING LITERATURE**

## 2.1. Introduction

The banking sector's performance and level of development are among the pivotal determinants of a country's economic growth. Nevertheless, few countries possess a developed banking and financial system. The form and degree of development of the banking sector vary significantly from country to country. According to the political economy discipline, an understanding of any system of economics and finance should be accompanied by an extensive analysis of society (Arndt, 1991). The performance, stability, and development of financial markets and the banking sector do not solely rely on economic variables and institutions but engage broader environments and institutions (Quintyn & Verdier, 2010). New institutional economics (NIE) focuses more on the pivotal role of institutions in diverse avenues, including the social, political, and legal (Ahmed, 2012; Joskow, 2004; Klein, 1999; Lee, 2017). The institutions of each society are created and developed based on its values; thus, a country's successful institutions might not be appropriate in others (Roland, 2004). The Political economy and New Institutional Economy theories advocate for implementing and equipping appropriate political and institutional environments are essential for deepening financial sectors, eventually leading to the nation's overall development. Based on the theory of political institutions raised by Acemoglu et al. (2005) and the Hierarchy of Institutions Hypothesis (HIH), among various types of institutions of a country, political institution plays an important and ultimate role that form other institutions such as economic and regulatory institutions, and impact economic performance and outcome. Moreover, a country's developed political institutional system limits the negative impact of authority and strong political ties and addresses the conflicts among different parties involved (Haber et al., 2008). Therefore, examining the political and institutional determinants is crucial not only for the functioning and development of the banking sector but also for the stability of the financial market and economy as a whole. However, there is still a lack of empirical research that explores the influence of the institutional environment on bank performance, specifically on bank efficiency and liquidity creation. As another dimension of this study, the Islamic banking industry, based on the economic and financial principles derived from Islamic law (*shariah*) (Frag et al., 2018), has a distinctive feature in the overall practice of the banking system. Moreover, with the rapid growth of the Islamic finance industry (Safiullah & Shamsuddin, 2018) and in the wake of the global financial crisis in 2008, the relative resilience of Islamic banks compared to conventional banks aroused interest in Islamic banking performance and its risk-taking

behaviour (Ahmed, 2009; Asutay & Sidek, 2020; Asutay & Turkistani, 2015; Belal et al., 2014). Consequently, substantial comparative research between Islamic and conventional banking performance on aspects such as profitability, efficiency, and stability, has been conducted in the last few years (*see*: Abdul-Majid, Falahaty, & Jusoh, 2017; Alexakis, Izzeldin, Johnes, & Pappas, 2019; Mollah & Zaman, 2015). However, from the political economy perspective, there is little assessment of the contributions of political and economic institutions to the performance of both banking systems. This study extends the literature on the political economy of Islamic banking performance by employing both Islamic and conventional political and economic institutions. It is important to note that Islamic views on political and economic institutions differ from conventional ones. For instance, the Islamic perspective on democracy originates from the ultimate religious sources of Islam, but traditional democracy is primarily rooted in the western philosophy that originated in ancient Europe and America. (Yusof et al., 2014). Although Islamic views share some common features of political and economic institutions with conventional counterparts, aspects such as meaning, features, elements, and requirements differ in Islamic views from the conventional ones because of their sources and purposes. Hence, there is a need to clarify these disparities between conventional and Islamic institutions before conducting empirical and comparative research. Accordingly, this study first examines the theoretical differences between conventional and Islamic institutions, which no prior investigation has attempted. Afterward, it identifies various institutions and ways in which they influence banking operations. Finally, it summarises the existing theoretical and empirical research that examines the impact of institutions on banking performance.

To accomplish the objectives, this study first conducts a conceptual analysis to differentiate between conventional and Islamic institutions along with the underlying theories followed by a systematic literature review to summarise the existing theoretical and empirical research to examine the impact of various institutions on banking performance. A systematic literature review comprises a comprehensive research of relevant theoretical and empirical studies on a specific topic and synthesises and appraises in a critical and justified way (Schiehll & Martins, 2016; Tranfield et al., 2003).

The study has three major findings. Firstly, while the research dealing with the impact of institutions on economic performance and growth has been well-explored, banking performance has been relatively ignored. Secondly, empirical research on institutions and banking performance mainly concentrates on economic and regulatory institutions and barely

focuses on the political institution, which builds the paradigm of other institutions in an economy. Finally, several earlier studies have compared the performance of conventional and Islamic banks. However, none of the studies conducted examine the impact of different institutional environments including Islamic institutions on conventional and Islamic banking. Given the political economy and new institutional economy (NIE) perspectives, a proper institutional environment for each banking type is required. A more comprehensive institutional environment's (political) impact and the interaction among various institutions on specific banking performance remain unexplored. Remarkably, the importance of banking efficiency and liquidity creation has been growing since they affect the country's economic performance and development. Therefore, in-depth investigations of the institutional environments or factors that affect banking efficiency and liquidity creation are needed. The research gaps found in the literature motivate the following empirical chapters in this thesis.

This study contributes to the political economy research on banking, finance, and Islamic finance by filling the research gaps. Firstly, it provides comprehensive conceptual knowledge of conventional and Islamic institutions. To the best of the author's knowledge, this is the first attempt to examine the theoretical differences between conventional and Islamic institutions. This study splits institutions into political and economic institutions and identifies the commonality and differences between those institutions from both conventional and Islamic perspectives. Although Islamic institutions have some common aspects of conventional institutions, such as the nature of democracy, Islamic institutions have several distinct and additional features. This study also analyses the underlying theories (political economy and new institutional economics) from the Islamic perspective. Secondly, this study identifies the current research gaps in the impact of institutions on banking performance by exploring and summarising current theoretical and empirical research on this area. Despite the growing importance of bank efficiency and liquidity creation as a banking performance measurement, empirical research on this issue concerning the institutional environment is insufficient. Moreover, there has been no research that employs both conventional and Islamic institutions and investigates their impact on both conventional and Islamic banking performance.

The remainder of this chapter is organised as follows. Section 2 theoretically analyses the underlying theories and differences between conventional and Islamic institutions. Section 3 identifies the institutional impact on banking performance by dividing institutions into political, economic, and regulatory institutions. Section 4 describes the methodology and



sample selection used in this study. Section 5 deals with the existing empirical research that ascertains the influence of various institutions on banking performance by themes. Section 6 concludes the study by summarising the main findings.

## **2.2. Theoretical background**

The underlying theories to explain the impact of the political and institutional environments on banking performance from both a conventional and Islamic perspective constitute a political economy theory, the new institutional economics theory (NIE), a theory of political institutions, and the hierarchy of institutions hypothesis (HIH). This study introduces theories from both conventional and Islamic perspectives.

### **2.2.1. Political economy**

The first leading concept that has motivated this study is the political economy theory. The concept of political economy originated in the early Greek period, where economics was a component of politics and involved a broader ethical and philosophical framework (Choudhury & Malik, 1992). Based on the existing literature (Arndt, 1991; Drazen, 2000; Ghosh, 1995; Rosdi, 2015), political economy has three representative definitions. The first focuses on the relationship between politics and economics; accordingly, political economy is a discipline that studies the relationship between politics and economics within a society (Choudhury & Malik, 1992; Drazen, 2000; Glipin, 2016; Rosdi, 2015). The second definition is more comprehensive because it reaches beyond the simple relationship between politics and economics and encompasses an interdisciplinary approach that includes sociology, history, psychology, philosophy, culture, and law (Haqqi, 2015; Rosdi, 2015). Thus, the understanding of economics should be accompanied by a broader analysis of society (Arndt, 1991). The third and final definition deals with ways to manage the state where political economy is a manner of this management (Ghosh, 1995; Rosdi, 2015). Regardless of the definitions in the political economy framework, economic and financial matters are considered within the extensive formation of society. Therefore, diverse factors of society determine the function, performance, and outcomes of economic and financial institutions.

As recently as the late 1990s, the distinct discipline of political economy from an Islamic perspective was established (Haqqi, 2015) as Islamic political economy. Many authors define the Islamic political economy as a political economy approach to Islamic economics (Asutay, 2007); or as a study of Islamic economic-Islamic state interaction (Haqqi, 2015); or a humanistic political economy derived from Islamic moral and ethical values, which are

distinct from secular humanism (Choudhury & Malik, 1992). Islamic political economy is a structure developed by the fundamental sources of Islam, rather than a study of positivistic elements of economics such as allocation, scarcity of resources and competition, and socio-political problems of the contemporary Muslim state (Choudhury & Malik, 1992). God's law, the basic foundation and fundamental source of Islam, manifested by the Holy *Quran* and *Sunnah* (Choudhury & Malik, 1992), provides the rationale behind the distinct discipline and system of Islamic economics (Haqqi, 2015). It creates an underlying worldview, order, and economic norms, and within this framework, Islamic economics and other related systems and institutions such as legal, social, and, political are located (Asutay, 2007; Choudhury & Malik, 1992).

### **2.2.2. New Institutional Economics (NIE)**

New institutional economics (NIE) is an institutional articulation of the new political economy, and primarily focuses on the pivotal role and impact of institutions on social, political, legal, and economic fields among others (Ahmed, 2012; Asutay, 2007; Joskow, 2004; Klein, 1999; Lee, 2017). According to the new institutional economics (NIE) theory, institutions mean any formal and informal human-made systems, rules, and constraints (North, 1990) and comprise a set of values, principles, and norms (Portes, 2010). Societal values create and develop the institutions of each society; thus, a country's successful institutions may not be appropriate in other locations (Roland, 2004). Williamson (2000), Roland (2004), Porte (2010) and Ahmed (2012), in their well-known works on the new institutional economics (NIE), classify the level of institutions, thus providing the core framework of the new institutional economics (NIE).

The first level of institutions constitutes the social embeddedness level, a primary and informal institution that determines other subordinate institutions. This level encompasses values, culture, traditions, norms, knowledge, and religion (Jackson, 2011; Roland, 2004; Williamson, 2000). The second level of institutions is the institutional environment, 'where the formal constraints and enforcement rules are specified' (Ahmed, 2012, p.26). This level comprises constitutions, laws, courts, political systems, and other institutions enforcing political, human, and property rights (Joskow, 2004). The third level is governance institutions or the organisational level, which Williamson (2000, p.597) refers to as 'the play of the game'. The economic relationships and structure, such as organisations and contractual and transactional relations, are determined at this level (Joskow, 2004). The last level of institutions involves the resource allocation and employment level in which the everyday

operation of the economy, such as prices, cost, and quantities, are determined (Joskow, 2004; Williamson, 2000). According to the new institutional economics (NIE) theory, the development of all institutions in society results from the impact of the primary and ultimate institution or embedded values (the first level), namely, knowledge to frame other institutions (Ahmed, 2012); and the interaction of each level's institution. Therefore, the imitating institutions from one society to another would not be appropriate (Portes, 2010; Roland, 2004).

In the Islamic political economy perspective, the first level institutions represent the basic knowledge, values, morality, and ethics, originating from the Holy *Quran* and *Sunnah*. Douglass North (1920-2015), the renowned scholar of institution research, argues that cognition plays a crucial role in a belief system and its formation, eventually impacting preference, decision-making, and institutions (Askari et al., 2014a). In this regard, the Islamic worldview, beliefs, and cognition provide essential pre-requisites for other following institutions in the economic system. The second level institutions in the Islamic political economy perspective can be the Islamic laws governing the country, Islamic political system, Islamic courts, and Islamic banking and finance law, as the second level encompasses the constitutions, laws, courts, political systems, and other enforcing institutions of the country (Joskow, 2004). However, compared to other institutions, the second level from the Islamic perspective is relatively not well advanced or applied to contemporary countries. This situation is because even Muslim-majority nations follow the primary government's laws and systems. However, such incompatibility may hamper the functioning and development of Islamic economics and other sub-ordinate institutions such as the financial and banking systems (Ahmed, 2014). For instance, the third level of new institutional economics (NIE) in the Islamic political economy perspective is Islamic banking and finance, which includes the Islamic economics' organisational and practical institutions. While the primary activity of Islamic banks is trading and investing in equities, most conventional banking systems and laws would not support those activities (Ahmed, 2014). Therefore, under the conventional legal system, Islamic financial institutions must compromise their activities, which may result in their system aligning with conventional ones.

### **2.2.3. Political institutions theory**

Before discussing the impact of institutions, it is essential to clarify that the definition and criteria that determine institutions vary according to different studies. This study mainly employs democracy (or democratic institutions) as political institutions as it is most widely

used proxy for political institutions. In a theory of political institutions propounded by Acemoglu et al. (2005), each country's specific political and historical events form their political institutions, including regime types, which determine their economic and regulatory institutions and eventually produce different economic performance and outcomes. As a political economy and political institutions theory, the hierarchy of institutions hypothesis (HIH) is employed in much of political economy literature emphasising the importance of political institutions in determining other institutions in the economy (*see*: Flachaire et al., 2014; Slesman et al., 2019; Agoraki et al., 2019). According to the theory, political institutions are the essential components in the institutional matrix since they create the primary stages of economic institutions (Acemoglu et al., 2019; Flachaire et al., 2014; Slesman et al., 2019). The theory assumes that political institutions, whether based on democracy or dictatorship, allocate and constraint the political power determining the arrangement of economic and legal institutions. The following section examines the theory of leading political institutions from both conventional and Islamic perspectives.

### **2.2.3.1. Democracy**

The type of regime, whether democracy or autocracy, is one of the leading measures of political institutions in many studies (*see*: Acemoglu et al., 2019; Agoraki et al., 2019; Apaydin, 2018; Ashraf, 2018; Durham, 1999; Przeworski & Limongi, 1993; Quintyn & Verdier, 2010; Rivera-Batiz, 2002). However, the conventional and Islamic perspectives on democracy vary according to the histories and sources of both. While the Islamic system is rooted in the ultimate religious sources—the Holy *Quran* and *Sunnah*—Western democracy is derived primarily from the European and American philosophy (Yusof et al., 2014). According to the definition, democracy (or liberal democracy, Western democracy) is a system in which all people in society have a free will and the right to participate and exercise free speech in public affairs (Marshall et al., 2016). Besides, Yusuf al-Qaradawi (1926- ), a famous Egyptian moderate Muslim thinker, emphasises the role of representatives and the competitive elections system in the democratic atmosphere (Al-Sulami, 2003). Referring to Al-Sulami (2000)'s book, many modern scholars and political theorists including James Pennock, David Held, Norbert Bobbio, Anthony Birch, Robert Dahl, and Albert Weale, agree that the crucial elements of democracy are popular sovereignty, civil liberties, majority rule, elected representatives, separation of powers, political participation, competitive elections, and political party system and interest groups. Explanations of each element are detailed in the sub-sections.

In the Islamic perspective, the Holy *Quran*, the ultimate source of Islam, does not specify the details of Islamic politics, including the form, composition, and elements of the state; instead, it provides the general ethical and moral guidelines across all aspects of human life, which encompasses social, economic, public, and political affairs (Al-Sayyed, 2015; Al-Sulami, 2003; Piscatori, 2000; Yusof et al., 2014). Islam has given the liberty to specify public and political issues to Islamic society (*ummah*), so the Islamic perspective on democracy has varied according to scholars and theorists. Representing one perspective, Rashid al-Ghanoushi (1942- ), the founder of the Tunisian Islamic movement (Al-Sayyed, 2015), states that Islamic principles have democratic features. In contrast, others such as Milad (2007) argues that Islam cannot stand in the same line with democracy and even contradicts democracy due to the disparity in its principles and origin (Al-Sayyed, 2015). However, most scholars such as Abu a'la Mawdudi, Sayyid Qutb, Yousuf al-Qaradawi, and Hassan al-Alkim acknowledge the common democratic features in Islam and the differences between Western democracy and Islamic democracy (*see*: Al-Sayyed, 2015; Esposito & Voll, 1996). Meanwhile, the principles and norms relating to public and political affairs in society can be found in the sources of Islam. In particular, this study examines the Islamic principles related to political system, democracy, and other political institutions from Islamic sources. It is possible because Islam is not merely a religion but also a comprehensive source embracing all parts of human life (Al-Sayyed, 2015; Bowering, 2015)

The basis of the Islamic political principle in the Holy *Quran* is the concept of *shura* (consultation), which is a crucial concept to consider when discussing democracy from the Islamic perspective (Esposito & Piscatori, 1991). Although the term does not have an agreed, universal definition, *shura* is generally interpreted as a system of government (Al-Sulami, 2003), with the right of people to voice their opinions on public and political affairs in the community (Esposito & Voll, 1996). Therefore, *shura* represents the democratic feature of Islam (Yusof et al., 2014). The Holy *Quran* mentions this concept and its importance in society several times, stating that it is an essential principle in Muslim life (Al-Sulami, 2003). Piscatori (2000) refers to one of the Quranic verses:

*'consult them with regard to the conduct of affairs, and once you have decided, put your trust in God'. (3:159)*

Al-Sulami (2003) points to another Quranic verse regarding consultation:

*'and those who answer the call of Allah, and perform regular prayer, and who [conduct] their affairs by mutual consultation, and spend out from what we have given them'. (42:38)*

Accordingly, some scholars believe that *shura* is the process of Islamic decision-making suggested by the Holy *Quran* (Esposito & Voll, 1996). For them, the principle of *shura* evolved to denote anti-dictatorship, including unelected governments that do not incorporate proper consultations (Esposito & Piscatori, 1991; Yusof et al., 2014). The traditions of the Prophet Muhammad also emphasize *shura*. According to the Holy *Quran*, the Prophet Muhammad was asked to request and follow the Muslim majority opinions and not to make any independent decisions without prior consultation with them (Al-Sulami, 2003). While in the early times of the Prophet Muhammad, discussions were conducted mainly with his leading companions to garner diverse opinions, the circle grew to include other tribal leaders such as Aus and Khazraj, and later even the ordinary people in Medinah and beyond (Yusof et al., 2014).

The other democratic concepts in the Islamic principles are *ijma* (consensus) and *ijtihad* (independent reasoning) (Esposito & Piscatori, 1991; Esposito & Voll, 1996). However, perfect consensus could not be made in practice and was ultimately limited to knowledgeable scholars throughout Islamic history (Esposito & Voll, 1996). Therefore, there is a need for representatives. In summary, the principle of *shura*, *ijma*, and *ijtihad* create the basis for the Islamic democratic political system. Additionally, Islamic moral and ethical principles such as equality and justice support the democratic idea in the Islamic political system. Moreover, the Holy *Quran* emphasises the importance of consultation with each person in society regardless of gender and religion (Al-Sulami, 2003).

Although the Islamic political system shares the common nature of democracy, there are more issues deemed critically divergent between the two systems which most scholars agree upon. Al-Sulami (2003) states that the principal elements of the Islamic political system are God's sovereignty, civil liberties, consensus (*Ijma*), election of the president of the state and members of the *shura* council, division of power, political participation, competitive elections, and a multi-party or trend system. Although most elements of the system are similar to the elements of Western democracy, the most important difference is the first and most crucial element: sovereignty. Sovereignty is the ultimate source of political power in society (Al-Sulami, 2003). Sovereignty is given to the members of the society, and allows them political power and authority in Western democracy (Al-Sulami, 2003; Esposito & Voll,

1996), in which no other laws or constitutions beyond the power of people exist (Al-Sulami, 2003). On the contrary, God has sovereignty in the Islamic political system (Al-Sayyed, 2015; Yusof et al., 2014), where there are no other laws and constitutions beyond God's teaching, consequently limiting the people's authority by *shariah* (Al-Sulami, 2003). This basic differing principle creates enormous disparities between the two systems, thus affecting other political institutions.

The sovereignty of God in the Islamic political system is based on the concept of *Tawhid*, which means the oneness of God (Asutay, 2007; ISRA, 2016). It is the core and basic concept of the Islamic faith, tradition, and practices across all spheres (Esposito & Voll, 1996). Among the modern Islamic scholars, Abu a'la Mawdudi (1903-1979), the founder and leader of Jamaat-e-Islami in Pakistan, denies the concept of popular sovereignty. However, he acknowledges the democratic nature of the Islamic political system. Thus, as long as the *shariah* limits popular sovereignty, the Islamic political system can be compatible with democracy (Esposito & Piscatori, 1991). Therefore, he calls the Islamic political system 'theo-democracy' (Esposito & Piscatori, 1991; Piscatori, 2000). Sayyid Qutb (1906-1966) also strongly disagrees with the sovereignty of people and any legislation made by humans, arguing that it is unnecessary and even harmful to human dignity (Esposito & Piscatori, 1991). Yusuf al-Qaradawi (1926- ) emphasises the democratic nature of the Islamic political system having *shura*, political contracts, and citizens' rights to choose their leader via elections (Yusof et al., 2014). However, he disagrees on the issue of ideology in which morality and spirituality are absent (Yusof et al., 2014). Hassan al-Alkim (1958- ) concurs with Mawdudi, agreeing on the general democratic nature but disagreeing with the concept of sovereignty and secularism (Yusof et al., 2014). He also opposes a separation between the state and religion based on the secularism of Western democracy (Yusof et al., 2014).

In summary, referring to the principles found in the ultimate sources, the Holy *Quran* and *Sunnah*, the history of the Islamic political economy, and opinions of modern Islamic scholars, it can be concluded that Islam shares standard democratic features with a modern democracy, but has fundamental differences. Some scholars, especially non-Muslims or those from the West, believe that Islamic factors constitute the decisive reasons behind the prevailing authoritarian regimes in certain Muslim countries (Al-Sayyed, 2015; Bayat, 2007). However, these regimes stem from other societal factors that are historical, political, cultural, and economic in nature (Smock, 2002). Moreover, the absence of detailed descriptions of the

Islamic political system, whether obligatory or advisory (Al-Sulami, 2003; Esposito & Voll, 1996), matters in different regime types in contemporary Muslim societies.

### **2.2.3.2. Civil liberties**

The guarantee of civil liberties is a crucial element of democracy (Marshall et al., 2016). The concept of civil liberties implies the freedom of citizens in terms of speech, thought, religion, assembly and association, and the press (Al-Sulami, 2003; Yusof et al., 2014). In a democracy, civil liberties and freedom are not restricted and controlled but regulated by people and country law to protect others' rights (Al-Sulami, 2003).

In the Islamic perspective, as mentioned earlier, although the ultimate sources of Islam do not specify a detailed Islamic principle relating to political affairs (Al-Sayyed, 2015; Al-Sulami, 2003), they provide fundamental and universal guidelines on the topic (Yusof et al., 2014). Islamic principles regarding freedom of speech can be found in the *Sunnah*. According to Kabbani (2002):

The Prophet Muhammad said, *'a good believer must listen and obey as long as he is not being ordered to commit a sin'*.

Moreover, there is another *Sunnah* narrated by Ibn Majah, Hadith no. 2191 (Said & Khairuldin, 2017):

*'Remember, do not let fear of man prevented with the right person to say if he knew'*.

This saying implies the concept of consultation and the people's freedom of speech. That is, all citizens in a society have the right to express their opinion freely on public affairs to make rulers accountable for their actions (Kabbani, 2002). Individual liberties have been ensured throughout Islamic history, including in the sources relating to the Prophet Muhammad and *caliphate* (Al-Sulami, 2003; Piscatori, 2000; Yusof et al., 2014). However, these liberties are limited and subject to the teachings of God (Piscatori, 2000). The vertical relationship with God and horizontal relationships among people make society equal even in the political system (Esposito & Voll, 1996). Yusuf al-Qaradawi (1926- ), confirms the presence of human rights in Islam, including individual liberties of 'privacy, thought, politics, laws, social life and economy' (Yusof et al., 2014).

However, there are differences between civil liberties in Western and Islamic perspectives. Unlike the civil liberties of Western democracy where all are regulated rather than restricted, Islamic civil liberties based on the *Tawhid* principle in Islam have specific limitations and



regulations according to *shariah* (Al-Sulami, 2003). After the submission to God, in other words, after the vertical relationship with God, the horizontal relationships among individuals are created (Asutay, 2007; ISRA, 2016). Under this relationship, the rights of individuals such as free speech, expression, assembly, and association in political affairs are given (Al-Sulami, 2003).

To conclude, both systems ensure civil liberties. However, the limitations and regulations vary. It is primarily because the civil liberties in a democracy are ensured on a secular basis, while Islamic civil liberties are built on a religious basis that incorporates the main elements of *Tawhid* (Al-Sulami, 2003).

### **2.2.3.3. Political participation and elections**

An important practice in a democratic system is the political participation of citizens. According to Al-Sulami (2003, p.158), political participation can be defined in democratic theory as ‘a political action of taking part of having a share with others in some action’.

Election is the most widespread means of political participation. Essentially, it is considered a critical factor and, metaphorically, as the heart of democracy (Al-Sulami, 2003; Esposito & Voll, 1996). Democratic systems involve competitive elections that are free, fair, and regular (Al-Sulami, 2003; Esposito & Voll, 1996; Yusof et al., 2014). Accordingly, the absence of such fair and free elections indicates the absence of a democratic system (Piscatori, 2000). To discuss the concept of an election, it is essential to understand the concept of representatives. While it is known that all people in society rule a democracy, society cannot be governed by all people (Piscatori, 2000). In this regard, the need for representatives arises. Therefore, the two concepts of democracy and the election of representatives are inseparable.

Political participation has an essential value from the Islamic perspective, as it is the right of people and a religious obligation in Islam (Yusof et al., 2014). In Islam, individuals have realized political participation through the *shura* system (Al-Sulami, 2003). Moreover, Islamic principles such as *nasihah* (voluntary advice) and *al-amru bil ma'ruf wa nahyu an munkar* (enjoy good deeds and forbid evils) encourage the political participation of citizens with their leader (Yusof et al., 2014). In particular, the institution of *hisbah* (Islamic ombudsman) plays an important role in the assessment of a leader's transparency (Yusof et al., 2014). However, the conventional and Islamic perspectives vary in their purpose of participation. While political participation is exercised ‘as a mean of obtaining the power to increase the likelihood of realising private advantages’ in Western democracy, in the Islamic

*shura* system, political participation is used to enhance cooperation among citizens and groups in society, and promote their common interests (Al-Sulami, 2003).

To understand the Islamic perspective on elections, it is essential to comprehend the concept of representatives as a crucial aspect of elections. Islam acknowledges the representation of majority interests and engagement in public and political affairs (Al-Sulami, 2003) as a means of people's authority (Piscatori, 2000). However, it should be distinct from God's sovereignty in Islam. While sovereignty originates from the God in Islamic belief, practical authority over the state's public affairs is vested in the people as a viceregent of God (Yusof et al., 2014; Piscatori, 2000). There are Quranic verses regarding this issue (Naqvi, 1994; Piscatori, 2000; Yusof et al., 2014):

*'obey God, the Prophet, and those in authority from among you'. (4:59)*

*'were you to follow the majority (akthar) of those on earth, they will lead you away from the path of God'. (6:16)*

*'He it is Who hath placed you as vicegerent of the earth... ' (6:166)*

Moreover, although Islam puts a high value on consultation, it is evident that not all members of society can attend consultations or a consensus process (Yusof et al., 2014). Therefore, the concept of *shura* also encompasses the representative concept of Islam. Muhammad Asad (1900-1992), an influential Muslim thinker and modernist, argues that 'the legislative assembly – *majlis ash-shura* – must be truly representative of the entire community, both men and women' (Esposito & Piscatori, 1991, p.434). Consequently, there is a need for the citizen-selected representatives to carry out decision-making processes on behalf of the people and the public (Yusof et al., 2014). According to Muhammad Asad, the representative system should be selected by free elections, with the participation of all people, men and women, in society (Esposito & Piscatori, 1991).

Regarding the presence of representatives in Islamic history, the Prophet Muhammad's tradition utilises such resources. In the time of the Prophet Muhammad, he consulted with the representatives of his companions from Ansar and Muhajirin even during the battle of the confederates (*Ahzab*) (Yusof et al., 2014). However, the concept of representatives between Western democracy and Islam differs. While Western representatives stand for the representatives of people, Islamic representatives imply both that of people and as the viceregent of God. The concept of representatives and elections in Islam is embodied in the *caliphate (al-khalifah)*. In general, the leaders of the *caliphate*, known as *caliph*, have acted

as the heads of society, ruling the state of Islam (Yusof et al., 2014). This concept is compatible with democratic thought since a *caliph* was not only considered a representative of God but also that of the people in society (Yusof et al., 2014). Thus, Abu a'la Mawdudi (1903-1979) states that the 'political system of Islam has been based in three principles, viz: *Tawhid* (unity of God), *Risalat* (Prophethood) and *Khalifat (Caliphate)*' (Esposito & Voll, 1996, p.23). Moreover, in the *caliphate* period, a kind of election could be seen from the *Caliph* Umar, who asked the members of the *shura* committee to elect his successor through the majority voting system (Yusof et al., 2014).

Many Islamic scholars have discussed this issue. Muhammad Asad (1900-1992) is an example of a scholar with modern views on the importance of elections. He says, 'in order to satisfy the requirements of Islamic law, the leadership of a state must be of an elective nature' (Piscatori, 2000, p.15). Abu a'la Mawdudi (1903-1979) also agrees on the necessity of the majority voting system in an advisory body (Piscatori, 2000). Furthermore, Yusuf al-Qaradawi (1926- ) poses the key similarity between democracy and Islamic principles as being the right to select a leader through free and fair elections (Yusof et al., 2014). However, as the details of the election system are left to the community (*ummah*) (Piscatori, 2000), there are still debatable issues in elections within Muslim countries.

In summary, the Islamic principles from the Holy *Quran* and *Sunnah*, and Islamic history from the Prophet Muhammad and *caliphate* times have acknowledged the value of election. As Islamic principles place a high value on morality and ethics (Yusof et al., 2014), fair, free, and just elections should be preserved. However, the Islamic perspective's notion of representatives differs from that of the conventional perspective. Furthermore, as Islamic principles, especially the values of justice and freedom, are one's spiritual responsibility according to Islam, all members of the society who engage in the election, including candidates, voters, and management bodies, should also exercise those values throughout the whole process of election (Yusof et al., 2014).

#### **2.2.4. Economic institutions theory**

Islam encompasses all aspects of human life, including economic activities (Al-Sayyed, 2015; Al-Sulami, 2003; Naqvi, 1994; Piscatori, 2000; Yusof et al., 2014). Owing to Islamic ethics, morality, and societal factors, which emphasise economic cooperation, Choudhury (1992) refers to Islamic economics as a 'socio-economic' system. Naqvi (1994) also mentions the 'socio-economic level' and stresses Islamic economics' societal features as an economic

activity and a spiritual aspect of Muslims in Islam. The significant economic institutions employed in this study, economic freedom or liberalisation and private property rights from the Islamic perspective, are discussed in the sub-sections below.

#### **2.2.4.1. Economic freedom**

Economic freedom can be defined as the individual right of a human to control their labour, resources, and property with which they have the freedom to work, produce, hold, and invest as they wish (Miller et al., 2019). In a society that ensures economic freedom, the role of the state and government is to allow people to work and create goods and services that can be freely circulated and to limit individual liberty to protect others' liberties (Miller et al., 2019). Economic freedom is highly promoted and considered one of the essential factors in developing competitive markets (Giavazzi & Tabellini, 2005; Sufian & Habibullah, 2010). Moreover, it is directly related to healthy and clean societies and environments, greater wealth, development of people and democracy, and poverty reduction (Miller et al., 2019).

In the Islamic perspective, as in the case of political affairs, Islam does not specify the details of economic rules; instead, it provides the general guidelines of economic affairs such as the limits and responsibilities of individuals in economic activities (Behdad, 1992). To understand the notion of economic freedom, it is essential to understand the principle of freedom in Islam from its ultimate sources. Freedom is ensured in Islam by its ethical and moral principles as it is derived from the notion of 'free-will', one of Islam's essential principles and axioms (Asutay, 2007; Haqqi, 2015; Naqvi, 1994). Moreover, Al-Tahtawi (1801-1873), a famous Egyptian religious scholar, argues that the widely understood concept of freedom is ensured in Islam as it stresses the value of justice, equality, and rights in society (Enayat, 2005). Al-Turabi (1932-2016) holds that all kinds of freedom—political, societal, and economic—are ensured in Islam (Al-Sulami, 2003). Consequently, Islamic principles also assure economic freedom (Naqvi, 1994), by which people can conduct commerce, and hold private property and enterprise (Asutay, 2007; Kabbani, 2002).

However, Islamic freedom, including economic freedom, is distinct from that of the conventional perspective of it. In the conventional concept of freedom, especially according to Kant, the individual has the autonomy as a free and rational individual in society to choose and act (Naqvi, 1994). Nevertheless, there are particular limitations to economic freedom and consequent individual rights in economic affairs in Islam. This situation is because, in Islam, there are separate relationships between the individual and the God, and the individual and

society (Naqvi, 1994). The principle of *Tawhid* establishes the vertical relationships with God and states the limitations on these issues. Consequently, Islam denies the absolute autonomy of people; instead, absolute autonomy is only given to God, and the people's autonomy is relative (Naqvi, 1994). According to Naqvi (1994), the Holy *Quran* states thus:

*'... but yet, man is rebellious, for he thinks he is sufficient in himself' (96:6-7)*

The relationship with society in Islam also limits individual freedom because every human is simultaneously cooperative and collective, and has social responsibilities (Choudhury & Malik, 1992; Naqvi, 1994). These 'responsibilities' constitute another vital value and axiom in Islam, directly relating to the value of 'free-will' (Asutay, 2007; Naqvi, 1994). Accordingly, human freedom, including economic freedom, is limited by the economic and social responsibilities of individuals (Naqvi, 1994).

To sum up, while all types of freedom are ensured in Islam, they are limited by *shariah*. In other words, any economic actions or activities that are against Islamic rules, morality, and societal values are not allowed in Islam (Asutay, 2007; Kabbani, 2002). It is the most distinct feature of an Islamic economy compared to conventional individual freedom in a conventional economy.

#### **2.2.4.2. Property rights**

Another crucial economic institution is securing private property rights. From the conventional perspective, private property can be defined as 'the right of an individual to use and dispose of, along with the right to exclude the access of others' (Askari et al., 2014a, p.18).

In the Islamic perspective, the Islamic economic system guarantees private property and enterprise and ensures individual freedom (Asutay, 2007). Consequently, all individuals have the right to access and hold resources and property (Askari et al., 2014a; Behdad, 1992). However, ensuring private property right in Islam is distinct from the conventional perspective due to the aforementioned unique relationships in Islam, and the definitions and limitations of property rights (Behdad, 1992).

The first and most integral concept regarding property and resources is ownership. According to Islamic principles, without any doubts among scholars, all resources and property on Earth are owned by God, with people only having a trusteeship (Askari et al., 2014a; Behdad, 1992; Choudhury, 1992; Naqvi, 1994). Consequently, individuals cannot have absolute ownership

over property, which is the most distinct feature compared to the conventional perspective (Naqvi, 1994). Behdad (1992) refers to some Quranic verses regarding this issue:

*'Unto Allah whatsoever is in heavens and whatsoever is in earth'. (2:284)*

*'Believe in Allah and his messenger, and spend of what whereof He had made you trustee'. (57:7)*

It is derived from the concept of *Tawhid* in Islam, which denotes the vertical relationship with God; and the horizontal relationships among individuals in society and economic affairs (Behdad, 1992). Thus, individuals cannot claim any resources or property without following *shariah* (Choudhury, 1992).

Moreover, Islam does not acknowledge property that, by definition, has not been acquired through hard work and efforts (Choudhury, 1992). In other words, work and labour are an essential part of acquiring the right to private property (Askari et al., 2014a; Naqvi, 1994). Behdad (1992) finds the Quranic verse regarding this issue:

*'And that man hath only that for which he marketh effort'. (53:39)*

According to Ali (2013), the Prophet Muhammad also mentions that:

*'Some sins can be abolished only by working hard to get earnings'.*

Therefore, certain activities are not allowed under this principle, and consequent outcomes and property are not acknowledged as property. For instance, Islam explicitly prohibits interest (*riba*) on a loan contract (Askari et al., 2014b; Behdad, 1992; Choudhury, 1992; Kuran, 1992) because it is considered unearned income without any work and efforts. Moreover, the risks derived from interest-based contracts shift to the borrowers without consideration of the contract outcomes, thus causing inequality in society (Askari et al., 2014b; Kuran, 1992). Thus, the Holy *Quran* explicitly prohibits such interest. Behdad (1992) finds the Quranic verse:

*'Those who swallow riba cannot rise up save as he ariseth whom the devil hath prostrated by [his] touch'. (2:275)*

By the same token, gambling, theft, and bribery are also prohibited (Askari et al., 2014a). Instead, the Holy *Quran* promotes trading, which is also an aspect found in the Prophet Muhammad's background as a merchant (Behdad, 1992). Behdad (1992) highlights this Quranic verse:

*'Allah permitted trading and forbad riba'. (2:275)*

Islam promotes the mutual exchange of property rights in which the risks are shared by both parties (Askari et al., 2014b). Risk-sharing is one of the crucial rules of property rights in Islam, and it is promoted in economic activities (Askari et al., 2014a; Behdad, 1992).

Furthermore, Islam limits the disposal of assets, unlike the conventional perspective in which the disposal of assets is an individual right and permissible (Askari et al., 2014a). For instance, Islam limits the waste, destruction, and opulence of an individual's assets since these actions are against Islamic rules (Askari et al., 2014a), thereby emphasising God's ownership of all resources on earth.

Finally, Islam teaches the balance of individual freedom and its social responsibility according to the three relationships in Islam; consequently, in terms of property rights, people cannot abuse private property right considering the social impact of property (Naqvi, 1994). In Islam, economic activities and actions cannot be considered as distinct from the social surroundings (Ali, 2013). Thus, profit maximisation is not the ultimate goal of economic activities in Islam; instead, it is the welfare of society (Ali, 2013). In this regard, along with the value of distributive justice in Islam, which is one of the religion's primary objectives (Naqvi, 1994), there is a unique institution for the sake of redistribution of wealth, known as *zakat*, which is collected by individual's accumulated wealth (Kuran, 1992). Although it resembles the conventional tax system, its payment is not enforced by a state rule but by a sense of religious obligation for Muslims. Kuran (1992) points out that the Holy *Quran* mentions *zakat*:

*'Those who believe, And do needs of righteousness, And establish regular prayers, And 'zakat', Will have their reward, With their Lord: On them shall be no fear, Nor shall they grieve'. (2:277)*

However, due to the general guidelines and lack of details on policies in Islam, there is a lack of consensus among Islamic scholars on the scope of private property rights allowed in Islam (Behdad, 1992).

**Table 1: Theoretical differences of conventional and Islamic perspective**

	<b>Conventional Perspective</b>	<b>Islamic Perspective</b>
<b>Political Economy</b>		
- Definition	Interdisciplinary study of economics within the extensive formation of the society	A study of Islamic economics-Islamic state interaction Political economy approach to Islamic economics A humanistic political economy which is derived from Islamic morality
- Objective	To maximise individual earnings and wealth	To realise economic and social justice To realise the <i>Maqasid al-shariah</i> (to realise the objective of human well-being)
- Features	Positive Human-centered Human-behavior based	Normative Creator-centered Rule-based
<b>New Institutional Economics</b>		
- 1 <sup>st</sup> Level (informal institutions)	Country's values, culture, traditions, norms, knowledge and religion	Islamic basic knowledge, values, morality and ethics rooted in the Holy <i>Quran</i> and <i>Sunnah</i>
- 2nd Level (institutional environment)	Country constitutions, laws, courts, political systems	Islamic law, Islamic banking and finance law, Islamic courts
- 3 <sup>rd</sup> Level (organisational level)	Financial institutions, organisations	Islamic banking and finance, Islamic insurance, Islamic capital market etc.
<b>Political Institutions</b>		
- Democracy	Popular sovereignty (Based on secular system)	God's sovereignty (Based on <i>Tawhid</i> )
- Civil Liberties	Regulated by people and country law	Regulated by <i>shariah</i>
- Political Participation	To obtain the power to realise private advantages	To enhance cooperation in society and promote the common interest
- Election	As a mean of selecting representative of people	Not only representative of people but also that of vicegerent of God



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## Economic Institutions

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- Economic Freedom	Unlimited but limited by country law to protect others' liberties	Limited by <i>shariah</i> for Islamic morality, social benefits and responsibilities
	Absolute autonomy of people over economic affairs	God's absolute autonomy No absolute autonomy of people
- Property Right	Property defined by country law	Property defined by <i>shariah</i>
	Individual absolute ownership	God's ownership of all resources An individual is a trustee of God
	Disposal of property is an individual right and permissible	Limit in disposal of property
	Redistribution of wealth by country tax law	Redistribution of wealth by not only country tax law but also <i>zakat</i>

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## 2.3. Institutions and banking

### 2.3.1. Political institutions and banking

Referring to the theoretical background discussed earlier in this study, the impact of institutions—including political and economic ones—on the performance and outcomes of the economy is significant. Considering the crucial role of the banking sector in the financial and overall economic performance and development of a country (Sufian & Habibullah, 2010), it is necessary to examine their impact on banking and finance. According to North (1990), a political institution is one of the fundamental institutions for financial development along with the legal institutions. However, there is a consensus among researchers that the impact of political institutions outweighs the role of legal institutions in the development of financial sectors, which further influences the formation of legal institutions (Roe, 2006; Keefer, 2007; Roe & Siegel, 2011 cited in Ashraf, 2017). It is consistent with the theory of political institutions and the hierarchy of institutions hypothesis (HIH). Thus, the varying degrees of development and performance of banking and finance in contemporary societies are rooted in their divergent political institutions, such as the extent of constraints on the government, political access, and competition (Quintyn & Verdier, 2010).

This study examines the impact of democracy, classified by the degree of constraints on the government and elections, on banking sectors. While the economic development study contains many underlying theories on the impact of regimes and elections, theories focusing on banking and finance are scant. Thus, various empirical research supports a short of the theories.

### **2.3.1.1. Democracy and banking**

As previously discussed, the primary classification that differentiates between a democracy and autocracy is the extent to which the government is constrained by institutions (Haber et al., 2008). Thus, a democracy is commonly denoted as a limited government in political studies. In the context of finance, it is broadly argued that the limited government of a democracy is a precondition or pre-requisite for financial accumulation, financial liberalisation, and a proper and adequate financial regulatory framework (Agoraki et al., 2019; North & Weingast, 1989). Therefore, the nature of democracy impacts the banking and financial sectors significantly and in varied ways.

First, the democratic nature plays a role in limiting the impact on and interference of politics in banking sectors. The relationship between politics and banking is inseparable; governments need the financial intermediaries to act as a source of funds, and banks require the state for the enforcement of contracts and maintenance of the structure of the credit market (Haber et al., 2008). In relation to the credit market, the government controls and influences the banks, to some extent, through chartering restrictions and licensing, and the banks influence the government's regulations and supervisions (Jackowicz et al., 2013; Liu & Ngo, 2014). However, inordinate political impact and interference can negatively affect the banking sectors. According to the Centre for the Study of Financial Innovation (CSFI) and PricewaterhouseCoopers (PWC), political interference in banking was the most significant risk in the recent global financial crisis (Ashraf, 2017; Liu & Ngo, 2014). It also accounts for the frequent banking crises in the US, when compared to Canada (Calmiris & Haber, 2014 cited in Ashraf, 2017). This situation is because the politicians' primary objective is political survival (Liu & Ngo, 2014). To survive in the political sphere, they might exert power and use the banking and financial systems for their benefits, such as lending to specific industries at opportune times (Liu & Ngo, 2014), which supports the theory of the political business cycle that denotes the government's tendency to make economic policies for political gain (Hasanov & Bhattacharya, 2019). Furthermore, some political elites might control the markets to maximise their economic benefits (Agoraki et al., 2019) by 'exploiting their

countries' economic resources and outputs' (Bitar et al., 2017, p.20) and capturing the regulatory framework (Agoraki et al., 2019). Such interventions can have a significant negative impact on the overall performance of the banks and economy. In this regard, there is a need for appropriate political institutions that limit the authority and discretion of the government while also limiting banking performance for the development of the banking and financial sectors (Haber et al., 2008). Otherwise, an unconstrained and unaccountable government can capture regulations in favour of specific and connected interests that undermine the financial accumulation in the country (Rajan et al., 1998).

There are enough historical examples of this issue. While the US, under the federal system with limited government authority, has the world's most advanced banking and financial system, Mexico is facing political anarchy and has an uncompetitive banking industry and a relatively undeveloped financial system (Haber et al., 2008). It shows that in contrast to the US, where the various developed political institutions have contributed to the development of the country's banking and finance, Mexico's weak political institutions have led to a fragile financial system. Besides, the case of Brazil shows a positive relationship between the development of political institutions and banking industry. Private sector finance began developing in Brazil in 1888 when the monarchy collapsed, and in the following three years, the number of Brazilian banks tripled (Haber, 2003).

Second, the democratic nature that allows political access and participation and leads to political competition has committed to developing banking and finance. Political competition ensures that politicians follow the rules to the development of the economy (Liu & Ngo, 2014). Moreover, political competition encourages banking and market competition by promoting access to and participation in financial markets (Ashraf, 2017). For instance, liberalisation of entry in the banking sector was possible after expanding suffrage in France and other European countries (Haber et al., 2008). Market competition is critical in economic growth (Rajan & Zingales, 1998; Beck et al., 2000). Besides, competition in the banking industry positively impacts financial stability (Agoraki et al., 2019). Countries under weak political institutions tend to lack financial stability as there is a likelihood of risk-shifting behaviour and abuse of investors' money, the consequence of which can be a financial crisis (Agoraki et al., 2019).

One of the factors behind the development of the US banking sector is the active competition in banking industry following the liberalisation of entry barriers consequent to political competition (Agoraki et al., 2019) manifested by 'the suffrage, party competition, a

bicameral legislature and federal system of government' (Haber et al., 2008). On the contrary, the lack of competitive atmosphere in the concentrated banking systems of Mexico and Brazil produces small credit allocations (Haber, 2003). Even the competitive authoritarian regime of Malaysia, where elections institutionalise political competition, is actively developing products conforming to the Islamic finance industry (Apaydin, 2018). Nevertheless, under a federal autocracy marked by elite competition, the United Arab Emirate (UAE) is experiencing low product development and relatively low industrial development (Apaydin, 2018). This situation is because, in the atmosphere of political competition, a few people cannot control the technical matters of the industry, which leads to the creation of new financial institutions and products (Apaydin, 2018). However, there also exists an opposite view of the impact of competition on banking stability. For instance, Ashraf (2017) argues that due to the increase in credit market competition, the banks' risk-taking ability also increases due to the rise in alternative sources of finance in the market. It is because high competition in the market may encourage banks to reduce interest rates on loans, whereby banks provide loans to risky borrowers to compensate for the reduced interest margins (Ashraf, 2017).

Third, the regulatory restrictions that vary according to the system of governance can impact banks. The excessive regulatory restrictions on banks are linked to 'lower credit market development and less bank stability and more corruption in lending' (Haber et al., 2008). It is because such an environment causes banks to lobby and limit banking competition and financial development (Bodenhorn, 2003). Autocratic countries tend to have more regulatory restrictions though they have a higher entry rate of banks than democratic countries (Barth et al., 2006). The example of less regulation in the US reflects a competitive market atmosphere and the consequent development of banking and finance in the country (Agoraki et al., 2019).

In summary, the more efficient political institutions manifested by constraints on government tend to limit the negative impact of politics on banks, and generate political competition; the consequent market and bank competition incur fewer regulatory restrictions on banks and their entry. This situation eventually contributes to the development of the banking and financial sectors. Moreover, based on the theory of the hierarchy of institutions hypothesis (HIH), the more efficient political institutions manifested by a democracy tend to produce better regulatory frameworks, in which there exists lower credit risk and a more stable banking system (Agoraki et al., 2019).

### **2.3.1.2. Election and banking**

As one of the political institutions, the election significantly impacts banking practice. Indeed, they affect not only banking performance, including lending activities and net interest margins (*see*: Baum et al., 2010; Dinc, 2005; Micco et al., 2007) but also banking stability and crisis (*see*: Keefer, 2006 cited in Hasanov & Bhattacharya, 2019). The effect of elections on banking practice mostly comes with the issue of bank ownership. It is because elections are the most popular and powerful tool of political interference in banking (Liu & Ngo, 2014) through their ability to exert the role of government in government-owned banks (Dinc, 2005).

As for banking performance, the political cycle, including the implementation of elections, is the most crucial factor shaping the profitability of state- or government-owned banks during elections (Jackowicz et al., 2013). State-owned banks tend to have lower net interest income ratios during elections as they are likely to impose lower interest on loans (Jackowicz et al., 2013; Micco et al., 2007). Thus, the return on assets of state-owned banks decreases compared to that in their private counterparts (Micco et al., 2007). Moreover, an increase in the loan volume of state-owned banks is also a positive effect of elections compared to privately-owned banks (Cole, 2009 cited in Baum, 2010; Dinc, 2005; Micco et al., 2007). It implies politicians using state-owned banks for their interests during the election period to obtain funds (Dinc, 2005).

In terms of banking stability and crisis, the likelihood of a banking crisis in the lead up to an election decreases (Hasanov & Bhattacharya, 2019). Liu and Ngo (2014) find that there is approximately 45% less possibility of a bank failure in this period. Any crisis would negatively impact the politicians' performance in the forthcoming elections (Hasanov & Bhattacharya, 2019). As banking stability and crisis present a high risk to an incumbent politician, they try to avoid these situations by delaying banks' failure (Liu & Ngo, 2014).

The impact of elections on banking performance, in particular, can vary by country and research (*see*: Baum et al., 2009 cited in Jackowicz et al., 2013; Micco et al., 2007) due to the particular nation's specific circumstances, history, and research scope. Nonetheless, the impact of the elections, either positive or negative, on banking is evident. Especially with state-owned banks, elections represent the influence of politics on the banking sectors, thus making such banks vulnerable, especially during an election period (Jackowicz et al., 2013). While this phenomenon is manifest in developing countries where political institutions are

underdeveloped, it is not the case in industrial countries (Micco et al., 2007). In this regard, to reduce the influence of politics in banking, especially in the state- or government-owned banks, there is a need for political institutions that limit and control the autonomy and power of politicians and promote political competition (Liu & Ngo, 2014).

Other than the direct impact of political institutions, Flachaire et al. (2014) argue that political institutions indirectly impact economic growth. The democratic nature of a country can reinforce economic liberalisation (Fidrmuc, 2000 cited in Agoraki et al., 2019). On the contrary, Bekaert et al. (2004, 2006) demonstrate that financial liberalisation creates instability in countries with weak political institutions and inadequate protection of investors. Moreover, limited government is one of the primary factors to ensure property rights and legal enforcement of contracts as an economic institution (North & Weingast, 1989). The impact of economic institutions in general, and liberalisation, in particular, plays a crucial role in connecting political institutions. For example, politically free societies manifested by freedom of expression and free media, which represents democratic systems with a good quality of governance more often show the positive effect of financial freedom on bank efficiency (Chortareas et al., 2013). Moreover, Demirguc-Kunt and Detragiach (1999) demonstrate that undeveloped institutional environments tend to result in more banking crises due to financial liberalisation, which increases banks' propensity to engage in more risky activities (Cubillas & González, 2014). Referring to the theory of the hierarchy of institutions hypothesis (HIH) and supporting empirical research that considers political institutions as ultimate institutions that affect overall economic performance and outcomes, which, in turn, shapes economic institutions, it can be assumed that the impact of political institutions on banking performance is too important to be ignored.

### **2.3.2. Economic institutions and banking**

According to Flachaire et al. (2014), political institutions indirectly impact economic growth, while economic institutions have a direct impact. Substantial research has been published and theories propounded on the effect of economic institutions on economic growth; yet there remains a lack of theories and studies related to banking and finance, in particular.

A primary variable used in research on economic institutions is economic and financial liberalisation (freedom). Financial liberalisation is a component of economic liberalisation, and implies an 'economy's banking system effectiveness as well as independence from government control and interference in the financial sector' (Chortareas et al., 2013, p.1230).

However, the terms ‘economic liberalisation’ and ‘financial liberalisation’ are used interchangeably in many studies as economic liberalisation usually encompasses financial liberalisation. In terms of banking sector performance, in particular, the indexes of economic and financial freedom are increasingly used in research (Chortareas et al., 2013) consequent to the global trend of financial liberalisation and integration, and the consequent banking competition in financial markets (Tanna et al., 2017). In contrast to many investigations on the relationship between liberalisation and economic growth (*see*: Ozdemir & Erbil, 2008; Ranciere et al., 2006 cited in Ahmed, 2013; Gwartney et al., 1996 cited in Gropper et al., 2015; Holmes et al., 2008 cited in Sufian & Habibullah, 2010), those on the impact of economic institutions on banking performance remain inconclusive and controversial. The views on the impact of economic and financial liberalisation on the banking and financial sector have thus diverged into two opposing views.

The first view supports the positive impact of liberalisation on financial development. This opinion mainly argues that economic and financial liberalisation positively affect financial development, and eventually contribute to the growth of the economy (Cubillas & González, 2014). This view originates from research conducted by McKinnon (1973) and Shaw (1973) (Ahmed, 2013), who state that the positive impact of liberalisation could be generated through positive and improved banking performance. In terms of the profitability of banks, economic freedom can have a positive effect on banks’ return on assets (ROA) (Gropper et al., 2015; Sufian & Habibullah, 2010) and return on equity (ROE) (Sufian & Habibullah, 2010). It is because an atmosphere of greater freedom inspires banks to work better and harder as it establishes a customer-focused environment (Gropper et al., 2015). Moreover, fewer regulatory restrictions from governments allow banks and entrepreneurs to undertake their business freely, thus leading to innovation and development (Sufian & Habibullah, 2010).

Furthermore, the interest rates in economically free societies tend to be set higher by the market forces than in the restricted financial systems (Li, 1997). Higher interest rates might positively impact savings levels and increase credit supply, eventually promoting the growth rate (Ahmed, 2013). In contrast, in a restricted financial environment, the lower interest rates cause lower savings and investments, thereby ultimately reducing the volume of business (Kitchen, 1986 cited in Ahmed 2013).

From the productivity and efficiency point of view, banks tend to manage their business in a more cost-efficient manner by maximizing their revenue in less restrictive environments, thus

ultimately leading to the efficient allocation of resources, reduced transactions and information cost, and improved economies of scale (Chortareas et al., 2013). This situation, in turn, improves banks' productivity (Tanna 2017) (Ahmed, 2013). Nevertheless, there is the view that excessive government interference might lower the efficiency of banks (Chortareas et al., 2013; Sufian & Habibullah, 2010).

Second, financial liberalisation contributes to the development of the economy and banking sectors through increased competition, which leads to pricing competition and better services and products in the market (Ahmed, 2013). Furthermore, according to the 'competition-stability' view, banking competition can reduce the risk to banks through safer business with lowered interest rates for borrowers and prevent the risk of expense from a lack of borrowers (Cubillas & González, 2014). On account of banking competition, interest rates might be set lower, thus ensuring that the borrowers repay their loans. However, establishing higher interest rates and more market power could lead to defaults on loans and result in greater risk to banks (Boyd & De Nicolo, 2005). This fact is supported by empirical research conducted by Boyd et al. (2006), who established that the risk to banks tends to be higher in more concentrated atmospheres. Uhde and Heimeshoff (2009) also explained that the concentration of financial markets negatively affects the stability of finance in EU countries (Cubillas & González, 2014). Nevertheless, as one of the causes of the negative impact of liberalisation on banking and finance, the relationship between competition and financial development is a controversial issue.

The opposing view mainly concerns the negative impact of liberalisation on financial sectors. Financial liberalisation might cause instability of banks and eventually lead to banking crises through the increased risk-taking of banks and financial fragility (Tanna et al., 2017). In this regard, market competition is a factor behind financial fragility. The traditional theory of the relationship between competition and finance is 'competition-fragility', which asserts that greater competition among banks due to liberalisation destroys the market power and lowers the profit margins, eventually corroding the value of the bank charters (Cubillas & González, 2014). The margin of banks can be reduced due to the openness of markets and engagement of other participants, including foreign players (Ahmed, 2013; Chortareas et al., 2013). This state would affect the efficiency of the banking system (Chortareas et al., 2013) and reduce the size of the financial system, and have a negative impact on the country (Ahmed, 2013).

A more pressing concern related to the negative impact of liberalisation is the stability of the banks and economy. Financial liberalisation can increase the risk to banks and eventually



hamper the financial instability of markets, as financial institutions tend to be engaged in newer, riskier businesses due to increased competition (Chortareas et al., 2013; Tanna et al., 2017). Furthermore, the openness to external markets can cause fluctuation of exchange rates, which incurs foreign exchange risk, and later, the fragility of banks, thus eventually affecting economic development (*see*: Laurenceson & Chai, 2003; Ahmed, 2013; Cubillas & González, 2014). Therefore, the collective agreement is that financial liberalisation is the main factor behind the frequent banking crises since the mid-1980s (Tanna et al., 2017) and the recent global and European crises (Chortareas et al., 2013).

Thus, some kind of government restriction is essential. Governments regulate to prevent the monopolising and excessive risk-taking behaviour of banks (Chortareas et al., 2013). Considering the significant role of banking in the economy, appropriate regulations and control by governments are necessary for the stability and soundness of financial systems and the economy as a whole (Sufian & Habibullah, 2010). However, appropriate government control and restrictions should be implemented, given the potential negative and positive impacts of regulations.

### **2.3.3. Regulatory institutions and banking**

It is evident that regulation in the banking sector significantly affects banking performance. For instance, according to diverse capital requirements, following the regulatory directions by intervention institutions for banks, each bank has a different balance sheet structure along with different ratios of assets and liabilities (Pasiouras et al., 2009). The divergent structures and ratios of assets and liabilities of banks form varied asset portfolios, and consequent returns and costs, which eventually affect banking performance in terms of efficiency and liquidity creation either positively or negatively.

In an optimistic view, regulatory intervention can positively affect the banks' stability. For instance, higher capital requirements can act as a buffer against risks such as portfolio risk (Banker et al., 2010) by reducing non-forming loans and improving bank stability (Barth et al., 2004). Moreover, especially after the financial crisis in 2008, the importance of liquidity in maintaining banking stability has arisen as it can also play a role as a buffer for banks' funding structure (Bitar et al., 2019). The official supervision approach view also holds that strong official supervision can avoid market failure by overseeing, regulating, and disciplining banks (Pasiouras et al., 2009). Doing so can prevent banks from engaging in high-risk activities for higher profits (Barth et al., 2004). In addition, a powerful official

supervision can strengthen the corporate governance of banks by reducing corruption and improving the functions of banks (Beck et al., 2006). Moreover, market discipline can positively play its role through private monitoring from depositors, debt-holders, and equity holders, thus leading to better outcomes for the banking sector (Beck et al., 2006). Overall, strong regulations on bank entry standards can promote stability in the banking sector (Barth et al., 2004). From a banking performance perspective, by restricting banks from engaging in risky and new activities, banks are encouraged to engage in and focus more on their core objectives such as liquidity creation to generate profits, improving banking performance (Bitar et al., 2019; Kladakis et al., 2021).

Nonetheless, the opposing views on strong regulations on the banking sector argue that stricter banking regulation harms the banking performance. For example, as the capital requirements of banks can impact the quantity and quality of lending by banks, higher capital requirements can reduce aggregate lendings (Pasiouras et al., 2009), which eventually affects the capacity of liquidity creation by banks (Berger et al., 2016; Bouwman, 2018). It is because higher capital requirement means the reduced total assets or total assets plus off-balance sheet exposures, and risk-weighted assets as a denominator in capital requirements formula, which can be reduced by reducing business loans or off-balance sheet guarantees leading to reduction in liquidity creation (Berger & Bouwman, 2016). Thus, this requirement affects the liability side of the banks' balance sheet by requiring banks to hold equity (Berger & Bouwman, 2016). Moreover, liquidity requirements imposed by Basel III are also expected to affect the liquidity creation capacity of banks. It is because while liquidity requirements can address the withdrawal risk on the liability side and off-balance sheet by requiring banks to hold cash-like assets, this holding may reduce banks capacity for liquidity creation (Berger & Bouwman, 2016).

Increased activity restrictions may also prevent banks from diversifying their portfolio and taking advantage of the synergy effect with complementary activities, thus decreasing banks' liquidity creation capacity (Kladakis et al., 2021). In addition, by changing the asset portfolio, banks efficiency can be negatively affected due to the resulting difference in returns and costs (Pasiouras et al., 2009). Moreover, the private monitoring approach argues that more powerful supervisory power might increase corruptions in banks that harm banking operations (Beck et al., 2006). This approach is in line with the 'political/regulatory capture view', which argues that politicians and supervisors seek their interest instead of maximizing social welfare (Hamilton et al., 1788; Buchanan & Tullock, 1962; Becker, 1983; Shleifer &

Vishny, 1998 cited in Beck 2006). Thus, powerful supervisory powers can reduce the integrity of bank performance, resulting in low efficiency of banks (Beck et al., 2006). As a result, it can be linked to increase in corruption by banks since the strict environment causes banks to lobby (Bodenhorn, 2003). This can limit banking competition and financial development, leading to lower credit market development (Haber et al., 2008). Moreover, increased regulations for the banking sector restrict competition due to stricter rules for entry. Autocratic countries tend to have more regulatory restrictions, though they have a higher entry rate for banks than democratic countries (Barth et al., 2006). The US's example of less regulation shows the results of a competitive market atmosphere and the consequent development of banking and finance in the country (Agoraki et al., 2019).

Moreover, excessive regulation can negatively impact the stability of banks. Consequent to high capital requirements, raising capital becomes more expensive; it can increase the risks for banks and induce banks' willingness to lend without proper screening, which consequently leads to more risks (Barth et al., 2004). Furthermore, restricting banks ironically forces them to participate in a broad range of activities, which can augment their risks (Barth et al., 2004).

## **2.4. Methodology**

This study employs a systematic literature review to identify the existing research performance and the research gaps in institutions and banking performance. Diverse research on banking and finance uses a systematic literature review to identify the current research status and gaps (see: Deku et al., 2019; Kersten et al., 2017; Kara et al., 2021; Zafar & Sulaiman, 2019). A systematic literature review consists of a comprehensive research of relevant theoretical and empirical studies on a specific topic and synthesises and appraises the existing literature in a critical and justified way (Schiehl & Martins, 2016; Tranfield et al., 2003). A systematic literature review follows a transparent and scientific procedure, which minimises errors and bias (Tranfield et al., 2003, cited in Kara et al., 2021).

### **2.4.1. Sample selection process**

To select samples, this thesis follows Deku et al. (2019), and Kara et al. (2021)'s structured selection steps. Firstly, this thesis clarifies this study's objectives and scope. The first objective of this study is to identify the differences between conventional and Islamic institutions with a particular focus on political, economic, and regulatory institutions, which no prior investigation has attempted. Secondly, this study seeks to figure out the ways

different institutions influence banking. Thirdly, this study intends to find out the research gaps by critically reviewing and summarising the existing theoretical and empirical literature on various institutions and banking. Finally, this thesis provides suggestions for future research and policymakers.

In the second step, this thesis sets the inclusion criteria. The first criteria are the inclusion of theoretical and empirical research that deals with institutional environments, economic growth, and finance and banking performance. This study includes theoretical studies that explain the impact of institutions on economic growth and performance, banking performance, and relationships of various institutions. This study also includes empirical studies that employ institutions (either political, economic, regulatory, and Islamic institutions) as the main independent variable in their empirical model. Although the kind of institutions used varies among studies due to differences in definitions and criteria, those that clearly define institutions are included. As the second criterion, this study only includes peer-reviewed journal papers, working papers in renowned institutions for empirical studies, and books for theoretical studies, all in English. A third criterion, this study only includes empirical studies published between 2000 and 2021. Theoretical research published before 2000 is also included to explain the underlying theories and support the empirical research. Lastly, this study uses the following combination of keywords for searching literature in titles, abstracts, and texts: ‘political economy’, ‘economic performance’, ‘banking performance’, ‘political institutions’, ‘economic institutions’, ‘regulatory institution’, ‘Islamic environments’, ‘Islamic banks’, ‘banking efficiency’, and ‘bank liquidity creation’. This study considers the theoretical and empirical cross-country research published in journals covering three business disciplines: economics, political economy, and banking and finance. It uses the following search engines and databases: ScienceDirect, Emerald Insight, SCOPUS, Wiley Online Library, and JSTOR recommended by prior systematic literature review studies (see: Zafar & Sulaiman, 2019; Fethi & Pasiouras, 2010).

In the third step, this study applies two exclusion principles. Firstly, this study excludes duplicate studies from the keywords search. Secondly, this thesis excludes research that does not include institutional factors or variables either in their theoretical or empirical research. In the fourth step, following Deku et al. (2019) and Kara et al. (2021)’s structured selection steps, this study scrutinises the quality of the final literature based on publication outlet and content relevance. After all steps, a total of 52 papers are included. Table 2 shows the publication outlets for literature. Descriptive statistics on the type of institutions of the papers

identified are presented in table 3. The top in the list in terms of the number of articles is political institutions; however, the literature is mostly economic growth and development literature rather than banking performance. Eight pieces of literature deal with the interaction among various institutions and their impact on economic and banking performance. Finally, in the fifth step, this study classifies literature into five themes based on the research issues, questions and focus. The themes of the sample literature are listed in table 4. The most frequently researched theme is banking performance among studies on institutions and economic and banking performance. However, most studies employ economic or regulatory institutions on this issue.

**Table 2: Publication outlet**

<b>Journal title</b>	<b>Count</b>
Journal of Banking & Finance	9
Journal of Financial Stability	7
Book	6
Journal of Financial Economics	3
Journal of Financial Intermediation	3
Economic Modelling	2
Journal of Economic Growth	2
Journal of Monetary Economics	2
Working paper (IMF & Federal reserve bank of New York)	2
American Economic Review	1
Economic systems	1
Global Finance Journal.	1
International Journal of Finance & Economics.	1
International Organisation,	1
International Review of Finance	1
International Review of Financial Analysis	1
Journal of Comparative Economics	1
Journal of Contemporary Accounting & Economics	1
Journal of Economic Perspectives	1
Journal of Finance	1
Journal of International Money and Finance	1
Journal of Political Economy	1
Quarterly Review of Economics and Finance	1
Review of Development Economics	1
World Development	1
<b>Total</b>	<b>52</b>

**Table 3: Descriptive statistics**

Type of institutions	Count
Political institutions	19
Economic institutions	10
Regulatory institutions	15
Interaction effect among institutions	8
Total	52

**Table 4: Themes of samples**

Themes	Number of papers *
Economic growth	11
Banking ownership	6
Banking performance	29
Banking stability	10
Islamic banking	2

\*As papers can appear in multiple themes, the total number of papers in this table exceeds 52, the total number of papers in this study.

## 2.5. Empirical literature review

### 2.5.1. Political institutions

#### 2.5.1.1. Economic growth

There is enough theoretical and empirical research on the impact of political institutions on economic growth in general (*see*: Acemoglu et al., 2005; Acemoglu et al., 2019; Durham, 1999; Giavazzi & Tabellini, 2005; Glaeser et al., 2004; Przeworski & Limongi, 1993; Rivera-Batiz, 2002). In the theory of political institutions (Acemoglu et al., 2005), each country's specific political and historical events form their political institutions, including regime types, which determine the corresponding economic and regulatory institutions and eventually produce diverse economic outcomes. Acemoglu et al. (2005) provide examples of various nations that demonstrate this theory, including the division of Korea and the divergent economic outcomes of South and North Korea, Mexico, and the United States' disparate regime types, and a comparison between the Eastern and Western Europe. Acemoglu (2019) empirically tests the relation between democracy and GDP growth using the dynamic panel model with 175 countries from 1960 to 2010. He finds a positive effect of democracy on GDP per capita; democratization increases GDP per capita by about 20 % in the long run. Democracy can encourage investment, schooling, and economic reforms and also reduce social unrest. This result is in line with the finding of Durham (1999), who conducts

empirical research using a panel data of 105 countries from 1960-1989 to identify the relationship between political regimes and economic growth. However, he finds that the impact of political regime types differs according to the development level. For instance, discretion can decrease the growth level in advanced countries.

However, as Przeworski and Limongi (1993) demonstrate, the impact of political institutions on economic growth is inconclusive. While they find eight studies that confirm the positive impact of democracy, they also discover eight studies that confirm the positive effects of authoritarian regimes, and five that saw no differences between the two government types. Instead, many empirical studies have investigated the synergy effect between institutions, whose results are also inconclusive. Rivera-Batiz (2002) examines the impact of the quality of governance in reaction to economic growth, measured using total factor productivity (TFP), from 1960 to 1990. Rivera-Batiz (2002) notes the interesting role of governance as a medium variable; democratic institutions influence the quality of governance, which statistically impacts economic growth. In sum, democratic institutions can play their role by increasing economic growth but only with good governance.

Meanwhile, Glaeser et al. (2004) emphasize the importance of economic institutions, thus denying the impact of political institutions on economic performance. After controlling for human and social capital, they confirm that while economic institutions positively impact growth, economic institutions are not the result of political institutions, a finding that would refute the hierarchy of institutions hypothesis (HIH). Regardless of the government type, good governance and economic institutions are the vital determinants of economic growth. This finding is also in line with Rivera-Batiz's (2002) emphasis on the importance of high-quality governance and a study by Bennett et al. (2017) that observed the positive impact of economic institutions on economic development when measured by GDP per capita. Giavazzi and Tabellini's (2005) findings are consistent with those of Glaeser et al. (2004); they investigate the effects and the interactions of economic and political liberalisation on GDP per capita, using investment rate as a proxy for economic growth. They affirm that countries that first liberalised their economies and then became democracies show more growth than those that proceed in the reverse order. Economic growth is accelerated when economic and political liberalisation goes hand in hand.

### **2.5.1.2. Ownership issue**

Empirical research on the influence of political factors on the banking sector concentrates heavily on bank ownership, specifically whether they are state-owned (government-owned) or privately-owned. In the relevant finance literature, Molyneux (1992) identifies the main factors behind a bank's profitability (of both state-owned and privately-owned banks) by investigating returns on capital. Molyneux (1992) says that returns on capital have a very significant positive relationship with state-owned banks, which contradicts previous studies that discovered the opposite, such as those by Short (1979) and Bourke (1989). Regarding the impact of election periods, Dinc's (2005) results show that government-owned banks increase lending by 11% in election years, while Jackowicz et al. (2013) reveal smaller net interest income ratios in government-owned commercial banks during parliamentary election years in central European countries. Jackowicz et al. (2013) observe that decreased profitability is due to the lower interest rates charged on loans during an election cycle. On the contrary, Baum et al. (2010) did not find any significant difference in banking outcomes, measured using loan-to-asset and deposit-to-asset ratios, between government- and privately-owned banks due to elections. Different samples used in the said studies can explain this apparent discrepancy.

### **2.5.1.3. Banking performance**

Haber et al (2008) shows the historical analysis of the US, Mexico, and Brazil regarding their political institutions and banking practice. He suggests that democratic political institutions constitute the competitive banking industry in the US while political anarchy in Mexico constrained its competitive banking industry. He also empirically tests it by using the pooled cross-sectional regression and examines the democracy and ratio of bank credit to GDP. He employs the Polity IV dataset (constraints on the executive) as a political institution variable and finds that the executive constraints increase lead to a five percentage point increase in bank credit.

There is a considerable volume of much empirical research that examines the impact of political institutions on banking and finance in particular (*see*: Agoraki et al., 2019; Ashraf, 2017; Asutay & Sidek, 2020; Bitar et al., 2017; Gropper et al., 2015; Hasanov & Bhattacharya, 2019; Jackowicz et al., 2013; Liu & Ngo, 2014). Slesman et al. (2019) empirically prove the core role of political institutions in the institutional matrix in emerging markets and developing countries. They employ a panel of 77 emerging markets over the



period 1975-2010 by using the non-linear dynamic panel threshold regression. They use the Freedom House's indices of political rights and civil liberty; and Political Constraint Index (POLCON) from the Political Constraint dataset developed by Henisz (2000); and Polity IV as political institution variables. Their findings indicate that high-quality political institutions provide a conducive financial environment for financial markets, which eventually leads to growth. This study supports the theory of the hierarchy of institutions hypothesis (HIH) by arguing that political institutions determine the emergence and persistence of economic institutions. However, it explores the overall development of the financial sector.

In the banking sector, in particular, Ashraf (2017) empirically examines the impact of political institutions on banks' risk-taking behaviour by using pooled panel ordinary least squares (OLS) with the political variables from the Political Constraint Index (POLCON) of Henisz (2000), the Freedom House, the International Country Risk Guide (ICRG), and Polity IV database. He finds that better political institutions in the form of higher constraints on government increase bank risk-taking. This result is due to the increased activity of the credit market and banking sector competition resulting from better political institutions. Moreover, he avers that the political institution has a close relation with legal institutions. This finding contradicts that of Hasanov (2019). However, it is due to the different political institution variables used according to multifarious definitions and criteria in research. Hasanov (2019) investigates the impact of political determinants proxied by government stability from ICRG on the banking crisis in advanced economies by employing a univariate probit model (and OLS as a robustness test) with a sample of 22 countries from 1995 to 2013. He demonstrates that high government stability reduces the likelihood of a banking crisis. This finding is in line with that of Agoraki (2019), who analyses the relationship among democracy, financial regulation, and banking competition in emerging markets (consequently, banking stability) by using the unbalanced panel data with a sample of 617 banks from 1994-2016. He employs the democracy rating from the Freedom House index, the Economist Intelligence Unit's democracy index, and the Global democracy ranking of the quality of democracy. He also uses the economic institutions proxied from property rights, government integrity, and financial freedom from the Heritage Foundation's Index of Economic Freedom. He finds that more democratic countries have better regulatory frameworks, and countries having better regulatory and institutional settings tend to have lower credit risk or more stable banking systems.

Research confirms the close relationship between better political institution (more democratic) and competitive banking system. For instance, Rosenbluth and Schaap (2003) hold that countries with a more accountable voting system tend to choose a competitive and lower cost banking system. It is in line with the finding of Beck (2012) who argues that unconstrained governments are more likely to prefer an uncompetitive financial system since the government can take rents from them. Moreover, better political institutions can generate moral hazard problems as banks expect governments to bail them out in the worst economic conditions.

Banking performance is also related to the election and ownership issue in relation to political factors (as shown in the theory section). For instance, Jackowicz (2013) examines the impact of political factors on the behaviour and performance of commercial banks in 11 central European countries by using the static panel model with a sample of 3164 bank year observations (358 banks from 11 central European countries from 1995 to 2008). He finds that state-owned banks report significantly lower net interest income rates during the year of parliamentary elections. He asserts that the political cycle is the most important political factor affecting state-owned banks' profitability showing the political pressure or power in the banking practice during the election period. Liu (2014) also reveals the impact of political power in banking practice from the banking stability and crisis perspectives in an empirical examination of election and bank failures using US data from 1934-2012. He finds that the bank failure rate is about 45% less in the year leading up to an election. His study shows that even developed countries such as the US do not truly escape from political pressure and control. Research in the area implicates the importance and need for proper political institutions that foster political competition and reduce political control in banking performance and the economy as a whole.

#### **2.5.1.4. Islamic banking**

There exist enough comparative studies on conventional and Islamic banks that mainly focus on banking performance indicators such as profitability and asset quality (*see*: Abdul-Majid, Falahaty, & Jusoh, 2017; Alexakis, Izzeldin, Johnes, & Pappas, 2019; Mollah & Zaman, 2015). Some compare the efficiency of Islamic and conventional banks (*see*: Bitar et al., 2019; Johnes et al., 2014; Safiullah & Shamsuddin, 2019). However, relatively few empirical studies look at the institutional determinants of Islamic banking performance compared with conventional banks. Bitar et al. (2017) examine the financial soundness of conventional and Islamic banks measured by their capital, efficiency, volatility of returns, liquidity,

profitability, and the credit risk due to the influence of the country's political and legal system. They find that Islamic banks show better performance under a hybrid and *shariah*-based legal system than under a conventional democratic political system (in terms of capital, efficiency, profitability, and credit risk measures). This finding aligns with the theory of political economy and new institutional economics (NIE) and the present study's hypothesis. However, it should be noted that Bitar's study compares a political system (democratic system) with a legal system (*shariah*-based legal system). Asutay and Sidek (2020) conduct empirical research to examine the impact of political regime type (conventional democracy versus autocracy), institutional environment, governance, and political risk on Islamic banking performance, using loan growth as a proxy. They find that although loan growth is positive and significant in democratic regimes, good governance is more important; and it includes reliable public services, a system for policy formulation and implementation, and the credibility of the government's commitment to its policy, regardless of the regime type. However, that study only investigates the impact of the conventional political system.

## **2.5.2. Economic institutions**

### **2.5.2.1. Economic growth**

Bennett et al. (2017) empirically examine the impact of economic institutions on economic development in colonial perspective by using the two-stage least square method and economic freedom index from the Fraser Institute's Economic freedom of the world index. They establish that increase in economic freedom leads to a rise in real GDP per capita. Additionally, they ascertain that colonisation factors such as colonial settlement conditions or the coloniser's identity, affect institutional development and long-term economic development. This finding supports that of Graeser (2004), although they employ different economic and institutional variables (property rights). Using the OLS method, they demonstrate that the level of economic institutions significantly impacts economic growth. Moreover, they argue that the impact of economic institutions outweighs the impact of political institutions on economic growth. Their argument is in line with Giavazzi's (2005) finding that uses a sample of 140 advanced and developing countries from 1960 to 2000 and liberalisation variables from Wacziarg and Welch (2003). They also argue that countries that first liberalize the economy and then become democracies do much better than countries pursuing the opposite sequence. They use a sample of 140 advanced and developing countries from 1960 to 2000 and liberalisation variables from Wacziarg and Welch (2003).

### **2.5.2.2. Banking performance**

There is enough research on banks' performance. Gropper et al. (2015) assert a significant positive impact of economic freedom on banks' ROAs by using the freedom index from the Fraser Institute. It means that the more economically free society tends to have large ROAs of banks. This result supports that of Sufian and Habibullah (2010), who reiterate that higher economic freedom increases the profitability of banks in Malaysia. It is because more freedom ensures that banks engage in and undertake various activities to help entrepreneurs start new businesses, which increase the banks' profitability. Tanna et al. (2017) also confirm positive effects of financial liberalisation on banks' TFP by employing a sample of 1530 banks in 88 countries from 1999 to 2011.

Chortareas et al. (2013) investigate the effects of financial freedom on banks' efficiency in European Union member states, using the data envelopment analysis (DEA) technique. They affirm a significant positive role of financial freedom on cost advantages and the overall efficiency of banks. However, this result contradicts the findings of Luo et al. (2016), who examine the interrelationship between financial openness, bank risk, and bank profit efficiency in 140 countries from 1999-2011. They observe the negative impact of financial openness on banks' profit efficiency. Different types of efficiency and measurements might have led to the divergent conclusions of these studies.

### **2.5.2.3. Banking stability**

Cubillas and González (2014) aver a negative impact of financial liberalisation on banks' risk-taking behaviour by using a sample of 4333 banks in 83 countries from 1991 to 2007. Financial liberalisation increases banks' risk-taking behaviour in both developed and developing countries. However, the negative impacts of financial liberalisation differ between developed and developing countries. For instance, in developed countries, financial liberalisation can promote higher competition among banks, increasing risk-taking incentives. On the contrary, financial liberalisation increases bank risk behaviour in developing countries by expanding opportunities to take a risk. This finding aligns with that of Tanna et al. (2017). Although Tanna et al. (2017) establish a positive impact of financial liberalisation on banks' total factor productivity, they also believe that financial liberalisation can lead to a higher propensity for banking crises. As previous studies reveal, one of the institutional factors negatively affecting banking stability following economic or financial liberalisation is banking sector competition. Cubillas and González (2014) find that in developed countries,

banking competition negatively affects banking stability. Repullo (2004) also argues that increased banking competition reduces the value of individual banks' franchises, thus forcing them to take risks.

However, the results of studies that examine the impact of banking competition on bank risk-taking behaviour and stability are still inconclusive. Some of them affirm a positive role of competition on banks' stability. For instance, Boyd et al. (2006) find that the risk to banks tends to be higher in more concentrated atmospheres, while Uhde and Heimeshoff (2009) explain that the concentration of financial markets negatively affects the stability of finance in EU countries (Cubillas & González, 2014). This result is consistent with the 'competition-stability' view. Increased competition may lead to lower interest rates on loans leading to fewer defaults on the part of the borrowers and prevent the risks of expense due to a fewer-than-required number of borrowers (Boyd & De Nicolo, 2005; Cubillas & González, 2014), which eventually reduces the banks' risk and increases their stability. However, higher interest rates and more market power could incur defaults on loans and result in greater risk for banks (Boyd & De Nicolo, 2005).

### **2.5.3. Regulatory institutions**

#### **2.5.3.1. Banking performance**

Empirical research on the impact of regulation on banking performance is inconclusive and holds opposing views. For example, Barth et al. (2004) find a positive impact of private monitoring on a bank's performance, which aligns with Pasiouras et al.'s (2009) study that employs 615 commercial banks from 74 countries and uses the stochastic frontier analysis (SFA) efficiency measure. Pasiouras et al. (2009) find a positive role of market discipline and supervisory power on cost and profit efficiency. Moreover, they assert the positive role of capital requirement and activity restriction on cost and profit efficiency, respectively. Beck et al. (2006) also demonstrate that increase in private monitoring helps in corporate finance's efficiency and banks' integrity in lending. Bitar et al. (2019) examine the impact of capital and liquidity ratios on the efficiency of banks by using a comparative analysis of conventional and Islamic banks. They employ the data envelopment analysis (DEA) efficiency measure and unbalanced panel data of 4123 bank-year observations over 2005-2012 and agree that higher capital and liquidity ratios increase the efficiency of conventional and Islamic banks. However, the effect is more significant in conventional banks' samples. This result is because the higher capital and liquidity ratios create a gap in the efficiency

between two banking types in favour of conventional banks by indicating that the effect of capital and liquidity also depends on the level of bank efficiency. This result also implicates the improper institutional environment on Islamic banking performance. Regarding liquidity creation by banks, the view that supports the positive impact of regulation argues that restricting banks from engaging in risky and new activities encourages them to focus on their core objectives such as liquidity creation to generate profits (Kladakis et al., 2021). Empirically, Ongena et al. (2013) find that banks tend to lose their lending standards and give more loans to offset the effects of activity restrictions on profitability.

Meanwhile, Pasiouras et al. (2009) confirm a negative effect of capital requirements and activity restrictions on profit and cost-efficiency. Regulatory institutions such as regulatory monitoring, intervention, and capital and liquidity requirements play an important role in banks' liquidity creation (Bouwman, 2018). Many studies found a negative impact of regulatory interventions (*see*: Berger et al., 2016; Bouwman, 2018). Regulatory interventions can reduce portfolio risk and a bank may tend to reduce risky lending activities and bank liquidity creation to adjust the portfolio (Berger et al., 2016). Bouwman (2018) empirically supports regulations' negative impact as restrictions on lending activities significantly reduce banks' liquidity creation capacity. This finding is in line with that of Berger et al. (2016). They use a sample of German banks and establish that regulatory interventions such as restrictions on deposit-taking, lending activities, profit distribution, business activities, and limit on managerial decision decrease the liquidity creation capacity. Consistent with previous research, Kladakis et al. (2021) hold that banks in countries with tighter capital regulations, more activity restrictions, and stronger private monitoring create less liquidity. Increased activity restrictions may prevent banks from diversifying their portfolio and taking advantage of the synergy effect with complementary activities. The liquidity requirement imposed by Basel III in December 2010 in reaction to the financial crisis in 2008, including liquidity coverage ratio (LCR) and Net Stable Funding Ratio (NSFR) (Roberts et al., 2018), also can negatively affect banks' liquidity creation ability. Roberts et al. (2018) believe that banks in which LCR is imposed have seen reduced liquidity creation since 2013, compared to non-LCR imposed banks, due to reduced commercial and residential real estate loans in the asset-side of their balance sheet. While liquidity requirements can address the withdrawal risk on the liability side and off-balance sheet by requiring banks to hold cash-like assets, this holding may reduce banks liquidity creation practice (Berger & Bouwman, 2016).

### **2.5.3.2. Banking stability**

In view of banking stability and crisis, some research empirically establishes a positive role of regulation on banks stability. For instance, Banker et al. (2010) identify the positive role of capital adequacy ratios in reducing banks' portfolio risk by using the Korean commercial banks' samples. Especially after the financial crisis in 2008, the critical importance of liquidity in banks has risen (Bitar et al., 2019). Consequently, research examining the effect of liquidity requirements or ratios on banks stability has increased. Vazquez and Federico (2015) find that higher liquidity ratios help improve bank stability. Many researchers identify the positive role of other regulatory interventions. Barth et al. (2002) argue that powerful supervision on banks can reduce the levels of non-performing loans, thus positively affecting banks' soundness and stability. This finding is in line with that of Fernandez and Gonzalez (2005), who hold that stricter restrictions on banks help reduce banking risks.

However, Barth et al. (2004) fail to find a positive role of regulation in reducing the likelihood of banking crises as they could not confirm the role of regulation that fosters private monitoring, thus reducing the likelihood of banking crises. Besides, Barth et al. (2001) assert that higher regulatory restrictions can increase the probability of banking crises.

### **2.5.3.3. Interaction effect**

Most of empirical research concentrates on the interaction effect among institutions on economic growth and banking performance instead of examining their sole impact. For instance, Flachaire et al. (2014) ascertain that both political and economic institutions significantly affect the growth rate but have different roles. While political institutions have an indirect impact, economic institutions have a more direct impact. Political institutions provide the stage for economic institutions to operate in. Quintyn and Verdier (2010) note the short-term effects of economic institutions even as they view the long-term impacts of political institutions on financial development, thus considering the latter as the 'ultimate' institutions. Slesman et al. (2019) empirically support the finding and argue that political institutions are one of the core components for financial growth among all the institutions. Primarily, their study held that good quality political institutions play a crucial role in providing a conducive environment for financial markets in developing and emerging countries. Nevertheless, weak political institutions result in an inefficient financial system. Choartareas et al. (2013) observe the significant impact of economic institutions, namely financial freedom, on overall bank efficiency. However, the study also emphasises the

relationship between economic and political institutions by showing that the positive impact of financial freedom on bank efficiency tends to be exhibited in freer political environments where the government can formulate and implement better quality policies and engage in high-quality governance. Their finding supports the hierarchy of institutions hypothesis (HIH) theory. Furthermore, Bartolini and Santolini (2017) discover a critical connection between political institutions and governance, and confirm that political institutions (type of government and electoral rule in the research) affect governance (performance of the governments), which eventually affects the economic outcome and development. Rivera-Batiz (2002) agrees on the role of governance as a medium variable. The presence of democratic institutions influences the quality of governance, which statistically impact economic growth. In sum, democratic institutions can play a role in increasing economic growth, but only when paired with high-quality governance.

However, there is an inherent contradiction in the relationship and interaction between political and economic institutions. Glaeser et al. (2004) reveal that the impact of economic institutions (property rights) outweighs that of political institutions when controlled for the human capital variable. They argue that regardless of the type of government and political institution, good governance and economic institutions (namely, property rights) are particularly crucial for economic growth. Persson and Tabellini's (2006) research is also in line with that of Glaeser et al. (2004). Although Persson and Tabellini (2006) noted the vital role of democratisation and economic liberalisation on economic growth, countries that liberalised their economies before expanding their citizens' political rights showed accelerated growth. However, Glaeser et al. (2004) focus on countries that had overcome poverty in recent years; the relationship between poor countries and dictatorships is ambiguous, especially considering that GCC countries, which are wealthy, are all dictatorships. The literature that examines the interaction effect of institutions in banking performance is still inconclusive.

## **2.6. Conclusion**

Every nation has its own form and degree of development of banking sectors based on the unique institutional environment. The discipline of political economy argues that financial markets' performance, stability, development, and the banking sector do not solely rely on economic or bank-level variables. Instead, more ultimate environments and institutions are engaged (Quintyn & Verdier, 2010). Hence, an understanding of any system of economics should be accompanied by an extensive and broad analysis of the society (Arndt, 1991). The



new institutional economic (NIE) theories emphasises the role of a country's institutions, including political, economic, regulatory, societal, and cultural institutions (Ahmed, 2012; Joskow, 2004; Klein, 1999; Lee, 2017). Consequently, there is an urgent need to investigate the institutional determinants of banking performance.

As one of the rapidly growing industries, the Islamic banking and finance industry, that is based on economic and financial principles that originate from Islamic law (*shariah*) (Frag et al., 2018), has attracted worldwide interest, particularly in the Islamic banking performance and its risk-taking behaviour (Ahmed, 2009; Asutay & Sidek, 2020; Asutay & Turkistani, 2015; Belal et al., 2014). Consequently, a substantial comparative assessment of conventional and Islamic banks that evaluates profitability, efficiency, and stability has been conducted in the last few years (*see*: Abdul-Majid, Falahaty, & Jusoh, 2017; Alexakis, Izzeldin, Johnes, & Pappas, 2019; Mollah & Zaman, 2015). However, very few studies address the impact of institutional environments on banking performance from the political economy perspective. However, although Islam shares the common natures of political and economic institutions with conventional perspectives, Islamic perspectives on institutions (political and economic) differ from the conventional ones. For example, while from a conventional perspective, Western democracy is primarily rooted in the philosophy of Europe and America (Yusof et al., 2014), the Islamic perspective on democracy is derived from the ultimate religious sources of Islam. Thus, it is essential to clarify the theoretical differences between conventional and Islamic institutions before conducting empirical and comparative research.

This study analysed the theoretical differences between conventional and Islamic institutions and the underlying theories by using the existing theories that no research has hitherto explored. In addition, it theoretically identifies an institution and how it influences banking. Finally, using the systematic literature review method, this study summarises the current theoretical and empirical research that examines the impact of various institutions on banking sectors and finds the current research gap in this area. This study has three major findings. Firstly, although the research examining institutions' impact on economic performance and growth has been well-explored, banking performance has been relatively ignored. Secondly, empirical research on institutions and banking performance heavily focuses on economic and regulatory institutions. It barely concentrates on political institutions, which builds the paradigm of other institutions in an economy. Finally, much earlier theoretical and empirical research has compared the performance of conventional and Islamic banks. However, none of

the studies explores the impact of different institutional environments, including Islamic institutions, on conventional and Islamic banks. Following the political economy and new institutional economics (NIE) perspectives, a proper institutional environment for each banking type is necessary. A more comprehensive institutional environment's (political) impact and the interaction among various institutions on banking performance remain unexplored. Notably, the importance of bank efficiency and liquidity creation has been growing as they can influence the country's economic performance and development. Therefore, there is a need to investigate the effect of institutional environments on bank efficiency and liquidity creation. The research gaps in existing literature motivate the following empirical chapters in this thesis.

This study contributes to the existing literature on the political economy of banking and Islamic finance by filling certain research gaps. Firstly, it provides comprehensive conceptual knowledge of conventional and Islamic institutions by identifying commonalities and differences, which constitutes the first attempt in academic research. Despite having common aspects with conventional institutions, such as the nature of democracy, Islamic institutions have distinct and additional institutional features. Secondly, this study identifies the current research gaps in the impact of institutions on banking performance by exploring and summarising extant theoretical and empirical research on this area. Empirical research on banking efficiency and liquidity creation concerning institutional environments with a particular focus on political, economic, and regulatory institutions is insufficient. Moreover, no research has employed both conventional and Islamic institutions and investigated their impact on conventional and Islamic banking performance.

**CHAPTER 3: POLITICAL, ECONOMIC, AND REGULATORY  
INSTITUTIONS AND BANK EFFICIENCY**

### 3.1. Introduction

Efficiency is a firm's ability to maximize profits or outputs by minimizing costs or inputs (Aigner et al., 1977; Coelli et al., 2005). The importance of bank efficiency has grown in recent years in the industry and academic areas. World population growth and scarce resources (Avkiran, 2013), and changes in regulations, especially after the financial crisis in 2008, make firms and banks have an efficient management strategy by controlling costs and optimizing revenues and profits. Academic research widely uses banks' efficiency measurement as a performance indicator (*see*: Barth et al., 2013; Chortareas et al., 2012; Johnes et al., 2014; Luo et al., 2016). To establish an effective efficiency strategy, identifying the determinants of bank efficiency is first required. However, studies on bank efficiency have not been well researched, and most studies focus on the impact of bank-level determinants (Pasiouras et al., 2009). This is because of the lack of country-level institutional data (Beck et al., 2001) and difficulty of conducting political economy research by identifying and measuring a country's institutional variables (Archer et al., 2007), and altering the model to accord with the data (Pagano & Volpin, 2001).

However, the discipline of the political economy and new institutional economics (NIE) theory argue that more comprehensive country-level institutional environments will affect banking performance. Accordingly, political economy research has grown in academic areas recently (Persson, 2002). However, insufficient empirical research and research on bank efficiency from the political economy perspective remains. Considering the importance of bank efficiency and political economy research, theoretical and empirical research on those issues is necessary.

Earlier studies examine the impact of economic or financial freedom and regulatory institutions on bank efficiency (*see*: Chortareas et al., 2012; 2013; Luo et al., 2016; Pasiouras et al., 2009). However, hardly any research examines the impact of political institutions on bank efficiency except for some studies that employ governance institutions, such as political stability, the rule of law and government effectiveness, as a political institution variable and control variable. The current study extends the existing literature on the political economy of banking performance by employing various institutional variables and bank efficiency measurements. The current study also includes Islamic institutions, investigating their influence on Islamic bank efficiency as a sub-sample analysis. This analysis aims to empirically test the theory of political economy and new institutional economics (NIE) that emphasize the proper institutional environments derived from their

philosophy and purpose for the performance of different banking systems. No earlier research has compared conventional and Islamic banking in relation to conventional and Islamic institutions. Earlier studies such as Bitar et al. (2017) compare the conventional political system and Islamic legal system, and Asutay and Sidek (2020) employ the only conventional political system. Compared with the earlier studies, the current research employs political, economic, and regulatory institutions to examine their impacts on conventional and Islamic banking. Hence, the present study provides more comprehensive information.

The current study examines the impact of institutional environments on bank efficiency, including political, economic, regulatory, and Islamic institutions. Additionally, this study aims to examine the theory of political institutions and the hierarchy of institutions hypothesis (HIH) by employing the interaction effect of institutions.

This empirical study included 594 banks (468 conventional banks and 126 Islamic banks) from 18 countries from 2005 to 2020. This study conducts a two-stage analysis: the first stage measures each bank's efficiency using the data envelopment analysis (DEA); the second stage conducts panel regression analysis to examine the impact of institutions on bank efficiency. This study employs conventional and Islamic political, economic, and regulatory institutions using the Polity IV database, the Heritage Foundation's Index of Economic Freedom, the World Bank's Bank Regulation and Supervision Survey, and the Islamicity Index database. Various robustness tests confirm the initial results and address the endogeneity problems. Endogeneity is one of the severe issues in regression analysis in many fields of study. This study employs two-stage least square (2SLS) to address the endogeneity problem, which is one of the popular methods for using instrumental variables; an instrumental variable is common for addressing endogeneity problems, particularly for cross-sectional and panel datasets.

The main findings include: first, political institutions, namely democratic institutions, positively affect the efficiency of both banking types: conventional and Islamic banks. Second, financial freedom negatively affects bank efficiency, whereas when it is integrated with good quality political institutions (more democratic institutions), their impact becomes positive. Consequently, the positive impact of regulatory interventions on banking activity turns negative when integrated with good quality political institutions. In other words, when more democratic institutions are present in the market, fewer regulatory interventions on bank activity are required to increase bank efficiency. This result implies that economic and

regulatory institutions' influence varies according to the presence of good quality political institutions. Third, however, during crisis times, greater regulation of bank activity is required as the country is more democratic. Lastly, Islamic institutions positively affect Islamic bank efficiency by confirming the political economy and the new institutional economics (NIE) theory.

This study contributes to the literature on the political economy of banking efficiency and Islamic banking by filling the research gaps. Firstly, this study provides empirical research of political economy on banking efficiency by investigating political, economic, and regulatory institutions' impact on banking efficiency. Several empirical studies examine a single institution's impact on bank efficiency; however, there has been no research that employs all institutions (political, economic and regulatory institutions) and Islamic institutions. Secondly, this study empirically supports the hierarchy of institutions hypothesis (HIH) theory that emphasizes the vital role of political institutions by employing the interaction effect. Thirdly, this study also provides empirical research on the political economy of Islamic banking performance. The extant literature examines the effect of conventional political institutions (*see: Asutay & Sidek, 2020*) or compares conventional political systems versus *shariah*-based legal systems (*see: Bitar et al., 2017*). This study extends the existing literature by employing conventional and Islamic political institutions. Lastly, this study empirically confirms the importance of Islamic institutional environments in Islamic bank efficiency. The findings of this study provide empirical support for the political economy and new institutional economics (NIE) theory that emphasizes appropriate institutional environments for each organisation and firm. By splitting the samples into conventional and Islamic banks, this study proves how institutions affect different banking types differently.

This study has important implications for policymakers and regulators. As it finds the importance of political institutions in increasing bank efficiency, policymakers should introduce and implement good quality democratic institutions in the market. Rather than changing a country's political structure or regime types, promoting democratic institutions such as enhancing sound checks and balances, electoral rules, and opening a new channel for political participation will be effective. To constrain political intervention in the banking sector for private interests, promoting political competition by implementing proper political institutions will help prevent harmful interference in bank efficiency. Secondly, as the influence of economic and regulatory institutions varies according to political institutions' quality, appropriate economic and regulatory policies are required that consider each

country's political-institutional environment. Lastly, to improve Islamic bank efficiency, the countries where Islamic banks operate should establish Islamic environments within their political, economic and regulatory system.

The rest of the research paper is organised as follows: Section 2 provides theoretical background, research motivation, a literature review, and consequent hypothesis development. Section 3 reviews the methodology by presenting the empirical model, sample, variables, and data sources used. Section 4 discusses the empirical results. Section 5 concludes this study by summarizing the results, providing policy implications, highlighting the limitations, and indicating future research directions.

## **3.2. Theoretical discussion and hypothesis development**

### **3.2.1. Research motivation**

Efficiency is a firm's ability to maximize its profits or outputs by minimizing its costs (Aigner et al., 1977; Coelli et al., 2005). The issue of banking efficiency has grown both in the industry and academic fields. With the growth of the world population and scarce resources, the issue and strategy of efficiency within a firm and bank has been substantial (Avkiran, 2013). Moreover, after the financial crisis, there has been increasing change in regulations, such as the introduction of Basel III. Changing operating environments have required banks to more focus on controlling their costs and optimizing revenues and profits (Chortareas et al., 2013). Efficiency measurement is widely used to examine banking performance in academic research (*see*: Barth et al., 2013; Chortareas et al., 2012; Johnes et al., 2014; Luo et al., 2016).

Consequently, banks need to have a strategy to increase their efficiency and proper efficiency management. Identifying the related determinants is required. Earlier research on bank efficiency is relatively sparse, and most research tends to focus on bank-level factors (Pasiouras et al., 2009). However, due to the availability of cross-country data on national institutional variables such as banking regulation and supervision from the world bank and the IMF, there has been increasing research on various institutional environments on bank efficiency (Gaganis & Pasiouras, 2013). For instance, much research uses national institutional variables such as economic freedom and regulatory restrictions variables (*see*: Chortareas, 2012; 2013; Luo et al., 2016; Pasiouras et al., 2009). Nevertheless, the results of the impact of institutional variables are still inconclusive (Luo, 2016; Chen, 2022; Djalilov, 2019; Gaganis, 2013). Moreover, there has been less research on the impact of political

institutions on bank efficiency despite the importance of political institutions raised from political economy, new institutional economics (NIE) and hierarchy of institutions hypothesis (HIH) theories. Considering the growing importance of efficiency within bank operations and the political economy discipline, the current study aims to fill this research gap.

As an alternative intermediary institution, Islamic banks have received global attention due to their relative resilience amid the financial crisis in 2008. Due to Islamic banks' distinct nature and principles derived from Islamic law, they perform differently from conventional counterparts. For instance, owing to *shariah* principles that determine Islamic economic and financial systems, Islamic banks have a distinct balance sheet structure with unique instruments and services. These different components of the balance sheet result in different inputs and output compositions for efficiency measurements.

Considering the growing number of Islamic banks, worldwide interest in this industry as an alternative model, as well as the importance of bank efficiency, research on Islamic banks' efficiency is valuable. In addition, country-level institutional determinants of bank efficiency have not been explored sufficiently. The prominent underlying theories (the political economy, the new institutional economics, and the hierarchy of institutions hypothesis theory) emphasize the importance of institutional matters. The question of which kinds of institutions ultimately impact bank efficiency motivates the current study.

The theoretical section focuses on issues of bank efficiency from both conventional and Islamic banks' perspectives by first identifying types of efficiency and efficiency measurements. In addition, this section identifies the theoretical relationship between institutions and banking efficiency, reviews relevant literature, and develops the research hypotheses.

### **3.2.2. Bank efficiency**

#### **3.2.2.1. Type of efficiency**

The general definition of efficiency refers to economic efficiency. Farrell (1957), who made contributions to microeconomic efficiency measurements, divides economic efficiency into two efficiency measures: technical efficiency and allocative efficiency (Charles & Kumar, 2012; Farrell, 1957; Ray, 2004). Technical efficiency refers to a firm's ability to attain the maximum level of outputs for the least amount of inputs (Charles & Kumar, 2012; Pasiouras et al., 2009). Allocative efficiency focuses more on the inputs side, meaning a firm's ability to have an optimal level of inputs for a given set of resource prices (Charles & Kumar, 2012;



Daraio & Simar, 2007; Pasiouras et al., 2009). Therefore, since economic efficiency means obtaining both types of efficiency – technical and allocative – it can refer to overall efficiency or productive efficiency (Farrell, 1957, cited in Luo, 2014).

Moreover, as economic efficiency can be defined as a firm’s ability to minimise its costs or maximise its profits (Aigner et al., 1977) it can also be divided into cost efficiency and profit efficiency (Bitar et al., 2019). Cost efficiency is a broader concept than technical efficiency as it includes the components of both technical and allocative efficiency (Luo & Yao, 2010; Pasiouras et al., 2009). Harvey Leibenstein first introduced the concept of cost efficiency in 1966, but financial institutions and banks did not focus on it until the late 1980s (Luo & Yao, 2010). Today, it is widely used in the banking sector to measure efficiency. Cost efficiency means the minimum cost level or best cost for a firm compared with the given level of outputs. The input price is estimated using the cost function to form the cost frontier (Nguyen, 2018). Following Berger and Mester (1997) and Chen, Skully, and Brown’s (2005) formula, the cost efficiency function is as follows:

$$C = C(p, y, z, v, \mu_c, \varepsilon_c) \quad \text{Equation (1)}$$

$C$  denotes a cost to banks,  $p$  is the vector of input prices (such as the price of deposits and labour),  $y$  is the vector of outputs (such as loans and investments), and  $z$  is the vector of fixed inputs and outputs (such as bank capital and fixed assets).  $v$  is the vector of other market condition variables, and  $\mu_c$  is the inefficiency factor that refers to the deviation from the frontier’s efficient level for cost at a given output level and given input prices.  $\varepsilon_c$  is the random error.

Meanwhile, profit efficiency refers to the maximum level of profits for a given set of inputs (Vivas, 1997) and is based on input-cost and output-revenue. For a profit efficiency function, profit before taxes replaces total cost,  $C$ , in Equation (1) as a dependent variable, and the sign of the inefficiency term,  $\mu_c$ , becomes negative:  $-\mu_c$  (Pasiouras et al., 2009). Moreover, profit efficiency is broader than cost-efficiency since it combines both costs and revenues as a measure (Pasiouras et al., 2009; Vivas, 1997). For this reason, profit efficiency sometimes represents the overall efficiency of a bank’s performance and Maudos et al. (2002) state that rather than using cost efficiency’s partial measure, profit efficiency provides a broader and more relevant look at the bank management. Therefore, much research on the efficiency of firms and banks focuses on cost and profit efficiency (*see*: Safiullah & Shamsuddin, 2019; Nguyen, 2018; Pasiouras, Tanna, & Zopounidis, 2009; Luo, Tanna, & De Vita, 2016).

### **3.2.2.2. Type of efficiency approach**

According to Farrell (1957), there are two approaches or orientations of efficiency measurement: the input- and output-oriented approaches. The input-oriented approach focuses on input minimisation while keeping output levels constantly proportionately (Daraio & Simar, 2007). By contrast, the output-oriented approach focuses on maximising outputs while keeping inputs constant (Charles & Kumar, 2012). Much existing research is based on the input-oriented approach (*see*: Fernandez, Paz-Saavedra, & Coto-Millan, 2019; Bitar, Pukthuanthong, & Walker, 2019) since banks aim to minimise inputs such as costs and expenses, and outputs are more likely determined by other external factors such as market conditions (Bitar et al., 2019; Fernandez et al., 2019).

### **3.2.2.3. Variable selection approach**

In measuring efficiency, the most controversial and complicated issue is identifying and selecting the inputs and output variables employed in the functions (Chen et al., 2005; Luo & Yao, 2010; Sathye, 2003). The two widely used approaches in recent research are the production and intermediation approaches. The most distinctive difference between the two approaches is the view of bank deposits. The production approach views the bank as a producer of deposits and loans using inputs such as labour, capital, and other materials (Nguyen, 2018; Sathye, 2003). This approach assumes profit maximisation as banks' main objective (Luo & Yao, 2010).

However, the intermediation approach views banks as intermediaries that collect funds (deposits) as inputs, transferring these funds into outputs, such as loans and other assets (Chortareas et al., 2013; Johnes et al., 2014; Luo et al., 2016; Nguyen, 2018; Safiullah & Shamsuddin, 2019). This approach views deposits as an input since they are the source for loans and other investments (Fukuyama & Matousek, 2011; Luo & Yao, 2010). The intermediation approach is the most widely used approach when determining the inputs and outputs of banks in the bank efficiency literature (*see* Nguyen, 2018; Luo, Tanna, & De Vita, 2016; Johnes, Izzeldin, & Pappas, 2014; Safiullah & Shamsuddin, 2019; Fernandez, Paz-Saavedra, & Coto-Millan, 2019; Chortareas, Girardone, & Ventouri, 2013). In particular, most research employing the data envelopment analysis (DEA) uses the intermediation approach (Sathye, 2003). While the intermediation approach is more appropriate for bank-level efficiency measurement, the production approach seems more suitable for branch-level efficiency measurement (Berger & Humphrey, 1997, cited in Nguyen, 2018). This is because,

while at the branch level it is not easy for a branch to control investment decisions, bank-level managers can manage the total costs (Luo et al., 2014). Consequently, the most used input variables in the intermediation approach are deposits, labour (personnel expenses) and capital, while output variables are loans and other earning assets (Fernandez et al., 2019).

### **3.2.3. Islamic bank's efficiency**

#### **3.2.3.1. Efficiency from an Islamic perspective**

Islamic sources, the Holy *Quran* and *Sunnah*, emphasize efficiency by stressing the efficient use and allocation of resources without wasting. Islam considers the waste of assets, wealth and property a grave sin since God owns all resources and property on earth, with people only having a trusteeship (Askari et al., 2014a; Behdad, 1992; Choudhury, 1992; Naqvi, 1994). Behdad (1992) refers to Quranic verse regarding this issue:

*'Unto Allah whatsoever is in heavens and whatsoever is in earth' (2:284)*

Additionally, considering earth's limited resources, Islam urges human beings to work hard to use the resources in the best possible manner (Jan & Asutay, 2019). Behdad (1992) finds the Quranic verse regarding this issue:

*'And that man hath only that for which he marketh effort' (53:39)*

According to Ali (2013), the Prophet Muhammad also mentions that:

*'Some sins can be abolished only by working hard to get earnings'*

In conjunction with the Friday congregational prayer, the following Quranic verse implies the efficient use of land and engagement in productive work. Jan and Asutay (2019) refer to:

*'And when the prayer is finished, you may disperse in the land, seek the bounty of Allah and celebrate the praises of Allah that you may prosper' (20:10)*

One of the essential incentives for the efficient use of resources is profit. Since efficiency, in general, is defined as a firm's ability to maximize its profits or outputs by minimizing its costs or inputs (Aigner et al., 1977; Coelli et al., 2005), conventional banks aim to achieve profit maximization by realizing efficient resource utilization (Bitar et al., 2019; Luo & Yao, 2010). Gaining or pursuing profit is also ensured in Islam as an essential motive for any system's successful operation (Chapra, 1979). Jaxiri, in his well-known work on the *fiqh* position of the four Sunnite schools of jurisprudence, says (Chapra, 1979):

*‘Buying and selling are allowed by the Shariah so that people may profit mutually. There is no doubt that this can also be a source of injustice, because both the buyer and the seller desire more profit and the Lawgiver has not prohibited profit nor has He sent limits to it. He has, however, prohibited fraud and cheating and ascribing to a commodity attributes it does not possess’*

Islam ensures people enjoy the bounties and the material growth provided by God, without any quantitative limits in society:

*‘When the prayer is ended, then disperse in the land and seek of God’s bounty’*  
(62:10)

This wisdom can also be found in the *Sunnah*, as Chapra (1979) noted:

*‘There is nothing wrong in wealth for him who fears God’*

If the profit is acquired in the right way, it is ensured. In addition, the Prophet Muhammad said:

*‘All people are the dependents of Allah, and the most beloved among them are those who are most benevolent to His dependents including those who put His resources to proper use’* (Ibn Kathir, 1980; 287) (Amin & Yusof, 2003).

However, while from a conventional perspective, it can be a primary goal of increasing efficiency, which can lead to many social and economic problems (Chapra, 1979), in Islam profit maximisation is not the ultimate goal of economic activities and efficient resource use; instead, it is social welfare or benefits (Ali, 2013). Thus, Islam puts moral restraints on this motive (profit), considering social and economic justice and equitable income and wealth distribution (Chapra, 1979). The objective of the Islamic economy (*Maqasid al-shariah*) is to realise the objective of human well-being (*falah*) in this world and the hereafter (Amin & Yusof, 2003).

*‘But seek, with the [wealth] which Allah has bestowed on you, the home of the hereafter, nor forget your portion in this world; but do good as Allah has been good to you, and do not seek mischief in the land; for Allah loves not those who do mischief’* (28:77) (Amin & Yusof, 2003).

In this regard, Islam opposes wealth concentrated in a few hands; instead, Islam emphasizes social justice and a balanced society that avoids the extremes of wealth and poverty (Askari

et al., 2014b). To achieve the best resource efficiency, the allocation of resources should follow Islamic guidelines (Amin & Yusof, 2003).

*'O you who believe! Betray not the trust of Allah and Messenger, nor misappropriate knowingly things entrusted to you' (8:27) (Amin & Yusof, 2003).*

First, Islam prioritises allocating the resources according to the degree of necessity: necessity, needs, and refinement. Compared with necessity and needs, fewer 'refinement' goods should be produced and allocated in society (Amin & Yusof, 2003). This is because the misallocation of resources in 'refinement' can lead to a shortage of critical social services such as housing, public health, and education (ISRA, 2016). Thus, to follow Islamic moral values, social justice, and balance, resource allocation or misallocation waste (placing too much emphasis on refinement, resulting in waste and misallocation) should be avoided (Askari et al., 2014b; ISRA, 2016).

*'And do not make your hand chained to your neck or extend it completely and [thereby] become the blamed and insolvent' (17:29)*

Secondly, only *halal* (permissible) goods and services can be allocated, and only profits produced from *halal* goods and services are acknowledged (Siddiqi, 1992). The Holy *Quran* has explicit instructions for approved and disapproved business practices to earn *halal* and lawful earnings (Jan & Asutay, 2019).

Thirdly, there is a distinct feature in Islam regarding resource distribution. Islam believes that if resources and wealth are efficiently allocated following Islamic teaching, it can maximize the net benefits, which can be better distributed for everyone (Askari et al., 2014b). The value of distributive justice in Islam is one of the religion's primary objectives (Naqvi, 1994). *Zakat* is a unique institution in Islam to redistribute wealth, which is collected by individuals' accumulated wealth (Kuran, 1992). Although it resembles the conventional tax system, its payment is not enforced by a state rule but by a sense of religious obligation for Muslims. According to Kuran (1992), the Holy *Quran* mentions *zakat*:

*'Those who believe, And do needs of righteousness, And establish regular prayers, And 'zakat', Will have their reward, With their Lord: On them shall be no fear, Nor shall they grieve' (2:277)*

In sum, in Islam, the purpose of efficient resource allocation is not only profit maximization as aligned in a conventional system. Instead, Islam emphasizes social justice and balanced society that avoids the extremes of wealth and poverty (Askari et al., 2014b). To achieve the

best resource efficiency, resource allocation should follow Islamic rules. For instance, resource allocation should establish priority according to necessity, needs, and refinement. Moreover, profit produced from *haram* (prohibited) goods and activities is not acknowledged; profit should be created from property in Islamic guidance. Lastly, *zakat* plays a vital role in redistributing wealth and resources.

### 3.2.3.2. Islamic bank's efficiency

A different perspective on efficiency and efficient use of resources creates different efficiency measures in Islamic banking. In general, efficiency means a firm's ability to maximize outputs or profits, minimizing inputs or costs (Aigner et al., 1977; Charles & Kumar, 2012; Pasiouras et al., 2009). The inputs and outputs of Islamic banks differ from conventional banks. Firstly, only approved *halal* services and activities can produce an efficient output using legitimate inputs. For instance, interest income cannot be produced as an output in Islamic banks since an exchange of interest is prohibited in Islamic finance; instead, they have profits or margins from different Islamic instruments. Secondly, due to the *shariah* principles that determine the Islamic economic and financial system, Islamic banks have a distinct balance sheet structure with unique instruments and services, which compose different kinds of bank inputs and outputs. Table 5 and 6 shows the common compositions of the conventional and Islamic bank's balance sheet.

**Table 5: Conventional bank's balance sheet**

Asset (Uses of funds)	Liability (Sources of funds)
<ul style="list-style-type: none"> <li>• Cash and deposits in other institutions</li> <li>• Investments in securities</li> <li>• Loans and leases</li> <li>• Other assets</li> </ul>	<ul style="list-style-type: none"> <li>• Deposits from the public</li> <li>• Non-deposit borrowings</li> <li>• Other liabilities</li> <li>• Equity capital from stockholders (stock, surplus, retained earnings)</li> </ul>

**Table 6: Islamic bank's balance sheet**

Asset (Uses of funds)	Liability (Sources of funds)
<ul style="list-style-type: none"> <li>• Cash reserve</li> <li>• Financing assets (<i>murabahah, salam, ijarah, istisna</i>)</li> </ul>	<ul style="list-style-type: none"> <li>• Deposits: - Current deposits (<i>amanah</i> or <i>Qard Hassan</i>)</li> </ul>

<ul style="list-style-type: none"> <li>• Investing assets (<i>sukuk, mudarabah, musharakah</i>)</li> <li>• Fee-based services (<i>wakalah, ju'alah, ijarah</i>)</li> <li>• Non-banking assets (land, buildings, equipment)</li> </ul>	<ul style="list-style-type: none"> <li>- Saving deposits (<i>Wadia</i>)</li> <li>- Investment account (<i>mudarabah, musharakah</i>)</li> <li>• Equity capital and Reserves</li> </ul>
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Various instruments compose the asset structure of Islamic banks with various modes, maturities and risk portfolios (Iqbal & Mirakhor, 2011; Wahyudi et al., 2015). The common compositions of the asset side of Islamic banks' balance sheet are: 1) cash reserve, 2) financing assets, 3) investment assets, 4) fee-based services, and 5) non-banking assets or other fixed assets such as land, buildings, and equipment. The financing and investing assets are the most significant and distinct features of Islamic banks compared to their conventional counterparts because of refusing to exchange interest on a loan. Meanwhile, the gross loan is one of the widely used output variables in conventional banks. Various underlying Islamic instruments have different maturities and risk-return profiles (Greuning & Iqbal, 2008). Islamic instruments and products are categorized into two: equity-based, such as *mudaraba* and *musharakah* and debt-based, such as *murabaha* and *ijara* (Berger et al., 2019). The above underlying instruments can be divided according to different maturities. While *murabaha* and *salam* can be used for short-term financing, *ijara* and *istisna* are used for intermediate-term financing; and *mudaraba* and *musharakah* are employed for long-term financing (Wahyudi et al., 2015).

The major components of the liquidity side of Islamic banks' balance sheets are 1) deposits and 2) equity capital and reserves. A customer's deposit is the most widely used input variable (as a primary source of funds) in conventional and Islamic banks. However, in Islamic banks, customers' deposits are distinct from conventional banks by comprising current, saving, and investment deposits. The current deposit (or demand deposit) is operating based on the principle of safe custody for customer convenience (Kettell, 2011). Although the treatment of this current deposit varies across banks, some Islamic banks treat it as an *Amanah* (trust) (Greuning & Iqbal, 2008), and some perceive it as *Qard Hasan* (interest-free loan) (Kettell, 2011). The current deposit guarantees the total amount, but any profit from utilising funds is not paid to the depositors as interest (Ahmed, 2011; Iqbal & Mirakhor,

2011). The savings deposit operates similarly to the current deposit. Based on the principle of *Al-wadia*, customers look for the safe custody of their funds and not guaranteed profits from the business of using the funds, but some gifts can be provided (Kettell, 2011). Lastly, the investment accounts, also called special investment accounts, are based on the profit and loss-sharing investment (PLS), where the principal and return are not guaranteed; instead, profit and loss are shared between banks and depositors (Hassan & Mollah, 2018; Kettell, 2011) generally based on the *mudaraba* mode (Iqbal & Mirakhor, 2011). This is the most distinctive feature compared to conventional counterparts, whose system is based on interest. Thus, investment accounts of Islamic banks are not fully considered liabilities since the relationship between depositors and banks is more likely that of partners (Greuning & Iqbal, 2008). The returns from investment accounts are linked to the bank's profit or a specific investment account on the asset side (Berger et al., 2019). As shown above, the different nature of an Islamic banks' balance sheet indicates the different efficiency measures, by composing different kinds of inputs and outputs.

Regarding efficiency measurements for Islamic banks, Bitar et al. (2019) argue that while profit efficiency is more appropriate for conventional banks, in which profit maximisation is the goal, using profit efficiency for Islamic banks may be questionable since their ultimate objective is not cost minimisation or profit maximisation. This is because profit efficiency assumes that a firm's core objective is profit maximisation. However, Hassan (2006, p. 50) argues that 'regardless of a bank's underlying philosophy, its long-run sustainability depends on economic efficiency'. Therefore, measuring efficiency is crucial in Islamic banking practice as well. The topic of efficiency of both bank types has been widely studied (*see*: Beck et al., 2013; Bitar et al., 2019; Safiullah & Shamsuddin, 2019).

#### **3.2.4. Institutions and bank efficiency**

With the growing importance and interest in the influence of macro- and country-level institutional environments, much empirical research examines the impact of institutional environments on bank efficiency, such as economic, regulatory, and governance institutions (*see*: Chortareas et al., 2012; 2013; Luo et al., 2016; Pasiouras et al., 2009). However, the demarcation among those institutions is hard to find as they are closely linked. Instead, they are alternatively and inter-changeably used in many studies. The current study employs the most used and distinguished variables that have fewer overlapping features with other institutions to address this issue. The current section explores the relationships between



institutions and bank efficiency by subdividing institutions into political, economic, regulatory, and Islamic using the relevant literature.

#### **3.2.4.1. Political institutions**

While much research examines political power's effect on bank performance by employing bank ownership, there are relatively few studies on the impact of political institutions on performance. For instance, according to political lending cycle theories, governments use state-owned banks by increasing loans for re-election purposes (Bircan & Saka, 2021). Empirically Bircan and Saka (2021) find that state-owned banks are involved in the lending strategy of governments in election years as compared with private banks. Moreover, Dinc (2005) investigates the lending behaviour of government- and privately-owned banks during election time. He finds an 11% increase in lending in election years by government-owned banks. This result means that politicians use the government-owned banks for their interests during the election year. Molyneux (1992) finds the relationship between governments and state-owned banks by finding the positive relation between state-owned banks and their profitability. This result implies that state-owned banks generated higher returns on capital than privately-owned banks. This government's strategy in lending might affect the state-owned banks' efficiency by increasing loans and influencing other private banks' efficiency. While it might positively impact state-owned banks, either long- or short-term, eventually it can harm the banking sector's efficiency if politicians pursue their own interests. This political intervention is considered one of the severe risks banks face (Liu & Ngo, 2014). Thus, there is a great need for political institutions to constrain political power.

The demarcation of political institutions is hard to identify. For instance, some research employs governance institutions such as political stability, the rule of law, regulatory quality and government effectiveness as political institutions, interpreting them as a positive quality of a country's political or democratic institutions, as the above governance factors are one of the features of democracies (*see*: Chortareas et al., 2012; 2013). Despite this confusion among studies, the most used political-institutional variable is type of government (democracy or autocracy). Democracy has been acknowledged as one of the essential factors for economic growth and development (Barro, 1999; North, 1990). By contrast, state autonomy is considered a source of inefficiency, impeding growth and development (North, 1990). Baum and Lack (2003) argue that democracy is a practical tools to achieve efficient resource utilization, which eventually leads to economic growth. In this regard, democracy might also significantly positively impact bank efficiency.

First, good quality institutions such as democratic institutions can clearly reduce the corruption within a country, in general, and in the market, which can negatively affect bank efficiency. For example, political competition, one of democracy's components, can effectively constrain politicians' bank interference by increasing the costs of politicians related to interfering in bank closure policy (Liu & Ngo, 2014). Chortares et al. (2012) empirically find that low market corruption achieves greater levels of bank operational efficiency. This is because, under a good quality political institution (democracy), corruption in a country can be suppressed with proper implementation of law and order, increasing institutional and market efficiency (Asutay & Sidek, 2020). A government with a high-quality political institution that can effectively formulate and implement appropriate policies and investments can enhance overall industry efficiency (Choartreas et al., 2013). Empirically, Chortareas et al. (2013) find that banks in more open institutional framework countries tend to achieve higher efficiency by using governance variables. This result implies that more developed and democratic countries create more efficient financial institution operation.

Political institutions also affect bank efficiency by influencing other institutions such as economic, governance, and regulatory institutions. For instance, the positive impact of other institutions tends to be pronounced in a good quality political-institutional environment. Chortareas et al. (2013) empirically find that the positive impact of financial freedom on bank efficiency is more pronounced in countries with more accessible political systems (open political systems) with a higher governance quality. This is because democracy (political institution) and economic freedom (economic institution) are closely related. For instance, Baum and Lack (2003) argue that democracy is one of the practical tools to ensure economic freedom. This finding aligns with Luo et al.'s (2016) argument that greater bank freedom in operations has increased overall bank efficiency, especially in environments with institutional reforms and a robust governance system. In line with this, Chortareas et al. (2012) also empirically find that countries with more developed and democratic systems tend to have a more banking sector efficiency. They also find that the positive impact of capital restrictions and official supervisory powers on bank efficiency is more pronounced in high-quality institution countries. Their result includes the good governance and degree of freedom of expression, including free media, which can be expressed as features of democracy. Moreover, Anginer and Demirguc-Kunt (2014) find that the negative impact of financial openness on bank efficiency is alleviated once there is a strong institutional environment with

efficient public and private monitoring of financial institutions. This is in line with Lensink et al. (2008). They compare the inefficiency of foreign banks in different countries according to a country's different institutional qualities, and find that good governance countries reduce foreign bank inefficiency

Theoretically, although there is a strong relationship between good quality of political institutions and bank efficiency, few empirical studies examine the impact of political institutions on bank efficiency by using a proper proxy for political institutions as the main variable. Some studies only use governance variables as a control variable (*see*: Chortareas et al., 2012; 2013).

#### **3.2.4.2. Economic institutions**

As an economic institution, many empirical studies discussing banking performance widely employ economic and financial freedom (*see*: Chortareas et al., 2013; Dutta & Williamson, 2016; Gropper et al., 2015; Tanna et al., 2017). Financial freedom or liberalization is one component of economic freedom (or liberalisation), meaning an 'economy's banking system effectiveness as well as independence from government control and interference in the financial sector' (Chortareas, Girardone, & Ventouri, 2013, p.1230). The terms 'economic freedom' and 'financial freedom' are used interchangeably in many studies, as economic freedom usually encompasses financial freedom. This study uses the term 'economic freedom', 'financial freedom', 'financial liberalization', and 'financial openness' interchangeably since, in the literature these terms are used interchangeably.

Economic and financial freedom impact bank efficiency from two opposing perspectives: positive and negative impact. The optimistic view argues that greater economic and financial freedom help increase bank efficiency. If there is less constraint on financial institution management, banks tend to be more effective in controlling their costs by being accountable to their shareholders, leading to more efficient resource allocation (Chortareas et al., 2013). This argument is in line with the view that individual freedom to pursue economic goals results in efficient outcomes (Chortareas et al., 2013). In this process, banks may have more possibility to create new financial instruments and services in a more open and free atmosphere (Classens et al., 2001). By contrast, suppose limited economic and financial freedom is imposed. In that case, banks tend to engage in opaque new instruments and non-traditional activities and miscalculate profit risk to compensate for limited activities, leading to bank inefficiency (*see*: Cubillas & ález, 2014). Secondly, economic and financial freedom

also mean the international openness of economic and financial markets. Financial openness is used for the financial freedom index (Luo et al., 2016). Openness to foreign capital markets helps to increase bank efficiency. Banks have greater potential to enhance capital allocation for productive investments. A more open atmosphere causes a higher propensity to channel funds towards projects with a greater expected return (Levine, 1997) by reducing transaction, overhead, and information costs (Classens et al., 2001). This is in line with the free-market view (Luo et al., 2016). Lastly, in terms of risk perspective, foreign capital flows and relaxed banking sector entry barriers make it more possible to allocate resources to improved risk diversification and management practice (Classens et al., 2001). According to the diversification hypothesis, by diversifying their portfolios internationally, banks can reduce risks (Berger et al., 2015, cited in Luo, 2016), increasing bank efficiency.

However, the opposing view emphasizes the negative impact of financial openness. Financial openness causes implicit costs for operation, restructuring of bank portfolios, and risk management, and eventually increases costs, undermines bank profits and decreases bank efficiency (Agénor, 2003). Moreover, due to the increasing number of banks in the market, market concentration within a country can create a monopoly if there is no government intervention (Chortareas et al., 2013). This eventually reduces the banking system's overall efficiency. The second argument that stresses the negative impact of economic freedom on bank efficiency relates to increasing risk. As a result of openness, there might be increased competition among banks, including domestic and foreign banks. To survive in the competitive atmosphere, banks may take more risks, which have contributed to the recent global and European crises (Chortareas et al., 2013). This argument aligns with the 'competitive-fragility' theory that the increase in bank competition may increase banks' fragility, reducing profits (Petersen and Rajan, 1995). Empirically, Classens et al. (2001) find that an increasing number of foreign banks tend to reduce the profitability of domestic banks by lowering margins. Cubilas et al. (2014) empirically find that both developing and developed countries tended to increase bank risk-taking after financial liberalization. Consequently, this negatively affects bank efficiency. Moreover, at the extreme, this risk-taking can lead to a banking crisis. Tanna et al. (2017) find high propensity for a banking crisis due to financial liberalization. Furthermore, by diversifying opportunities into foreign markets or non-traditional activities, banks' risk also may increase (Cubilas et al., 2014). This is in line with the 'market risk hypothesis', which suggests that banks have a higher risk when they operate abroad due to the market-specific factors that make their foreign assets

risky (Berger et al., 2015, cited in Luo 2016). In general, the view of the negative impact of economic and financial freedom supports the ‘market failure’ approach, which argues that market imperfections prevent competitive markets from having the most efficient outcomes (Chortareas et al., 2013). Consequently, they emphasize the importance of government involvement in the financial sector.

#### **3.2.4.3. Regulatory institutions**

Regulatory institutions such as capital requirements, monitoring, restrictions, and interventions affect bank efficiency. However, views are divergent on their impact, which differs according to the different types of regulatory institutions (Chortareas et al., 2013; Pasiouras et al., 2009).

Various types of regulations influence bank efficiency. For instance, capital requirements can affect bank efficiency by affecting the quantity and quality of lending as it affects banks' asset portfolios, which eventually affect loans and profits (Pasiouras et al., 2009). If stricter capital standards are imposed, banks tend to substitute loans with alternative forms of assets to meet the stricter capital standards. The alternative, relatively less risky assets might produce low profits according to the risk-return hypothesis, affecting profit efficiency (Pasiouras et al., 2009). Further, capital requirements can affect the costs of banks through the sources of funds, such as deposits and equity (Pasiouras et al., 2009). However, from a risk perspective, a higher capital requirement can reduce risk managements costs since it can lower the probability of financial distress and risks (Berger & Bonaccorsi, 2006). Capital acts as a buffer for banks; thus, with adequate capital, there is no asset ‘fire sale’, leading to depositors’ losses and deposit insurance, which add to costs (Chortareas et al., 2012). Thus, by reducing banks’ costs, higher capital can increase cost efficiency.

As another regulatory institution, official supervisory power plays a vital role in bank efficiency. According to the official supervisory approach (or public interest view), a powerful supervisory power that oversees, regulates, and disciplines banks can positively affect bank efficiency by avoiding market failure (Pasiouras et al., 2009). Tanna et al. (2017) empirically find that powerful supervisory power positively reduces the probability of a banking crisis. Additionally, greater supervision can enhance banks' corporate governance, reduce corruption in lending, and improve function (Beck et al., 2006; Chortareas et al., 2012). By contrast, from a private monitoring approach (or private interest view), a powerful supervisory power can create more corruption that impedes efficient operations once they

pursue private interest (Becker, 1983). Some argue that market discipline through private monitoring from depositors, debt holders, and equity holders can offset the negative impact of supervisory power by enhancing bank function resulting in better banking outcomes (Pasiouras et al., 2009), which can increase bank efficiency.

Perspectives on banking activity restrictions also diverge regarding cost and profit efficiency. Fewer restrictions on bank activity can make banks engage in diverse activities, provide services, and consolidate scale and scope economies (Barth et al., 2004). However, simultaneously, engaging in diverse and new activities both domestically and internationally can increase bank risks, which eventually negatively affect bank efficiency through increased costs and failed operations. Consequently, higher restrictions on banking activity can positively affect bank efficiency by reducing bank risks. Fernandez and Gonzalez (2005) empirically find that stricter restrictions on bank activities effectively reduce banking risks. However, there is also an opposing view that higher restrictions can create more risks as it makes banks engage in additional risky activities and investments in ways that circumvent regulations (Chortareas et al., 2012).

Other than the bank risk perspective, Dermirguc-Kunt et al. (2004) find that regulatory restrictions on banking activities have a relationship with a higher level of interest margins, which can positively increase bank efficiency. However, other studies find that economic and financial openness in the banking markets can reduce bank margins and improve efficiency (Classens et al., 2001). This is because less regulatory control can lead banks to fail to manage their diverse activities, increasing costs and resulting in lower profitability (Barth et al., 2003). However, if higher restrictions on banks are imposed, there are limited opportunities to manage their costs efficiently, reducing bank efficiency.

Rather than sole institutional impact, many studies reveal that the impact of institutions (political, economic, and regulatory) is intertwined. In other words, the institution's impact on bank efficiency can be pronounced by integrating with other institutions. For instance, the effect of economic freedom is more pronounced in higher-quality political, regulatory, and governance institutions within a country (*see*: Anginer & Demirguc-Kunt, 2014; Chortareas et al., 2013; Lensink et al., 2008). In addition, Fernandez and Gonzalez (2005) find that more powerful supervisory power reduces risk-taking behaviour in countries with low accounting and auditing requirements. However, Chortareas et al. (2012) find that the positive impact of supervisory power becomes negative in less developed countries due to excessive

government involvement and consequent decrease in bank lending integrity with adverse implications on credit allocation efficiency.

### **3.2.5. Hypothesis development**

The bank efficiency issue has attracted much attention both in industry and academia. With world population growth and scarce resources, banks need an excellent efficiency strategy (Avkiran, 2013). Moreover, after the financial crisis, there have been increasing regulatory changes, such as the introduction of Basel III, which has required banks to focus more on controlling their costs and optimizing revenues and profits (Chortareas et al., 2013). Thus, identifying the determinants of bank efficiency becomes essential both in industry and academia. However, research on bank efficiency is relatively poorly examined, and most research tends to focus on bank-level factors' impact (Pasiouras et al., 2009). Later, due to the availability of cross-country data on national institutional variables such as banking regulation and supervision from the world bank and the IMF, there has been increasing research on various institutional environments on bank efficiency (Gaganis & Pasiouras, 2013). For instance, much research uses national institutional variables such as economic freedom and regulatory restrictions variables (see: Chortareas, 2012; 2013; Luo et al., 2016; Pasiouras et al., 2009). Nevertheless, the results of the impact of institutional variables are still inconclusive (Luo, 2016; Chen, 2022; Djalilov, 2019; Gaganis, 2013). ). Moreover, there has been less research on the impact of political institutions on bank efficiency. Nonetheless, the political economy, new institutional economics (NIE), and hierarchy of institutions hypothesis (HIH) theories provide the underlying theories, and the theoretical relationship between various institutions and bank efficiency has been evident. Additionally, comprehensive country-level determinants are expected to affect bank efficiency. Thus, the current study develops the following hypothesis:

*H<sub>1</sub>: Political, economic, and regulatory environments affect bank efficiency.*

According to the theory of political institutions advanced by North (1990) and the hierarchy of institutions hypothesis (HIH) proposed by Acemoglu et al. (2005), political institutions are the essential component in the institutional matrix since they create the primary stages of economic institutions (Acemoglu et al., 2019; Flachaire et al., 2014; Slesman et al., 2019). As an ultimate institution, political institutions, whether based on democracy or dictatorship, allocate and determine the arrangement of economic and regulatory institutions. Eventually, it can impact economic performance and outcomes. Thus, varying development levels and

contemporary banking and finance performance are rooted in each society's divergent political institutions, such as the extent of constraints on the government, political access and competition (Haber et al., 2008; Quintyn & Verdier, 2010). Thus, the current study assumes that political institutions also play an essential role in increasing bank efficiency. Particularly, democracy might significantly positively impact bank efficiency by reducing corruption within a country. This is because, under a democratic environment, corruption in a country can be suppressed with the proper implementation of law and order, increasing institutional and market efficiency (Asutay & Sidek, 2020). Empirically, Chortareas et al. (2013) find that banks in more open institutional framework countries tend to have higher bank efficiency, implying that more developed and democratic countries create more efficient bank operations. However, they employed institutional variables such as political stability, the rule of law, and government effectiveness that are more likely considered governance institutions. Based on the theory of hierarchy of institutions hypothesis (HIH) and past findings of empirical research, the current study formulates the sub-hypothesis as below:

*H<sub>1a</sub>: Political institutions have a positive impact on bank efficiency.*

Theoretical views on the impact of economic institutions on bank efficiency have two opposing perspectives: positive and negative impact. The optimistic view argues that greater economic and financial freedom help increase bank efficiency by controlling their cost more effectively (Chortareas et al., 2013), and new innovation in products and services (Classens et al., 2001). Some empirical studies examine the impact of economic institutions on bank efficiency. Many studies use economic and financial freedom variables (*see*: Chortareas et al., 2013; Luo et al., 2016). Those variables can either positively or negatively affect bank efficiency. However, there is no conclusive result on the impact of economic and financial freedom. For instance, Chortareas et al. (2013) investigate the effects of financial freedom on bank efficiency in European Union countries and find a significant positive role of financial freedom on cost advantages and overall bank efficiency. However, this result contradicts the findings of Luo et al. (2016). They examine the interrelationship between financial openness, bank risk, and profit efficiency. They observe a negative impact of financial openness on banks' profit efficiency. Different types of efficiency, measurements, and samples might have led to these divergent results. Since the sample countries used in this study are mainly developing countries, more regulations seem necessary. For example, due to the increasing number of banks in the market as a result of financial openness, market concentration within a country can create a monopoly if there is no government intervention (Chortareas et al.,



2013). Following the theoretical relation between economic freedom and bank efficiency, and the consideration of the sample countries used in this study, the current study sets the second sub-hypothesis:

*H<sub>1b</sub>: Economic institutions have an inverse impact on bank efficiency.*

Regulatory institutions such as capital requirements and regulatory interventions significantly affect bank efficiency. Many studies examine the relationship between regulatory restrictions and bank efficiency (*see*: Chortareas et al., 2012; 2013; Pasiouras et al., 2009). For example, Chortareas et al. (2012) find that strict bank capital requirements improve their overall efficiency by using European examples. However, Pasiouras et al. (2009)'s result is contradictory. Although they agree on the positive impact of capital requirement on cost efficiency, their result confirms its negative impact on profit efficiency. Nevertheless, both studies agree on supervisory power's positive impact on bank efficiency. As shown in the literature, regulatory institutions' impact on bank efficiency is still inconclusive according to different samples and efficiency measurements. Considering the sample countries used in this study, the sub-hypothesis for bank efficiency is developed as below:

*H<sub>1c</sub>: Regulatory institutions have a positive impact on bank efficiency.*

God's law manifested by the Holy *Quran* and *Sunnah* provides the rationale behind Islamic economics and finance (Haqqi, 2015). According to the political economy and new institutional economics (NIE) theory, the proper institutional environments are necessary for banking performance. Appropriate Islamic institutional environments, such as Islamic political, economic, and legal institutions, are essential for Islamic banks. Some empirical research examines the impact of Islamic environments on Islamic banking performance through a comparative analysis with conventional counterparts. For example, Bitar et al. (2017) investigate the influence of a country's political and legal systems on the financial soundness of both banking systems. They find that Islamic banks perform better (in terms of capital, efficiency, return volatility, liquidity, profitability, and credit risk) under a hybrid and *shariah*-based legal system than under a conventional democratic political system. This finding aligns with Asutay and Sidek's (2020) finding. They find that Islamic banks' performance is negatively affected under a conventional regulatory system due to their disfavour towards Islamic banks. Bitar et al. (2019) also find that the current capital and liquidity ratios in favour of conventional banks widen the efficiency gap between the two banking types. Those studies empirically support the theory of political economy and new

institutional economics (NIE). However, such studies compare a political system (democratic system) with a legal system (*shariah*-based) or only use the conventional political system. Moreover, there is a lack of Islamic research that deals with Islamic banks' efficiency. The current study aims to fill the research gap by investigating bank efficiency and employing both conventional and Islamic institutions. Following the theory of the political economy and the new institutional economics, and existing literature, this study sets the last sub-hypothesis below:

*H<sub>1d</sub>: Islamic institutions have a positive impact on Islamic bank efficiency.*

### **3.3. Methodology**

#### **3.3.1. Introduction**

One of the challenges of conducting political economy research is identifying and examining variables (Archer et al., 2007) and altering the model according to the data (Pagano & Volpin, 2001). However, due to the development of available variables that quantify macro-economic factors, such as the index of political institutions and economic and financial liberalization, there is growing research on macro-economic factors and their impact on the economy and banking sectors. Nevertheless, the findings of empirical studies on this issue remain inconclusive due to the difficulty of measuring variables (Hermes and Lensink, 2005, cited in Ahmed, 2013) and the divergence in variable selection between one study to another. The current study addresses this issue by employing the most widely used variables for each institution (political, economic, and regulatory).

This study faces another challenge. The ability to identify and examine Islamic political systems and institutions was significantly more difficult prior to the emergence of the Islamicity Indices, measurements of the Islamic institutional environments in a country. The Islamicity Index comprehensively assesses and quantifies how much a country reflects Islamic values and how much its institutions are based on the Holy *Quran* and *Sunnah*. This can influence many aspects of society, such as politics, economy, human development, the legal system, governance, and international affairs. Still, this index has its limitations and critics. According to the Index's official website (IslamicityIndices), it is challenging to define truly compliant Islamic values due to subjectivity in this matter. Finding data on these characteristics is also difficult. Lastly, although the index does not have time-series data before the year 2010, this problem can be addressed by using various methods outlined below. Despite these limitations, it is the only index that measures the Islamic system in Muslim and

in non-Muslim countries; instead of merely dividing countries into two simple categories based on whether they implement Islamic law. This study employs the index as the main index of Islamic political, economic, and legal institutions.

To examine banks' performance, this study uses a banking efficiency measurement. Efficiency can be defined as a firm's ability to maximise its profit or outputs and minimise its cost of inputs (Aigner et al., 1977; Coelli et al., 2005). The importance of efficiency in firms has been growing in recent years. With world population growth and scarce resources, firms of all kinds have increased focus on their operations' efficiency (Avkiran, 2013). Consequently, along with profits, a strategy for efficiency is considered crucial for any organisation and its market competitiveness in the long run (Avkiran, 2013). Thus, the efficiency measure is widely used to examine bank performance (*see*: Barth et al., 2013; Chortareas et al., 2013; Johnes et al., 2014; Luo et al., 2016).

Earlier studies have focused on ratio analysis to measure the performance and efficiency of banks (Luo & Yao, 2010; Sathye, 2003). Financial ratio analysis, conducted by using firms' financial statements, such as balance sheets and income statements, is the traditional way of examining performance and efficiency. Financial ratio analysis aims to identify past and current trends that predict future bank performance, including profitability, efficiency, asset quality, and solvency (Casu et al., 2015). However, there are limitations to examining bank efficiency and comparing it with other banks. Firstly, there is criticism that a one-year-based analysis of financial ratios is not sufficient to measure bank performance because of the difficulty in analysing long-term performance (Sathye, 2003) since, to estimate performance, at least five years of data is required (Casu et al., 2015). Secondly, banks are complex organisations with multiple inputs and outputs (Bitar et al., 2019). Thus, it is inappropriate to compare banks with a single input or output ratio directly. Moreover, financial ratio analysis uses ratios that explain the related outputs and inputs, even though they have different prices (Humphrey & Pulley, 1997). Thirdly, precise comparisons between banks may be difficult since each entity may be operating in different markets with diverse customers and products (Casu et al., 2015). Especially for cross-country analysis, different national laws or tax regimes might affect each entity's financial ratio to make the comparison unfair (Casu et al., 2015). Lastly, in terms of the comparison between Islamic and conventional banks, financial ratio analysis seems even more inappropriate. This is because one of the built-in assumptions in financial ratios is cost minimisation and profit maximisation; however, this is not the case for Islamic banks (Johnes et al., 2014). Therefore, there needs to be another analysis method

for comparative research between conventional and Islamic banks and their efficiency. To address this, there is a growing use of frontier analysis methods to measure firms' efficiency in general and banks in particular (Sathye, 2003). Consequently, this study also employs the frontier analysis method to measure bank efficiency.

This chapter includes a general explanation of efficiency, including its type, approach and variable selection. It introduces the most widely used efficiency estimations and specifies the method employed in this study. The sample, data, variables, and empirical model follow.

### **3.3.2. Efficiency measurement**

Much of the literature on efficiency measurement employs frontier efficiency methods since frontier efficiency can make other production units comparable (Johnes et al., 2014). Frontier efficiency analysis, first introduced by Farrell (1957), computes the best efficiency frontier by using multi-inputs and outputs to estimate each firm's efficiency by measuring the deviation between the best frontier and individual firms' performance (Bitar et al., 2019). The best efficiency frontier here means the maximum or optimum outputs for given inputs or the optimum inputs to produce the maximum level of outputs; consequently, the distance from the best frontier refers to firms' inefficiency (Luo, 2004).

There are two primary analyses used in frontier efficiency methods, the non-parametric (mathematical) approach and the parametric (econometric) approach (Nguyen, 2018). Data envelopment analysis (DEA) and stochastic frontier analysis (SFA) are the most widely used methods for those approaches (Silva et al., 2017). The two methods differ in their underlying assumptions when producing the best efficient frontier (Silva et al., 2017). The following sub-chapters examine the pros and cons of each approach and justify the main approach used in this study.

#### **3.3.2.1. Data Envelopment Analysis (DEA)**

The most popular and widely used non-parametric method is data envelopment analysis (DEA) (Avkiran, 2013; Hjalmarsson et al., 1996; Nguyen, 2018), which was first introduced by Charnes, Cooper, and Rhodes in the *European Journal of Operational Research* in 1978 (Ray, 2004; Silva et al., 2017; Theodoridis & Anwar, 2011). Data envelopment analysis (DEA), a non-parametric linear programming method, estimates the (technical) efficiency of decision-making units (DMUs) by using a combination of multiple inputs and outputs which are formed from piecewise linear facets (Silva et al., 2017; Sturm & Williams, 2004; Theodoridis & Anwar, 2011). Data envelopment analysis (DEA) employs benchmark

technology using mathematical programming by comparing units (Ouenniche et al., 2017; Ray, 2004; Tone, 2017b). Therefore, while any firms in the piecewise linear hull line are considered efficient, firms inside the envelope are believed to be inefficient (Silva et al., 2017).

There are several advantages to using the data envelopment analysis (DEA). First and most significant, it has fewer restrictions on measuring efficiency. It does not require any functional form of the frontier, neither a production nor a cost function, to measure the best frontier; it requires no input or output prices (Fang et al., 2019; Sturm & Williams, 2004; Theodoridis & Anwar, 2011) since there is no assumption of a specific production technology common to all DMUs (Avkiran, 2013). Consequently, one of the advantages of using this analysis is that the efficiency of the DMUs can be measured based on other units' performance, and there are fewer restrictions on sample selection (input and output variables) (Avkiran, 2013; Luo & Yao, 2010). Second, it assumes no random errors or noise in its efficiency measurement (Silva et al., 2017). Third, it is more appropriate for comparative research looking at Islamic and conventional banks since it does not concern itself with a firm's objectives; instead it compares similar input and output mixes (Bitar et al., 2019). For instance, Islamic banks that mainly engage in sale and mark-up transactions are not comparable to firms involved in joint venture finance since it has a different mix of outputs (Johnes et al., 2014). Lastly, data envelopment analysis (DEA) can address the issue of scale and analyse multiple inputs and outputs quickly, which is a shortcoming of financial ratio analysis as it cannot do this (Theodoridis & Anwar, 2011). Moreover, this approach is most appropriate for small samples (Fang et al., 2019). Due to the advantages above, data envelopment analysis (DEA) is widely used in many studies and considered a comparatively robust method (Sathye, 2003).

However, the data envelopment analysis (DEA) approach has been criticised for its limitations and drawbacks (Fernandez et al., 2019). Firstly, unlike the parametric functional form, data envelopment analysis (DEA) does not produce any production, cost, and profit function that measures the marginal products, costs, and elasticities of substitution from the model produced (Ray, 2004). Secondly, the most crucial issue is that data envelopment analysis (DEA) lacks a concept of efficiency distribution and does not account for random errors. Since data envelopment analysis (DEA) does not recognise the impact of random errors and data noise in its estimation, random errors and other external factors are not filtered out, making data envelopment analysis (DEA) sensitive to measurement error

(Avkiran, 2013). Consequently, any deviation may inappropriately be considered an inefficiency (Fang et al., 2019; Hjalmarsson et al., 1996; Ray, 2004; Theodoridis & Anwar, 2011). Secondly, like the first issue, data envelopment analysis (DEA) is dependent on and sensitive to the number of samples, and the total sum of inputs and outputs (Sun and Chang, 2011, cited in Fang et al., 2019) since the lack of an ability to account for errors leaves data envelopment analysis (DEA) vulnerable to sudden changes in the data, which affects the outcome and efficiency measures (Venet, 2002, cited in Nguyen, 2018). Moreover, since data envelopment analysis (DEA) does not provide any statistical form for modelling the efficiency of firms, elements outside the sample can profoundly affect the result (Theodoridis & Anwar, 2011). Lastly, the approach does not concern itself with the bank's input and output prices (Nguyen, 2018). For instance, marginal costs and input costs might differ depending on the region or country. Therefore, the approach looks more appropriate for measuring technological than economic efficiency (Nguyen, 2018).

data envelopment analysis (DEA) was first applied to banking by Sherman and Gold (1985), specifically the classical CCR model (Liu et al., 2013; Sathye, 2003). Since that time, the banking area has been one of the most prominent fields that employ data envelopment analysis (DEA) methods to measure efficiency since the banking sector frequently requires efficiency checks from governments and individuals in the market (Liu et al., 2013). In addition to using data envelopment analysis (DEA), a recent trend in banking efficiency measurement is two-step contextual analysis in which the research first measures the efficiency score and then examines the relationships with other contextual factors through regression analysis (Liu et al., 2013).

### **3.3.2.2. Type of DEA**

According to the literature, the traditional data envelopment analysis (DEA) models are the CCR and BCC models, and many studies have addressed their limitations. The section below examines the different two models from both output- and input-oriented perspectives.

Charnes, Cooper, and Rhodes first introduced the DEA model in their seminal paper in 1978 (Charles & Kumar, 2012; Tone, 2017b). Therefore, the first and basic model is called the CCR model, taking its name from the initials of those who introduced it. As a powerful tool for efficiency measurement, CCR employs linear programming technology with multiple inputs and outputs (Tone, 2017b). According to the efficiency approach, be it output- or input-orientation, the model can be divided into two forms. Following Charles and Kumar

(2012) and Tone (2017) books, the output-oriented model, described below, has a two-stage data envelopment analysis (DEA) process:

$$\begin{aligned}
 & \text{Max } \phi + \varepsilon(\sum_{r=1}^s S_r^+ + \sum_{i=1}^m S_i^-) \\
 & \text{subject to} \\
 & \phi y_{r0} - \sum_{j=1}^n y_{rj} \lambda_j + S_r^+ = 0, r = 1, \dots, s, \\
 & \sum_{j=1}^n x_{ij} \lambda_j + S_i^- = 0, i=1, \dots, m, \\
 & \lambda_j \geq 0, S_r^+ \geq 0, S_i^- \geq 0, j = 1, \dots, n, \\
 & r = 1, \dots, s, i = 1, \dots, m,
 \end{aligned}
 \tag{2}$$

Each DMU<sub>*j*</sub> is denoted as DMU<sub>*j*</sub> (*j* = 1, 2, ..., *n*) and the input and output vectors for each DMU<sub>*j*</sub> are defined as  $x_j = (x_{1j}, x_{2j}, \dots, x_{mj})^T$  and  $y_j = (y_{1j}, y_{2j}, \dots, y_{sj})^T$ .  $\lambda_j$  represents the structural variables,  $S_r^+$  and  $S_i^-$  represent slacks, and  $0 < \varepsilon$  is a non-Archimedean infinitesimal, which is defined to be smaller than any positive real number.

$\phi^*$  defines the CCR score of DMU<sub>*j*</sub>.

If  $\phi^* = 1$ , and  $S_r^{+*} = S_i^{-*} = 0, \forall i, r$ , (all slacks are zero) where \* designates an optimum, is considered that DMU<sub>*j*</sub> is efficient.

If  $\phi^* = 1$ , and  $S_r^{+*} \neq 0$  and/or  $S_i^{-*} \neq 0$  ( not all slacks are zero), is considered that DMU<sub>*j*</sub> is weakly efficient.

If  $\phi^* < 1$ , it is considered that DMU<sub>*j*</sub> is inefficient.

Similarly, an input-oriented model is more likely to focus on minimization of total input costs at given outputs (Tone, 2017b). The input-oriented model is as below:

$$\begin{aligned}
 & \text{Min } \phi - \varepsilon(\sum_{r=1}^s S_r^+ + \sum_{i=1}^m S_i^-) \\
 & \text{Subject to} \\
 & \sum_{j=1}^n y_{rj} \lambda_j + S_r^+ = y_{r0}, r = 1, \dots, s, \\
 & \phi x_{i0} - \sum_{j=1}^n x_{rj} \lambda_j - S_i^- = 0, i = 1, \dots, m, \\
 & \lambda_j \geq 0, S_r^+ \geq 0, S_i^- \geq 0, j = 1, \dots, n, \\
 & r = 1, \dots, s, i = 1, \dots, m,
 \end{aligned}
 \tag{3}$$

$\lambda_j$  represents the structural variables,  $S_r^+$  and  $S_i^-$  represent slacks, and  $0 < \varepsilon$  is a non-Archimedean infinitesimal, which is defined to be smaller than any positive real number.

The CCR score of DMU<sub>*j*</sub> is defined by  $\varphi^*$ .

If  $\varphi^* = 1$ , and  $S_r^{+*} = S_i^{-*} = 0, \forall_i, r$ , (all slacks are zero) where \* designates an optimum, is considered that DMU<sub>*j*</sub> is efficient.

If  $\varphi^* = 1$ , and  $S_r^{+*} \neq 0$  and/or  $S_i^{-*} \neq 0$  ( not all slacks are zero), is considered that DMU<sub>*j*</sub> is weakly efficient.

If  $\varphi^* < 1$ , it is considered that DMU<sub>*j*</sub> is inefficient.

The difference between the CCR and BCC models is their underlying assumption regarding returns; the former has a constant return to scale (CRS) assumption, while the latter has a variable return to scale (VRS) (Luo, 2014). The outputs change proportionally because of input changes under a CRS assumption (Charles & Kumar, 2012). Thus, the original CCR model is only applicable using CRS (Ray, 2004). However, VRS assumes that changes of inputs and outputs are not necessarily proportional, and it has both increasing (IRS) and decreasing returns to scale (DRS) (Charles & Kumar, 2012). The CRS model is more limited in its applicability since the real cases do not always work based on CRS (Charles & Kumar, 2012; Ray, 2004).

As a result, Banker, Charnes, and Cooper extended the basic CCR model to involve increasing, constant, or diminishing returns to scale in the production frontier in a 1984 management science journal to accommodate the technologies that exhibit VRC (Ray, 2004). Consequently, this data envelopment analysis (DEA) efficiency model, which falls under VRS, is called the BCC model (Charles & Kumar, 2012). The other differences between CCR and BCC are that while the CCR model (based on CRS) measures overall technical efficiency, the BCC model (based on VRS) divides overall technical efficiency into pure technical efficiency and scale efficiency (Charles & Kumar, 2012). Thus, this measure can more accurately estimate whether each DMU has experienced IRS, DRS, 'or [is] operating at the most productive scale size' (Charles & Kumar, 2012, p.23).

The BCC model can be described by incorporating a convexity constraint  $\sum_{j=1}^n \lambda_j = 1$  to the output- and input-oriented CCR models above, Equation (2) and (3) (Charnes et al., 1978; Luo, 2004).



Data envelopment analysis (DEA) models can be divided into radial and non-radial models. The radial measure is represented by the CCR and BCC models (Fukuyama & Matousek, 2011). The non-radial model addresses radial model's limitations; it only measures a proportional change of inputs and outputs. Further, one of the radial model's limitations is neglect of slacks in the efficiency score (Fukuyama & Matousek, 2011). Therefore, if non-radial slacks play an essential role in the function, the efficiency measurement can be biased and overestimated. The most representative model of the non-radial model is slacks-based measure (SBM). This model puts aside the assumption of proportional changes in inputs and outputs and deals with slacks directly (Tone, 2017a).

One of the limitations of the traditional data envelopment analysis (DEA) model is a lack of concern for various internal divisions in a firm and their linking activities (Avkiran, 2013; Tone & Tsutsui, 2017). For example, each firm has many divisions, and it employs various types of inputs and outputs. In other words, one division's outputs can be another division's inputs; these outputs/inputs are called intermediate products (Avkiran, 2013). The network data envelopment analysis (DEA) model examines the efficiencies of various divisions and their linkages by employing different production stages with intermediate inputs/outputs (Tone & Tsutsui, 2017; Wanke & Barros, 2014). The first network model was employed in Avkiran (2009) (Avkiran, 2013). The typical structure of a network data envelopment analysis (DEA) model is two-stage. In a banking example, inputs such as labour and fixed capital are used to produce a deposit, a bank's most representative intermediate output, which becomes an input to a second stage to produce the final outputs, such as loans and securities (Fukuyama & Matousek, 2011; Matthews, 2010).

In recent research, the network data envelopment analysis (DEA) model has been used in many fields (Liu et al., 2013). In particular, this network data envelopment analysis (DEA) model is frequently used in the banking area due to the classification of deposits in many studies (*see*: Fukuyama & Matousek, 2011; Matthews, 2010). The data envelopment analysis (DEA)-Solver is usually used to run network data envelopment analysis (DEA) models (Tone & Tsutsui, 2017).

### **3.3.2.3. Stochastic Frontier Analysis (SFA)**

One popular method in the parametric approach is stochastic frontier analysis (SFA). Although data envelopment analysis (DEA) is still widely used, because of the limitations of the approach and the data set, the use of stochastic frontier analysis (SFA) has been

increasing (Avkiran, 2013; Hjalmarsson et al., 1996; Nguyen, 2018). Stochastic frontier analysis (SFA), which Meeusen developed and Van den Broek (1977) and Aigner et al. (1977), examines a parametric best practice frontier based on standard cost or profit functions (Silva et al., 2017). Therefore, this approach requires specific profit, cost, revenue, and production functions (Kuosmanen et al., 2013), distinct from the data envelopment analysis (DEA) approach. For this reason, these parametric techniques are believed more suitable for economic efficiency measurements since the approach concerns the cost and profit efficiency concepts (Nguyen, 2018). Consequently, as this approach requires a parametric frontier, specific production technology and distribution of the inefficiency term are required (Silva et al., 2017). Due to the need for the estimated parameter in the regression equation, stochastic frontier analysis (SFA) is less sensitive to significant data changes (Avkiran, 2013).

Moreover, stochastic frontier analysis (SFA) assumes and accommodates error terms and statistical noise such as measurement errors, exogenous factors, and unexpected and uncontrollable factors in its efficiency model, one of its advantages (Fernandez et al., 2019; Theodoridis & Anwar, 2011). Many unexpected factors influence firm performance and efficiency. This approach acknowledges the ‘random unobserved heterogeneity’ among different firms (Fernandez et al., 2019, p.6). Lastly, the use of stochastic frontier analysis (SFA) could be more appropriate for examining the efficiency of Islamic banks since stochastic frontier analysis (SFA) is considered more suitable in studies of developing countries where there exist more measurement errors and unexpected and uncertain factors (Fries & Taci, 2005, cited in Fang et al., 2019). Moreover, this approach is suitable for panel data since it provides a more lavish specification (Hjalmarsson et al., 1996).

However, stochastic frontier analysis (SFA) also has limitations. The significant difficulty in conducting stochastic frontier analysis (SFA) comes mainly from the requirement of a pre-specification of functional forms and an explicit distributional assumption of the efficiency term that determines the shape of the efficient frontier (Coelli et al., 2005; Silva et al., 2017; Theodoridis & Anwar, 2011). Nevertheless, having a pre-assumption of the functional form is not easy and difficult to justify in advance, especially in the case of a structural form not representing the organisation’s behaviour (Avkiran, 2013). This is unknown in many cases (Charles & Kumar, 2012). Moreover, the pre-assumed functional form may cause bias in the stochastic process if there is no consistency between the shape and the data (Silva et al., 2017). Syrjanen et al. (2006) say that the ‘most commonly used functional forms fail to

capture the economies of scope in joint production’ (Syrjanen et al., 2006, cited in Kuosmanen, Saatamoinen, & Sipilainen, 2013).

Given the two approaches’ strengths and weaknesses, the literature does not offer a clear view of the superiority of one approach over the other (Silva et al., 2017). Both approaches have advantages and disadvantages, such as DEA’s no measurement error and stochastic frontier analysis (SFA)’s particular structure (Avkiran, 2013). Thus, choosing the suitable method depends on the research objectives, data type, and technology characteristics (Hjalmarsson et al., 1996; Silva et al., 2017).

**Table 7: DEA and SFA measurement**

	<b>Data envelopment analysis (DEA)</b>	<b>Stochastic frontier analysis (SFA)</b>
<b>Approach</b>	Non-parametric method (Hypothesis cannot be tested) Mathematical programming	Parametric method (Hypothesis can be tested) Econometric estimation
<b>Input &amp; Output</b>	Multiple inputs & outputs	Multiple inputs & single output
<b>Random Error</b>	No random error assumption	Accommodate error term and statistical noise
<b>Functional &amp; Distributional Form</b>	No functional and prior distributional forms are required	Pre-assumption of Functional and distributional form is required
<b>Sample Selection &amp; Sensitivity</b>	Less restriction on sample selections, but sensitive to sample changes	Less sensitive to large sample changes
<b>Islamic Banks Concern</b>	No concern on the specific objective of firms	More suitable for Developing countries’ research

### 3.3.3. Econometric modelling

To investigate the impact of conventional and Islamic institutional environments on bank efficiency, this study employs a two-stage empirical approach: the first stage calculates bank efficiency using the data envelopment analysis (DEA) technique, and the second stage conducts a panel regression analysis to identify the relationship between institutional environments and bank efficiency by setting it as a dependent variable in the model.

#### 3.3.3.1. Measuring bank efficiency

This study calculated the technical efficiency score of both conventional and Islamic banks by using the data envelopment analysis (DEA) technique. The data envelopment analysis

(DEA) technique is more appropriate in this study for several reasons. Firstly, although financial ratio analyses are the traditional way of examining the performance of firms, there are limitations to examining bank efficiency. Banks are complex organisations with multiple inputs and outputs (Bitar et al., 2019). Thus, comparing banks with a single input or output ratio is inappropriate. Moreover, precise comparisons between banks may be difficult since each entity may operate in different markets with diverse customers and products. Especially for cross-country analysis, different national laws or tax regimes might affect each entity's financial ratio to make the comparison unfair (Casu et al., 2015). Therefore, this study employs the frontier efficiency method since frontier efficiency can make other production units comparable (Johnes et al., 2014) and analyse the multiple inputs and outputs variables. Secondly, the dataset of this study is more suitable for the data envelopment analysis (DEA) technique. The data envelopment analysis (DEA) technique is most appropriate for small samples, whereas the stochastic frontier analysis (SFA) requires a large dataset (Fang et al., 2019). Since this study's Islamic banks sample is relatively small, the data envelopment analysis (DEA) technique is more appropriate. Finally, measuring the efficiency score of Islamic banks via data envelopment analysis (DEA) seems adequate for a comparison of Islamic and conventional banks since this technique does not consider the firm's objectives (which differ between Islamic and conventional banks) but instead compares similar inputs and outputs mix (Bitar et al., 2019). For instance, Islamic banks that mainly engage in sales and mark-up transactions are not comparable to firms involved in joint venture finance since there is a different mix of outputs (Johnes et al., 2014).

While much empirical research uses cost and profit efficiency, Bitar et al. (2019) argue that technical efficiency is suitable when comparing conventional and Islamic banks. Moreover, this efficiency measure is used for banking regulations (Bitar et al., 2019) and managerial efficiency (Tanna et al., 2011). Thus, this study measures the technical efficiency of the sample banks using the DEA technique. In keeping with previous studies (*see*: Bitar et al., 2019; Chortareas et al., 2013; Tanna et al., 2011), this study employs the input-oriented technique and measures the efficiency accordingly. This approach sees banks as a cost-minimising institutions in which outputs are determined by external demand and factors the banks themselves cannot control (Bitar et al., 2019; Tanna et al., 2011).

To calculate bank efficiency using the data envelopment analysis (DEA) technique, this study uses three input variables: 1) total customer deposits (m USD), 2) fixed assets (m USD), and 3) total interest expenses (m USD); and two output variables: 1) gross loan (m USD) and 2)

total interest income (m USD). This study follows the intermediation approach when selecting the input and output variables. Many bank efficiency studies widely employ the intermediation approach (*see*: Barth et al., 2013; Chortareas et al., 2013; Johnes et al., 2014; Luo et al., 2016; Nguyen, 2018; Safiullah & Shamsuddin, 2019; Sathye, 2001; Stum & Williams, 2004; Tanna et al., 2017; Tanna et al., 2011). The intermediation approach view banks as intermediaries that collect funds (deposits) and transfer them to financial products such as loans or other assets (Luo et al., 2016; Tanna et al., 2017). Islamic Banks collect various forms of deposits including investment deposits offering an ex-post profit rate. All the deposits offered by the Islamic banks have different underlying Islamic contracts, which have been originated from the sources of Shariah. However, unlike conventional banks, Islamic banks offer various types of profit-loss based financing (alternative to interest-based loans) products, which are again tied to various Islamic contract. Islamic banks do not deal with interest within a banking operation, and Islamic banks do not offer loans in the same way as conventional banks (Johnes et al., 2014). Gross financing amount in Islamic banks include both equity- and debt-based Islamic products. However, most international bank databases, including Bankfocus and Fitchconnect, use the common templates and generic terms in compiling and publishing financial statement data for all banks including conventional and Islamic banks. Hence the current study uses internationally recognised data terminologies and formats. This study excludes missing or zero values for the input and output variables when calculating the data envelopment analysis (DEA) efficiency score.

### 3.3.3.2. Empirical model

For the second stage analysis, following the empirical model of Asutay and Sidek (2020), this study employs the fixed effect model. Since this study employs institutional variables that vary within each country, the degree of democracy and autocracy varies according to different sample countries. The fixed-effect approach is more appropriate since it controls the country-specific time-invariant traits not accounted for by the control variables (Asutay & Sidek, 2020). Additionally, the current study conducted the F-test to determine which models between pooled OLS and fixed effect models are more suitable for the dataset. According to the result, the fixed-effect model is more appropriate. Further, the Hausman test determines which panel data model is appropriate between random and fixed effects. The fixed-effect model is more appropriate. The main empirical model to test the impact of institutional environments on bank efficiency is as follows:

$$H_{1a}: \text{Bank Efficiency}_{it} = \alpha_{it} + \beta_1 \text{Political institutions}_{it} + \beta_2 \text{Controls}_{it} + \varepsilon_{it}$$

$$H_{1b}: \text{Bank Efficiency}_{it} = \alpha_{it} + \beta_1 \text{Economic institutions}_{it} + \beta_2 \text{Controls}_{it} + \varepsilon_{it}$$

$$H_{1c}: \text{Bank Efficiency}_{it} = \alpha_{it} + \beta_1 \text{Regulatory institutions}_{it} + \beta_2 \text{Controls}_{it} + \varepsilon_{it}$$

$$H_{1d}: \text{Bank Efficiency}_{it} = \alpha_{it} + \beta_1 \text{Islamic institutions}_{it} + \beta_2 \text{Controls}_{it} + \varepsilon_{it}$$

In the models, the data envelopment analysis (DEA) efficiency score measured in the first stage is regressed as a dependent variable for the conventional and Islamic political and economic institutions along with the control variables.  $\varepsilon_{i,t}$  denotes the error term.

### 3.3.3.3. Sub-sample analysis

The current study conducts sub-sample analysis by splitting samples into conventional and Islamic banks. This is to examine how the same institutions differently affect bank efficiency according to the banking type. In a sub-sample analysis, bank efficiency is separately calculated between conventional and Islamic banks sample using data envelopment analysis (DEA) and stochastic frontier analysis (SFA) for the robustness test.

Additionally, this study employs the interaction term between political institutions and economic and regulatory institutions. This study examines how institutions affect bank efficiency when integrating with political institutions by employing interaction terms. This test empirically confirms the theory of political institutions and the hierarchy of institutions hypothesis (HIH) that stresses the political institution's role as an ultimate institution and its significant impact on the economy and banking areas.

Lastly, this study aims to examine how the 2008 financial crisis affected the institutional effect on bank efficiency by employing the interaction effect of the crisis period dummy. Many studies employ the interaction effect of the crisis to examine its impact on various banking performances (*see*: Beck et al., 2013; Diaz & Huang, 2017). The crisis dummy is defined as 1 for the period 2007-2009.

### 3.3.3.4. Robustness test

Various robustness tests are conducted to confirm the results of the initial regression model. First, the current study employs alternative efficiency measurement using stochastic frontier analysis (SFA). Although the data envelopment analysis (DEA) technique is more suitable for the current study in terms of the sample size and the comparative research between conventional and Islamic banks, the stochastic frontier analysis (SFA) technique is also widely used to calculate banks' efficiency. This technique is expected to overcome the data envelopment analysis (DEA) technique's limitations. Moreover, the parametric technique is

more appropriate for economic efficiency measures since it requires specific profit, cost, revenue, and production functions (Kuosmanen et al., 2013; Nguyen, 2018). Lastly, since the stochastic frontier analysis (SFA) is considered more suitable for studies of developing countries that have more measurement errors and unexpected and uncertain factors, it would be appropriate for this study's sample countries, which are mostly developing countries (Fries and Taci, 2005, cited in Fang et al., 2019). By employing the other alternative measure of banks' efficiency, this study provides a robust result of the relationships between institutional environments and bank efficiency. The use of an alternative measure of the dependent variable is common in broad research (*see*: Ashraf, 2017).

Following the previous empirical studies, this study employs the Battese and Coelli (1995) model (*see*: Luo et al., 2016; Pasiouras et al., 2009). This model provides the efficiency measurement in a single-step which incorporates country and bank-specific variables to impact banks. In its general form, the stochastic frontier function can be written as follows:

$$\begin{aligned} \log(Y_{it}) = & \beta_0 + \beta_1 \log(\text{Deposit}_{it}) + \beta_2 \log(\text{Fixed assets}_{it}) \\ & + \beta_3 \log(\text{Interest expense}_{it}) + v_{it} - u_{it} \end{aligned} \quad \text{Equation (4)}$$

Where  $Y$  is a total value of output and Deposit represents the total customer deposits (m USD), Fixed assets denotes fixed assets (m USD), and Interest expense represents the total interest expenses (m USD).  $v_{it}$  is the random error and  $u_{it}$  is a non-negative random inefficiency term.

Secondly, this study conducts the propensity score matching to address the imbalance between the two banking types (conventional and Islamic banks), which might produce a biased result. Islamic banks are much fewer than conventional banks in this study's sample. Thus, propensity score matching (PSM) provides a better comparison between conventional and Islamic banks by providing the match quality between two groups (treatment and control groups), where Islamic banks are the treatment group and conventional banks are the control group. The propensity score matching (PSM) method is conducted when the treatment group receives treatment and compares it with a control group's outcomes. After that the comparison between Islamic and conventional banks is conducted based on the matched sample. This study employs the propensity score matching with common support and this study uses total assets, equity to total asset and GDP growth as controls. Propensity score matching (PSM) consists of matching observations of banks based on the probability that they are Islamic ones (Bitar, 2017). To conduct the propensity score matching (PSM), this

study creates the Islamic bank dummy, in which Islamic banks take the value of 1, and conventional ones take the value of 0. Then, the logit model is estimated where the Islamic bank dummy is regressed on the control variables used in the baseline model and the year-fixed effects (Bitar. 2017).

Lastly, following the work of Bitar et al. (2017) and Cubillas and álex (2014), to address the endogeneity problem, the current study conducts the two-stage least square (2SLS). The endogeneity issue is one of the most common and challenging issues in social research (Lynch & Brown, 2011). In particular, it is intractable in quantitative cross-country research (Esping-Andersen & Przeworski, 2001), and in economic growth studies that deal with institutional variables (Glaeser et al., 2004). Although these are the two areas where it presents the most, the issue plagues many other fields of study.

In econometric terms, the term endogeneity means the situation where an explanatory variable (independent variable) is correlated with the error term (Lynch & Brown, 2011; Wooldridge, 2008). According to statistical assumptions, predictor variables (explanatory variables) should be independent from the dependent variable (Esping-Andersen & Przeworski, 2001). Thus, a problematic situation can occur under two common conditions: 1) when the vital variables are omitted either as explanatory or control variables, which is called omitted variable bias, and 2) when the outcome (dependent) variable is simultaneously affecting the independent variable, which is called simultaneity bias (Lynch & Brown, 2011). Both can result in a biased result, leading to overestimations by the model (Johnston, 1972).

One of the most effective ways to address the endogeneity issue is using instrumental variables (Lynch & Brown, 2011). This is a way to regress the original explanatory variables by replacing the instrumental variables and regressing the outcome variable in the exogenous explanatory variable (Lynch & Brown, 2011). The most common method in the instrumental approach is the two-stage least square (2SLS). This technique is widely used to solve the issue of omitted variables bias and the reverse causality issue (Angrist & Imbens, 1995; Tanna et al., 2017) in much of the existing literature (*see*: Agoraki et al., 2011; Ashraf, 2017; Ashraf et al., 2016; Bitar et al., 2017; Cubillas & ález, 2014; Luo et al., 2016).

Firstly, to select the proper, valid, and strong instrumental variables, the current study refers to theories and previous literature to find a strong relation between exogenous and instrumental variables. *Regime durability* is used for political institutions (*polity 2*), which is one component of *democracy* and *polity 2*. As an instrumental variable for *financial freedom*,



the *fiscal health* index is used. As an instrumental variable for regulatory institutions (*activity restriction*), *market discipline* is employed. For Islamic institutions, the *Muslim population* and *corruption* rate are used. This is because Islamic institutions, particularly political institutions such as democracy, are closely related to corruption. Corruption can be reduced and suppressed with proper law and order implementation, one of the resulting institutions of democracy (Asutay & Sidek, 2020). Barro (1999) examines the determinations of democracy by using the political corruption variable. By contrast, Rivera-Batiz (2002) examines the impact of democracy on the quality of governance, including corruption in a country. The research finds that the quality of governance tends to be higher in more democratic countries. This is because democratic institutions take a role in constraining corrupt officials. As seen above, much empirical research examines the close relationship between democracy and corruption in both directions. Consequently, it can be concluded that there are close relationships between them regardless of the direction.

#### **3.3.4. Sample**

The empirical analysis of this study includes data on 594 banks (468 conventional banks and 126 Islamic banks) from 18 countries from 2005 to 2020. This study chose the countries that operate both conventional and Islamic banks and those with more than two Islamic banks for a more accurate comparison. This study chose the sample countries regardless of whether they are Muslim-majority or Islamic countries; thus, Muslim-minority countries such as the UK are also included. This study excluded Sudan and Iran from the sample since they only have an Islamic banking system. Data availability and the need for consistency limit sample selection here. For data consistency, this study tried to collect bank-level data from the same source (Bankfocus and Fitchconnect) as much as possible. Appendix 1 shows all the banks included, sorted by country.

#### **3.3.5. Variables and data**

##### **3.3.5.1. Input and output variables**

To calculate bank efficiency using the data envelopment analysis (DEA) technique, input and output variables were collected from Bankfocus and Fitchconnect. This study uses three input variables: 1) total customer deposits (m USD), 2) fixed assets (m USD), and 3) total interest expenses (m USD); and two output variables: 1) gross loan (m USD) and 2) total interest income (m USD). This study follows the intermediation approach when selecting the input and output variables. Many bank efficiency studies widely employ the intermediation

approach (*see*: Barth et al., 2013; Chortareas et al., 2013; Johnes et al., 2014; Luo et al., 2016; Nguyen, 2018; Safiullah & Shamsuddin, 2019; Sathye, 2001; Stum & Williams, 2004; Tanna et al., 2017; Tanna et al., 2011). The intermediation approach sees the banks as intermediaries that collect funds (deposits) and transfer them to financial products such as loans or other assets (Luo et al., 2016; Tanna et al., 2017). Thus, the main input in this approach is a deposit. The selection of input and output variables follows the recommendations found in the literature about those most used in efficiency research. To calculate the stochastic frontier analysis (SFA) bank efficiency, three input variables are used: 1) total customer deposits (m USD), 2) fixed assets (m USD), and 3) total interest expenses (m USD), alongside one output variable: gross loan (m USD).

Islamic banks do not deal with interest within a banking operation, and Islamic banks do not offer loans in a same way as conventional banks (Johnes et al., 2014). Gross loan in Islamic banks encompass equity- and debt-based Islamic products as a generic term. However, most international bank databases, including Bankfocus and Fitchconnect, follow the international formats and generic terms of balance sheet, off-balance sheet, and income statement. Consequently, the current study follows the international formats and terminologies.

#### **3.3.5.2. Institutional variables**

The demarcation between institutions is hard to find. Consequently, it can be used interchangeably or mixed in research. For instance, some research identifies governance institutions such as political stability and the rule of law as political institutions. In addition, economic institutions and regulatory institutions are closely linked. For example, while financial freedom, popularly used for economic institutions, implies limited government intervention in financial and banking market, regulatory intervention, a regulatory institution means government intervention in bank activities (Chortareas et al., 2012; 2013). To address this problem, the current study employs the most distinct feature of political, economic, and regulatory institutions, which do not have similar features. Additionally, this study uses the most widely used indicators for each institution.

The main political institution was drawn from the Polity IV database. Polity IV is a well-known dataset for political institution research. Many studies employ this variable (*see*: Flachaire et al., 2014; Giavazzi & Tabellini, 2005; Glaeser et al., 2004; Persson & Tabellini, 2006) to examine the impact of political institutions and to identify what interactions exist between institutions. Even in the literature on Islamic banking's political economy, this

variable is popularly used (*see*: Asutay & Sidek, 2020; Bitar et al., 2017). Polity IV consists of six polity component variables and three concept variables, which form the degree of democracy (*democ*) and autocracy (*auto*), ranging from fully democratic (+10) to fully autocratic (-10). The component variables are regulation of chief executive recruitment (*xrreg*), competitiveness of executive recruitment (*xrcomp*), openness of executive recruitment (*xropen*), executive constraints (*xconst*), regulation of participation (*parreg*), and competitiveness of participation (*parcomp*). The concept variables as alternative variables and compatible variables with component variables are the executive recruitment (*exec*), the executive constraints (*exconst*), and the political competition (*polcomp*) concepts. Among them, this study uses *polity 2* score for a political institution, which is the revised combined *polity* score, subtracting the *auto* from *democ*. This score aims to capture the overall political institutions of a country.

The Heritage Foundation's Index of Economic Freedom is mainly used in the regression analysis for economic institutions. Many studies on economic institutions and freedom use this database (*see*: Chortareas et al., 2013; Cubillas & ález, 2014; Sufian & Habibullah, 2010). This index aims to assess the extent of government regulation and intervention in banks and other financial institutions and markets (Luo et al., 2016). The Heritage Foundation's Index of Economic Freedom covers various freedoms in 186 countries. Freedom is measured with 12 components: *property rights, government integrity, judicial effectiveness, government spending, tax burden, fiscal health, business freedom, labour freedom, monetary freedom, trade freedom, investment freedom, and financial freedom*. Remarkably, this database has a financial freedom index which is distinct from other databases. Thus, some studies have employed this financial freedom data from the Heritage Foundation (*see*: Chortareas et al., 2013). The current study employs the *financial freedom* index as an economic institution.

As a regulatory institution, regulatory intervention variables are used. Much empirical research examines the impact of regulatory intervention on bank efficiency by using *capital adequacy ratio, supervisory power, activity restrictions, and market discipline* (*see*: Luo et al., 2016; Pasiouras et al., 2009). The current study employs two regulatory variables: *activity restrictions* and *market discipline* (for an instrumental variable). These regulatory intervention variables have been widely used in research, along with bank system capital adequacy ratio and supervisory power. *Activity restrictions* measure the level of restrictions on a bank's activities, especially in securities, insurance, real estate, and ownership of non-financial firms. Recent research discusses enforcement action concerning banks' liquidity

creation (*see*: Nguyen et al., 2020). *Market discipline* is an indicator measuring the degree to which banks are allowed to disclose their off-balance sheet items and risk management procedures to the public and whether certified auditors are required. This study constructed the above mentioned regulatory variables based on the World Bank's Bank Regulation and Supervision Survey's relevant questions. The questions differ slightly depending on the version. However, the current study refers to existing literature that constructs a regulatory index based on the World Bank's Bank Regulation and Supervision Survey (*see*: Ashraf, 2017; Barth et al., 2013; Djalilov & Piesse, 2019; Luo et al., 2016; Pasiouras et al., 2009). This study constructs the variables by using version 1 (the 2001 database), version 2 (the 2003 database), version 3 (the 2007 database) for 2000-2009, version 4 (the 2011 database) for 2010-2014, and version 5 (the 2019 database) for 2015-2020.

Islamic environments and institutions likely influence the countries in which Islamic banks operate; they are prevalent. Thus, it is necessary to examine the impacts of this environment on the economy in general, and bank performance in particular. As a proxy for Islamic political and economic institutions, the Islamicity Index is used here. The Islamicity Index was constructed by the Islamicity Foundation, a non-profit corporation in the United States consisting of diverse country partners, specialists, and *shariah* scholars. The index assesses the country's Islamicity level, such as how much the country reflects Islamic economic, political, social, human, and governance values and to what degree they are in accordance with the Holy *Quran*. Thus, this index serves as a benchmark that assesses Islamic compliance in a country. The index consists of five elements: the *overall Islamicity score*, *economic and human development*, *laws and governance*, *human and political rights*, and *international relations*. However, the index does not measure personal religiosity, such as 'belief commitment, daily prayers, fasting and pilgrimage' (Askari & Mohammadkhan, 2016). Instead, it assesses the Islamic values and society's adherence to those values. One hundred fifty-one countries, including Muslim-minority countries, are scored and ranked annually. The Index is reported every five years up to 2015 and every year after that, ranging from 0 to 10 (0 is highly un-Islamic and 10 is highly Islamic). There are limitations to the index. Firstly, the subjectivity in the components of the index matters. This index is criticized for whether it represents core Islamic elements. This issue is not only applied to the Islamicity index but also all institutional variables, such as political and economic variables (Acemoglu et al., 2019; Asutay & Sidek, 2020). Nonetheless, the Islamicity index is the only index that measures and quantifies the Islamic values of various countries. Other contemporary indices

exist, such as the *shariah*-based index or Islamic index, but they are for the stock market. Secondly, as this index is released every five years until 2015, this study only had values for 2010 and 2015. This study thus constructed the data between 2011 and 2014 by applying the linear spline interpolation technique. While linear interpolation is generally used for non-sequential missing values, the linear spline interpolation technique is applied to interpolate missing values by using two neighbour values (Wubetie, 2017).

### **3.3.5.3. Control variables**

To control for other factors that affect banks' efficiency, bank-, and country-level control variables are employed. The control variables used in this study were suggested by previous studies, both on bank performance in general and efficiency, in particular.

As bank-level variables, the natural logarithm of the banks' *total assets* is used. This variable is widely used to control the size of banks (*see* Ashraf, 2017; Asutay & Sidek, 2020; Bitar et al., 2017). Further, the current study employs *equity to total assets* to control a bank's capital, a widely-used mechanism (*see*: Chortareas et al., 2013; Tanna et al., 2017; Tanna et al., 2011). Lastly, *return on assets* is used. The Bankfocus and Fitchconnect databases collected all bank-level variables.

As country-level variables, *GDP growth* annual rate, *inflation*, *corruption perception index*, *unemployment rate*, and *Muslim population* are employed as country-level control variables. GDP growth and inflation are widely used to control a country's macroeconomic environments in many studies (*see*: Ashraf, 2017; Bitar et al., 2017; Pasiouras et al., 2009; Tanna et al., 2017). These variables were obtained from the World Bank database and the Global Market Information Database (GMID). The corruption perception index (CPI) is drawn from the Transparency International Database. The CPI measures how much corruption experts and business executives perceive in a country or territory. A high score indicates a low level of corruption in a country, while a low score represents high corruption. The CPI is the most popular index that measures the corruption level. In general, corruption is used to control a country's macroeconomic factors in many studies (*see*: Ashraf, 2017; Asutay & Sidek, 2020). The unemployment rate is obtained from the IMF database, and Muslim population data is collected from the Pew Research Center and Muslim Population. Appendix 2 describes all variables and data sources.

### 3.3.5.4. Summary statistics

**Table 8: Summary statistics**

Full sample				
Variables	Mean	Std. Dev.	Skewness	Kurtosis
<i>Political institution</i>	1.913	0.463	-2.269	9.093
<i>Financial freedom</i>	3.851	0.466	-0.708	3.685
<i>Activity restriction</i>	2.211	0.349	-0.644	2.600
<i>Islamic political institution</i>	0.392	0.281	0.623	2.032
<i>Islamic economic institution</i>	0.441	0.290	0.508	1.656
<i>Islamic legal institution</i>	0.416	0.298	0.589	1.891
<i>Corruption</i>	2.410	1.302	0.070	1.514
<i>GDP growth</i>	0.038	0.037	-1.167	6.377
<i>Inflation</i>	0.058	0.071	3.577	19.389
<i>Unemployment rate</i>	0.060	0.036	0.813	2.997
<i>Muslim population</i>	0.721	0.342	-1.330	3.083

	Full sample				Conventional Banks				Islamic Banks			
	Mean	Std. Dev.	Skewness	Kurtosis	Mean	Std. Dev.	Skewness	Kurtosis	Mean	Std. Dev.	Skewness	Kurtosis
<i>Efficiency</i>	0.384	0.237	1.060	3.443	0.389	0.233	1.019	3.386	0.362	0.254	1.261	3.735
<i>Total asset</i>	7.106	2.076	0.018	2.738	7.127	2.117	0.057	2.717	7.012	1.884	-0.267	2.662
<i>Equity to total asset</i>	0.414	0.293	0.484	1.553	0.407	0.293	0.532	1.597	0.448	0.293	0.282	1.430
<i>Return on assets</i>	0.361	0.255	1.027	2.783	0.354	0.252	1.099	2.958	0.393	0.267	0.721	2.187

Note: *Efficiency* is calculated by DEA which estimates the bank efficiency by using a combination of multiple inputs and outputs. The natural logarithm of bank's *Total assets* (USD m) is used to control for bank size. *Equity to total asset* is calculated as the amount of equity divided by total asset of banks. *Return on assets* is calculated as the net income divided by total assets of banks. *Corruption* is the corruption index of sample countries. *GDP growth* is calculated as the change in the GDP of the countries in comparison to an earlier period. *Inflation* is the rate at which prices increases over time. *Unemployment* is the unemployment rate of the countries. *Muslim population* represents the percentage of Muslims of the countries. *Political institution* indicates the country's polity score, subtracting the degree of autocracy from the degree of democracy. *Financial freedom* assesses the extent of government regulation and intervention in financial institutions and markets. *Activity restriction* measures the level of restrictions on a bank's activities. *Islamic institutions* measures how much the country reflects Islamic political, economic and legal values.

Table 8 shows the summary statistic of the dependent, independent, and control variables considered here, including the mean, standard deviation, skewness, and kurtosis of each variable. From the statistics of the dependent variable, the current study finds that bank *efficiency* varies with an average value of 0.384 and 0.237 standard deviation. Conventional banks' efficiency is slightly higher (0.389) than Islamic banks' efficiency (0.362) with less standard deviation (0.233). This finding is in line with a few previous studies (*see*: Bader et al., 2008; Johnes et al., 2009). These studies claim that Islamic banks are relatively cost inefficient due to their unique operational structure based on *shariah* principles. Many Islamic banking products are not standardized, increasing operational costs (Johnes et al., 2009). Additionally, Islamic banks in some countries must follow two regulatory regimes – conventional and Islamic– which leads to inefficiency in the Islamic banking system. Bitar et

al. (2017) observe similar results of Islamic banks having increasing costs and reduced efficiency.

The *political institution* has an average value of 1.913 and 0.463 standard deviation with negative 2.269 skewness and 9.093 kurtoses. *Financial freedom* varies with an average value of 3.851 and 0.466 standard deviation. The skewness and kurtosis of *financial freedom* are negative 0.708 and 3.685, respectively. As for regulatory institutions, *activity restriction* ranges with an average value of 2.211 and 0.349 standard deviation. It has negative 0.644 skewness and 2.600 kurtoses. Regarding Islamic institutions, while *Islamic political institutions* vary with an average value of 0.392 and 0.281 standard deviation with 0.623 skewness and 2.032 kurtoses, *Islamic economic institutions* range with an average value of 0.441 and 0.290 standard deviations with 0.508 skewness and 1.656 kurtoses. *Islamic legal institutions* have an average value of 0.416 and 0.298 standard deviation with 0.589 skewness and 1.891 kurtoses.

Table 8 also shows the summary statistic of the control variables used here. The control variables are divided into a bank- and country-level control variables that influence banks' efficiency. The statistics for full-sample control variables show that *Total asset* ranges with an average of 7.106 with a 2.076 standard deviation. Conventional banks' *total asset* mean value (7.127) is higher than Islamic banks' *total asset* mean value (7.012), meaning that conventional bank's size is bigger than that of Islamic banks on average. *Equity to total assets* differs with an average of 0.414 with a 0.293 standard deviation. Islamic banks have a higher mean value of *equity to total assets* (0.448) than that of conventional banks (0.407). This finding means that Islamic banks have a higher capital level than conventional banks, supporting the previous study's finding. *Return on assets* ranges, with an average of 0.361 and a 0.255 standard deviation. The mean value of Islamic banks' *return on assets* (0.393) is higher than the mean value of conventional banks' *return on assets* (0.354). This result supports the finding of Khediri et al. (2015), who find that Islamic banks are more profitable and better capitalized than conventional banks. *Corruption rate* and *GDP growth* vary with an average of 2.410 and 0.038, respectively. *Inflation* differs with an average value of 0.058 and 0.071 standard deviation. While the *Unemployment rate* ranges with an average of 0.060, the *Muslim population* ranges with an average of 0.721.

### **3.4. Result and discussion**

#### **3.4.1. Introduction**

This section shows the regression analysis results that examine the impact of institutions (political, economic, regulatory, and Islamic institutions) on bank efficiency and discusses the results. The following section shows the results: 1) full-sample analysis, 2) sub-sample analysis (conventional vs. Islamic banks), 3) the effect of the interaction of institutions on bank efficiency, and 4) the impact of the crisis on the institution's effect on bank efficiency. The discussion section analyses the above results in detail. Lastly, the results of robustness tests are presented.

#### **3.4.2. The impact of institutional environments on bank efficiency**

##### **3.4.2.1. Full-sample analysis**



**Table 9: Effect of institutions on bank efficiency**

Variable	Full sample					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Political institution</i>	0.035*** (0.000)					
<i>Financial freedom</i>		-0.145*** (0.000)				
<i>Activity restriction</i>			0.083*** (0.000)			
<i>Islamic political institution</i>				-0.109*** (0.000)		
<i>Islamic economic institution</i>					-0.071*** (0.000)	
<i>Islamic legal institution</i>						-0.137*** (0.000)
<i>Total asset</i>	0.001 (0.460)	0.001 (0.704)	-0.000 (0.741)	-0.001 (0.701)	-0.001 (0.676)	-0.000 (0.732)
<i>Equity to total asset</i>	0.020* (0.058)	0.012 (0.150)	0.018** (0.028)	0.015* (0.059)	0.015* (0.054)	0.015* (0.059)
<i>Return on assets</i>	-0.008 (0.406)	-0.004 (0.559)	-0.006 (0.408)	-0.005 (0.525)	-0.005 (0.469)	-0.005 (0.527)
<i>Corruption</i>	-0.068*** (0.000)	-0.060*** (0.000)	-0.070*** (0.000)	-0.046*** (0.000)	-0.052*** (0.000)	-0.039*** (0.000)
<i>GDP growth</i>	-0.523*** (0.000)	-0.481*** (0.000)	-0.416*** (0.000)	-0.388*** (0.000)	-0.397*** (0.000)	-0.430*** (0.000)
<i>Inflation</i>	0.179 (0.182)	0.116** (0.020)	0.093** (0.037)	0.061 (0.156)	0.061 (0.154)	0.095** (0.026)
<i>Unemployment rate</i>	-1.428*** (0.000)	-1.148*** (0.000)	-0.733*** (0.000)	-0.814*** (0.000)	-0.751*** (0.000)	-0.908*** (0.000)
<i>Muslim population</i>	-0.685*** (0.000)	-0.066 (0.487)	-0.163* (0.095)	-0.042 (0.656)	-0.055 (0.555)	-0.063 (0.498)
<i>Intercept</i>	1.034*** (0.000)	1.248*** (0.000)	0.571*** (0.000)	0.661*** (0.000)	0.671*** (0.000)	0.680*** (0.000)
<i>R<sup>2</sup></i>	0.206	0.229	0.213	0.210	0.215	0.212
<i>Observations</i>	3946	6043	5939	6267	6267	6267

Note: This study applies fixed-effect method to examine  $Bank\ Efficiency_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  where bank efficiency is calculated by the data envelopment analysis (DEA). Models 1 – 6 include major independent variables, which are *Political institution*, *Financial freedom* (economic institution), *Activity restriction* (regulatory institution) and Islamic institution (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). The models further include control variables, which include *Total asset*, *Equity to total asset*, *Return on assets*, *Corruption rate*, *GDP growth*, *Inflation*, *Unemployment rate*, and *Muslim population*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

Table 9 shows the research's main result that examines the impact of various national institutions on bank efficiency. As can be seen from the table, *political institution* significantly positively impacts bank efficiency (coefficient 0.035, p-value 0.000). The political institution variable used in this analysis is the *polity 2* score from the Polity IV database, which demonstrate a country's level of democracy. This result means that more democratic countries tend to have high bank efficiency. This result is in line with Chortareas et al. (2013). They suggest that more democratic countries tend to have more efficient financial institution operations. However, their research employs the governance variables. Further, the finding here supports the hierarchy of institutions hypothesis (HIH) by emphasizing the critical role of political institutions.

For economic institutions, the *financial freedom* index is used in this study. A country's financial freedom negatively affects bank efficiency (coefficient -0.145, p-value 0.000), meaning that less financial freedom within a country leads to an increase in bank efficiency. This result is in line with the 'competitive-fragility' theory. As a result of financial freedom, there might be high bank competition, increasing banks' fragility. Luo et al. (2016) empirically support the negative impact of financial openness on bank efficiency. However, this result contradicts Chortareas et al. (2013), who find the significant positive role of financial freedom on cost advantages and overall bank efficiency.

As a regulatory institution, *activity restriction* has a significant effect on increases in bank efficiency (coefficient 0.083, p-value 0.000). These results imply that more restrictions on bank activities create more bank efficiency. This result supports the finding of Fernandez and Gozalez (2005) and Dermiguc-Kunt et al. (2004), who find a positive role of stricter restrictions on bank activity in increasing bank efficiency.

Regarding Islamic environment impact, all Islamic variables (*political, economic, and legal institutions*) have a negative impact on bank efficiency for all sample countries. This result aligns with the theory of political economy and new institutional economics (NIE).

Table 9 also shows that the *Equity to total asset* ratio (capital) positively impacts bank efficiency as far as control variables are concerned. This is in line with the predominant findings of existing studies (*see: Chortareas et al., 2012; 2013; Mester, 1996; Pasiouras et al., 2009*). Pasiouras et al. (2009) find that higher capital requirements increase banks' cost efficiency since they may lead to higher capital levels in banks, absorbing risks and reducing the probability of financial distress. For instance, high capital prevents banks from selling

their assets in a 'fire sale' that might affect depositors' losses and increase bank costs (Chortareas et al., 2012). Further, higher capitalization can alleviate the agency problems between managers and shareholders, contributing to fewer risks by providing both with incentives to take fewer risks (Chortareas et al., 2013; Mester, 1996). The *corruption* rate harms bank efficiency. This finding implies that less corrupt countries have higher bank efficiency, supporting the previous predominant finding regarding corruption and bank efficiency (Chortareas et al., 2012). *GDP growth* shows a negative impact on bank efficiency, meaning that higher GDP growth leads to less bank efficiency. This finding aligns with Maudos et al. (2002), who find that banks in expanding markets face difficulties controlling their costs, leading to cost inefficiency.

The *inflation* rate positively relates to bank efficiency, implying that countries with higher inflation tend to have high efficiency. This result contradicts predominant findings regarding the relationship between inflation and bank efficiency (*see*: Pasiouras et al., 2009; Luo et al., 2016). For instance, Pasiouras et al. (2009) find a negative effect of inflation on bank efficiency as higher inflation can increase costs and reduce profits. However, according to Sufian and Habibullah (2012), the impact of the inflation rate on bank efficiency differs according to different banks' ability to anticipate inflation changes. In other words, if the banks are good at anticipating the rate, they can adjust interest rates to increase revenue and profits, which probably increases bank efficiency. However, if banks cannot forecast the inflation rate in advance, higher costs arise, leading to bank inefficiency. Considering sample countries which are mainly developing countries, banks' poor ability to anticipate may affect the sample banks' efficiency. The *unemployment rate* harms bank efficiency, which means more employment in society can increase bank efficiency. The increased numbers and high quality of human capital as inputs might increase bank efficiency. The *Muslim population* has a negative impact on bank efficiency by indicating that more Muslim populated countries tend to have a low bank efficiency.

In this analysis, this study tests the effect of various institutions, including political, economic, regulatory, and Islamic institutions, on bank efficiency. The full-sample analysis produces some valuable findings. Political institutions significantly affect bank efficiency. The current study is distinct in that it employs the core political-institutional variable, which demonstrates a country's level of democracy, and it employs this variable as a main analytical variable. However, past studies employ mainly governance institutions as a control variable and interpret them as political institutions. The result supports the theory of the hierarchy of

institutions hypothesis (HIH) by confirming political institutions' vital and ultimate role in banking performance. A political institution can influence bank efficiency in various ways: first, the positive influence of political institutions on bank efficiency might be due to the decreased general corruption level within a country and in the market. Many studies identify the role of democracy in decreasing and suppressing corruption within a country. Under democratic institutions, corruption can be suppressed by adequately implementing law and order and relevant institutions to constrain political power, such as a check and balance system (Asutay & Sidek, 2020). In line with these arguments, Chortareas et al. (2013) also find that a government with a high quality of political institutions that can effectively formulate and implement appropriate policies and investments can enhance the industry's overall efficiency. This result implies that more developed and democratic countries create more efficient financial institution operations. Additionally, Chortareas et al. (2012) empirically find that low market corruption achieves greater operational efficiency levels for banks.

Secondly, political institutions can positively affect bank efficiency by impacting other subordinate institutions such as economic and regulatory (*see*: Anginer & Dermirguc-Kunt, 2014; Chortareas et al., 2013). Some empirical studies find that the positive impact of other institutions, such as economic and regulatory, tend to be more pronounced in good quality political-institutional environments (*see*: Chortareas et al., 2012). This is because political (democracy), economic (economic and financial freedom) and regulatory institutions (regulatory intervention) are closely related. For example, Baum and Lack (2003) argue that democracy is one of the practical tools to ensure economic freedom. This agrees with Agoraki et al. (2019), who argue that democracy is a prerequisite for financial liberalisation and an adequate financial regulatory framework. This is because more democratic political institutions tend to lead banking competition in the market, which positively impacts banking sector development. The historical examples of the US and Mexico's banking industries support the argument by finding that while the US, with limited government authority, shows the most advanced banking and finance system in the world, Mexico, with an anarchic political system, has an uncompetitive banking industry and relatively undeveloped financial system (Haber et al., 2008). Although divergent views exist on the impact of banking competition resulting from open political participation and competition on banking performance and stability, the competitive atmosphere in the banking sector promotes developed products and services and consequently a developed industry (Ashraf, 2017).

Moreover, the political competition encourages banking and market competition by promoting access to and participation in financial markets (Ashraf, 2017). For instance, liberalisation of entry into banking was possible after expanding suffrage in France and other European countries (Haber et al., 2008). This market competition is critical to economic growth (Beck et al., 2000; Rajan et al., 1998). As an extended discussion, the current study employs an interaction analysis between political, economic, and regulatory institutions to examine the impact of institutional interaction on bank efficiency. Table 11 presents the results in detail and a detailed discussion of the interaction effect.

Financial freedom negatively affects bank efficiency. This is probably because financial freedom can cause implicit costs such as operation, restructuring of bank portfolios, and risk management, which eventually increase costs, undermine bank profits, and decrease bank efficiency (Agénor, 2003). Moreover, due to the increasing number of banks in the market due to financial freedom and openness, market concentration within a country can create a monopoly in the market if no government intervention prevents such power (Chortareas et al., 2013). This eventually reduces overall banking system efficiency. Another possible explanation for the negative impact of financial freedom comes from the negative impact of bank competition. As a result of financial freedom and openness, there might be significant bank competition. They may take greater risks to survive in the competitive atmosphere, contributing to the recent global and European crises (Chortareas et al., 2013). This argument aligns with the 'competitive-fragility' theory that the increase in bank competition may increase banks' fragility, reducing bank profits (Petersen and Rajan, 1995). Empirically Luo et al. (2016) find a negative impact of financial openness on bank efficiency by increasing the risks. Cubillas and ález (2014) also find that developing and developed countries tend to increase bank risk-taking following financial freedom. Consequently, it affects the bank's efficiency.

Moreover, this risk-taking can lead to a banking crisis. Tanna et al. (2017) support this argument by finding the high propensity for a banking crisis resulting from financial liberalization. Furthermore, by diversifying opportunities into foreign markets or non-traditional activities, bank risk may increase (Cubillas & ález, 2014). This is in line with the 'market risk hypothesis', which suggests that banks may have a higher risk when they operate abroad due to the market-specific factors that make foreign assets risky (Berger et al., 2015, cited in Luo et al., 2016). Thus, the view that supports the negative effect of financial freedom argues the importance of government's financial sector involvement.

This study finds a positive impact of regulatory restrictions on bank activity. This means that more restrictions on banking activities increase bank efficiency. This is because higher banking restrictions prevent banks from engaging in a broader range of risky activities due to moral hazards (Pasiouras et al., 2009), which can reduce bank risks and contribute to increasing efficiency. Fernandez and Gozalez (2005) empirically find that stricter restrictions on bank activities effectively reduce banking risk. Other than risk issues, Dermiguc-Kunt et al. (2004) find that regulatory restrictions on banking activity relate to higher interest margins, which can positively increase bank efficiency. However, other studies find that economic and financial openness in the banking markets can reduce bank margins (*see*: Classens & Laeven, 2004). In other words, less regulatory control can make banks fail to manage their diverse activities and experience lower profitability (Barth et al., 2003), reducing profit efficiency. Another possible reason is that the sample countries employed here are mostly developing countries where developed infrastructure or institutions for a free market do not exist; thus, appropriate regulations are required following the market failure approach. This argument is supported by Fernandez and Gonzalez (2005). They find that the more powerful official supervisory authorities reduce bank managers' risk-taking behaviour in countries with low accounting and auditing requirements. Further, some regulations can control negative political power; therefore, when integrated with political institutions in the interaction effect, the negative impact of financial freedom becomes positive, and the positive effect of regulatory intervention turns negative. If there is a good quality political institution that constrains and controls political power, the country can benefit from the positive effect of openness and freedom; simultaneously, there is less need for strict regulation. Table 11 shows detailed results and explanations.

As for Islamic institutions, all Islamic institutions (political, economic, and legal institutions) negatively impact bank efficiency. This is probably due to Islamic economic institutions' conflicting features with general banking activity. According to the Islamicity index, Islamic economic institutions have additional components that conventional economic institutions generally are concerned with. For instance, Islamic economic institutions are concerned with economic and social justice and welfare by emphasizing income distribution and providing aid for basic needs through donations and aid, which does not exist in the conventional banking system. More importantly, Islamic economic institutions should adhere to Islamic principles regarding banking and finance, such as the prohibition on interest; thus, the Islamic banking system needs alternative income structures, which increases costs. This finding is in

line with past studies on Islamic banking efficiency (*see*: Bader et al., 2008; Johnes et al., 2009). These studies claim that Islamic banks are relatively cost inefficient due to their unique operational structure based on *Shariah* principles. Considering that the conventional banking system is the leading banking and finance system, this incompatibility between Islamic institutions and the banking system may occur.

The results are consistent with the view that the country's institutional environment, including political, economic, and regulatory institutions, greatly affects bank efficiency (*see*: Baradwaj et al., 2016; Berger et al., 2016; Bouwman, 2018; Jiang et al., 2019). This study provides strong evidence that country-level institutional environments play a significant role in increasing bank efficiency along with the bank-level variables. A political institution as an ultimate institution plays a vital role.

#### **3.4.2.2. Sub-sample analysis**

**Table 10: Effect of institutions on bank efficiency – conventional vs. Islamic banks**

Variable	Panel A: Conventional Banks						Panel B: Islamic Banks					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
<i>Political institution</i>	0.017** (0.048)						0.127*** (0.000)					
<i>Financial freedom</i>		-0.153*** (0.000)						0.012 (0.862)				
<i>Activity restriction</i>			0.047*** (0.001)						0.238*** (0.000)			
<i>Islamic political institution</i>				-0.275*** (0.000)						0.211*** (0.002)		
<i>Islamic economic institution</i>					-0.262*** (0.000)						0.246*** (0.000)	
<i>Islamic legal institution</i>						-0.279*** (0.000)						-0.005 (0.935)
<i>Total asset</i>	0.000 (0.918)	-0.001 (0.526)	-0.002 (0.132)	-0.002 (0.124)	-0.002 (0.126)	-0.002 (0.146)	0.015* (0.074)	0.013** (0.014)	0.014*** (0.006)	0.010** (0.046)	0.010* (0.057)	0.012** (0.018)
<i>Equity to total asset</i>	0.021* (0.055)	0.013 (0.129)	0.018** (0.044)	0.013 (0.136)	0.013 (0.117)	0.013 (0.112)	0.054 (0.291)	-0.029 (0.344)	-0.030 (0.324)	-0.014 (0.641)	-0.012 (0.695)	-0.008 (0.804)
<i>Return on assets</i>	-0.021** (0.041)	-0.011 (0.191)	-0.012 (0.147)	-0.009 (0.267)	-0.010 (0.210)	-0.010 (0.202)	0.042 (0.319)	0.030 (0.244)	0.020 (0.434)	0.025 (0.321)	0.022 (0.390)	0.029 (0.251)
<i>Corruption</i>	-0.067*** (0.000)	-0.069*** (0.000)	-0.077*** (0.000)	-0.023*** (0.000)	-0.021*** (0.000)	-0.019*** (0.000)	-0.061*** (0.000)	-0.067*** (0.000)	-0.066*** (0.000)	-0.104*** (0.000)	-0.117*** (0.000)	-0.064*** (0.000)
<i>GDP growth</i>	-0.320*** (0.000)	-0.163** (0.011)	-0.096 (0.144)	-0.152** (0.012)	-0.222*** (0.000)	-0.235*** (0.000)	-0.931*** (0.003)	-1.113*** (0.000)	-1.145*** (0.000)	-0.834*** (0.000)	-0.787*** (0.000)	-0.862*** (0.000)
<i>Inflation</i>	0.641*** (0.000)	0.144*** (0.007)	0.166*** (0.001)	0.114** (0.014)	0.095** (0.041)	0.186*** (0.000)	-1.629** (0.013)	-0.442** (0.036)	-0.873*** (0.000)	-0.770*** (0.000)	-0.755*** (0.000)	-0.803*** (0.000)
<i>Unemployment rate</i>	-1.287*** (0.000)	-1.414*** (0.000)	-0.887*** (0.000)	-1.286*** (0.000)	-1.173*** (0.000)	-1.430*** (0.000)	2.977** (0.035)	4.282*** (0.000)	4.129*** (0.000)	4.448*** (0.000)	4.326*** (0.000)	4.505*** (0.000)
<i>Muslim population</i>	-1.094*** (0.000)	-0.204* (0.053)	-0.356*** (0.001)	-0.104 (0.314)	-0.113 (0.277)	-0.152 (0.141)	0.047 (0.948)	0.441 (0.141)	0.375 (0.223)	0.580* (0.052)	0.575* (0.053)	0.509* (0.092)
<i>Intercept</i>	1.324*** (0.000)	1.457*** (0.000)	0.851*** (0.000)	0.794*** (0.000)	0.798*** (0.000)	0.834*** (0.000)	0.208 (0.684)	0.105 (0.770)	-0.297 (0.288)	0.034 (0.895)	0.045 (0.860)	0.063 (0.807)
<i>R<sup>2</sup></i>	0.258	0.303	0.275	0.308	0.307	0.311	0.169	0.164	0.196	0.167	0.171	0.158
<i>Observations</i>	3467	5046	4961	5206	5206	5206	486	1009	990	1073	1073	1073

Note: This study applies fixed-effect method to examine  $Bank\ Efficiency_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  where bank efficiency is calculated by data envelopment analysis (DEA). Models 1 – 6 include major independent variables, which are *Political institution*, *Financial freedom* (economic institution), *Activity restriction* (regulatory institution) and Islamic institution (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). The models further include control variables, which include *Total asset*, *Equity to total asset*, *Return on assets*, *Corruption rate*, *GDP growth*, *Inflation*, *Unemployment rate*, and *Muslim population*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.



Table 10 shows the sub-sample analysis by splitting samples into conventional and Islamic banks. This analysis examines how the institutions differently affect the two banking types. Panel A shows the conventional banks' efficiency in reaction to different institutions. Most results are in line with the full-sample analysis. *Political institution* has a significant positive impact on conventional bank efficiency (coefficient 0.017, p-value 0.048), which means that to increase conventional bank efficiency, high-quality political institutions are required.

A country's *financial freedom* negatively affects conventional bank efficiency (coefficient 0.153, p-value 0.000), meaning that more financial freedom in the market can decrease bank efficiency. This result supports the 'competitive-fragility' theory that argues that high bank competition because of financial freedom can increase bank's fragility and affect bank efficiency. Luo et al. (2016) empirically support the negative impact of financial openness on bank efficiency.

By contrast, *activity restrictions* on bank activity positively impact conventional and Islamic bank efficiency (coefficient 0.047, 0.238, p-value 0.001, 0.000, respectively), meaning that more regulations and restrictions on bank activities can increase conventional bank efficiency. This result supports the finding of Fernandez and Gozalez (2005) and Dermiguc-Kunt et al. (2004), who find a positive role of stricter restrictions on bank activity in increasing bank efficiency.

All *Islamic institutions* have a negative impact on conventional bank efficiency. This result means that countries with more Islamic institutions tend to have a less conventional bank efficiency. However, in panel B, Islamic institutions positively affect Islamic bank efficiency. This result aligns with the theory of political economy and new institutional economics (NIE). This study finds that the countries with the high quality of national political institutions (which means more democratic countries) tend to have greater bank efficiency irrespective of bank types. This result empirically supports the theory of political institutions and the hierarchy of institutions hypothesis (HIH), which emphasizes the role of political institutions as the ultimate institution that determines and affects other sub-ordinate institutions and their essential role and impact on the economy and banking. As confirmed in the full-sample analysis, a high-quality political institution might reduce corruption within a country and the market, which helps to increase conventional bank efficiency. Under democratic institutions, corruption can be suppressed by properly implementing law and order and relevant institutions to constrain political power, such as a check and balance system (Asutay & Sidek,

2020). Chortareas et al. (2012) empirically find that low market corruption achieves greater operational efficiency levels for banks. Additionally, political institutions can positively affect conventional bank efficiency by influencing other institutions, such as economic and regulatory (*see*: Anginer & Dermirguc-Kunt, 2014; Chortareas et al., 2013). Some empirical studies find that the positive impact of other institutions, such as economic and regulatory tend to be more pronounced in high quality political-institutional environments (*see*: Chortareas et al., 2012).

In line with the baseline model, financial freedom negatively affects conventional bank efficiency. This is probably due to the additional costs resulting from financial freedom and openness, such as operational costs, restructuring bank portfolios, and risk management, which eventually increase costs and affect bank efficiency (Agénor, 2003). Further, high levels of bank competition due to financial freedom and market openness might negatively affect conventional bank efficiency, as banks may take greater risks to survive in the competitive atmosphere (Chortareas et al., 2013). This argument aligns with the 'competitive-fragility' theory that increased bank competition may increase banks' fragility, reducing bank profits (Petersen & Rajan, 1995). Luo et al. (2016) empirically support the argument by finding a negative impact of financial openness on bank efficiency by increasing the risks. Furthermore, by diversifying opportunities into foreign markets or non-traditional activities, bank risk may increase (Cubillas & ález, 2014). This is in line with the 'market risk hypothesis', which suggests that banks may have a higher risk when they operate abroad due to the market-specific factors that make foreign assets risky (Berger et al., 2015, cited in Luo et al., 2016). Thus, more restrictions on banking activity can reduce banks' risk-taking behaviour, contributing to increased bank efficiency.

In line with the negative impact of financial freedom, regardless of banking type, more restrictions on banking activities help increase bank efficiency. This is because higher banking restrictions prevent banks from engaging in a broader range of risky activities due to moral hazards (Pasiouras et al., 2009), which can reduce the risks of banks and contribute to increasing bank efficiency. Fernandez and Gozalez (2005) find that stricter restrictions on bank activities effectively reduce banking risk. Another possible reason is that the sample countries employed here are mostly developing countries that do not have developed infrastructures or institutions for a free market; thus, appropriate regulations are required following the market failure approach. This argument is supported by Fernandez and Gonzalez (2005). They find that the more powerful official supervisory authorities reduce

bank managers' risk-taking behaviour in countries with low accounting and auditing requirements. Additionally, some regulations can control the negative political power; therefore, when integrated with political institutions in the interaction effect, the negative impact of financial freedom becomes positive, and the positive effect of regulatory intervention can turn negative. This means that if there is a good quality political institution that constrains and control political power, countries can benefit from the positive impact of openness and freedom, and less regulatory intervention is required. Table 11 shows detailed results and explanations.

Regarding Islamic institutions, while they negatively affect conventional bank efficiency, they positively impact Islamic bank efficiency. This might be due to the incompatibility of institutions to the banking system. For example, according to the Islamicity index's components, Islamic economic institutions have additional components that conventional economic institutions generally do not. For instance, Islamic economic institutions are concerned with the economic and social justice and human welfare by emphasizing income distribution and providing for basic human needs through donations and aid, which does not exist in the conventional banking system. Further, more importantly, Islamic economic institutions should adhere to Islamic principles regarding banking and finance, such as the prohibition of interest. This incompatibility might increase the costs of conventional banks. However, Islamic institutions positively affect Islamic bank efficiency, meaning that to achieve high efficiency, Islamic institutional environments should be improved. This is because Islamic institutions are compatible with the Islamic banking system. This finding confirms the theory of political economy and new institutional economics (NIE) that economic and financial matters should be considered within more extensive social formation. Thus, proper institutional environments derived from their philosophy and purpose are necessary for the performance of each banking system. The result is consistent with the view of previous findings. Bitar et al. (2017) conclude that Islamic banks perform better under a hybrid and *shariah*-based legal system than under a conventional democratic political system. Additionally, Asutay and Sidek (2020) find that Islamic banks' performance is negatively affected under a conventional regulatory system due to the conventional system's disfavour towards Islamic banks. However, the current study differs from Bitar et al. (2017) and Asutay and Sidek (2020). Both studies compare a political system (democratic system) with a legal system or use the only conventional political system. This study provides strong evidence of the importance of Islamic environments for Islamic banking performance.

This sub-sample analysis implies that if conventional banks want to increase efficiency, good quality political institutions (more democratic institutions) and appropriate regulatory intervention are required. As for Islamic banks, to increase their efficiency, equipping proper Islamic environments is required.

As robustness test, table 9 and 10 are re-run without the UK bank sample, which can cause biased results due to its large number of banks. The results support the initial results. Appendix 3 and 4 show the results.

#### **3.4.2.3. Interaction term**

**Table 11: Effect of interaction between political institution, economic freedom, activity restriction on bank efficiency**

<i>Variable</i>	(1)	(2)
<i>Political institution</i>	-0.455*** (0.000)	0.255*** (0.008)
<i>Financial freedom</i>	-0.489*** (0.000)	
<i>Activity restriction</i>		0.289*** (0.001)
<i>Political institution* Financial freedom</i>	0.127*** (0.000)	
<i>Political institution 2* Activity restriction</i>		-0.087** (0.027)
<i>Total asset</i>	0.002 (0.248)	0.002 (0.278)
<i>Equity to total asset</i>	0.019* (0.069)	0.027** (0.013)
<i>Return on assets</i>	-0.007 (0.497)	-0.006 (0.546)
<i>Corruption</i>	-0.058*** (0.000)	-0.074*** (0.000)
<i>GDP growth</i>	-0.736*** (0.000)	-0.605*** (0.000)
<i>Inflation</i>	-0.121 (0.384)	0.307** (0.029)
<i>Unemployment rate</i>	-2.291*** (0.000)	-1.888*** (0.000)
<i>Muslim population</i>	-0.226 (0.188)	-0.602*** (0.000)
<i>Intercept</i>	2.671*** (0.000)	0.304 (0.211)
<i>R<sup>2</sup></i>	0.243	0.225
<i>Observations</i>	3810	3736

Note: The model (1) examines  $Bank\ Efficiency_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Political\ Institution_{it} * Economic\ Institution_{it} + \beta_3 Controls_{it} + \varepsilon_{it}$  by interacting *Political institution* and *Financial freedom* (economic institution), and the model (2)  $Bank\ Efficiency_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Political\ Institution_{it} * Regulatory\ Institution_{it} + \beta_3 Controls_{it} + \varepsilon_{it}$  by interacting *Political institution* and *Activity restriction* (regulatory institution). Bank efficiency is calculated by the data envelopment analysis (DEA). The models further include control variables, which include *Total asset*, *Equity to total asset*, *Return on assets*, *Corruption rate*, *GDP growth*, *Inflation*, *Unemployment rate*, and *Muslim population*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

This study conducts an additional test by employing the interaction effect, aiming to empirically confirm the theory of political institutions and the hierarchy of institutions hypothesis (HIH), which emphasizes the role of political institutions as an ultimate institution that determines and affects other subordinate institutions and their essential role and impact on the economy and banking areas. Thus, this test examines how institutions affect bank efficiency when integrated with political institutions. Additionally, this test can explain the inconclusive impact of financial freedom and regulatory intervention in bank efficiency literature.

Model (1) in table 11 shows how the *financial freedom*'s effect changes with the interference of *political institution*, i.e. financial and economic indicators exert unique impacts on bank efficiency in a convenient political environment and vice versa. Thus, the negative impact of financial freedom becomes positive when in the presence of a favourable political environment (democratic political environment) with a coefficient of 0.127 and p-value of 0.000.

However, the positive impact of *regulatory intervention* on bank efficiency turns negative when it integrates with good quality *political institution*, as shown in model (2), which interact political institution and regulatory institution (activity restriction) with a coefficient of 0.087 and p-value of 0.027.

This study finds that good quality political institutions, namely a more democratic national atmosphere, creates financial freedom that can positively affect an increase in bank efficiency. For example, Baum and Lack (2003) argue that democracy is one of the effective tools to ensure economic freedom. This agrees with Agoraki et al. (2019), who argue that democracy is a prerequisite for financial liberalisation and an adequate financial regulatory framework. This is because more democratic political institutions lead the competition in the banking market, which positively impacts the sector's development. One of the factors behind the negative impact of financial freedom on a sample country's bank efficiency might be the underdeveloped institutions and infrastructures for free economic and financial markets and the negative impact of political power, considering most sample countries employed here are developing countries. In line with this, Faccio (2006) and Li et al. (2008, cited in Bitar et al., 2017) argue that adequate political environments are more important for emerging and developing countries where a proper political system continues to be absent, which can lead to poor economic policies, weak governments, and turbulent power transitions. Thus, if there

are proper political institutions that control political power and facilitate economic policies for economic and financial freedom in the market, the impact of this freedom can be positive. This result supports the finding of Anginer and Dermirguc-Kunt (2014). They concluded that the detrimental impact of financial openness is eased by a solid institutional environment with efficient public and private monitoring of financial institutions. Chortareas et al. (2013) also find that countries with a high degree of economic and financial freedom and good governance tend to display a higher cost efficiency.

As shown in model (2) in table 11, the positive impact of regulatory intervention on bank efficiency turns negative when it integrates with good quality political institutions. This result is in line with the model (1) in that in the presence of national democratic institutions, less regulatory intervention can significantly increase bank efficiency. In other words, if the countries are democratic, fewer regulatory bank interventions are needed.

Financial freedom and regulatory intervention are closed related since financial freedom implies limited government intervention in financial and banking markets, and regulatory intervention means the intervention in banks' activities (Chortareas et al., 2012; 2013). For this reason, in many studies, the demarcation between economic or financial freedom and regulation is hard to identify. To address this issue, the current study employs the most widely used indicator for each institution, which is discriminative. The result implies that once there is a good quality political institution, more financial freedom and, consequently, less regulatory intervention in bank activities can help to increase efficiency.

#### **3.4.2.4. Impact of crisis**

**Table 12: Effect of institutions on bank efficiency during crisis period**

Variable	(1)	(2)	(3)
<i>Crisis dummy</i>	0.156*** (0.001)	0.096*** (0.005)	2.461*** (0.000)
<i>Political institution</i>	0.035*** (0.000)		0.090 (0.325)
<i>Activity restriction</i>		0.097*** (0.000)	0.168** (0.046)
<i>Political institution * Activity restriction</i>			-0.021 (0.571)
<i>Political institution * Crisis dummy</i>	-0.063*** (0.004)		-1.045*** (0.000)
<i>Activity restriction * Crisis dummy</i>		-0.030* (0.057)	-0.966*** (0.000)
<i>Political institution * Activity restriction * Crisis dummy</i>			0.410*** (0.000)
<i>Total asset</i>	0.002 (0.349)	-0.000 (0.865)	0.003 (0.163)
<i>Equity to total asset</i>	0.012 (0.264)	0.013 (0.101)	0.018* (0.099)
<i>Return on assets</i>	-0.009 (0.362)	-0.006 (0.422)	-0.006 (0.543)
<i>Corruption</i>	-0.062*** (0.000)	-0.064*** (0.000)	-0.068*** (0.000)
<i>GDP growth</i>	-0.464*** (0.000)	-0.305*** (0.000)	-0.400*** (0.000)
<i>Inflation</i>	0.133 (0.323)	0.075* (0.090)	0.019 (0.892)
<i>Intercept</i>	0.498*** (0.000)	0.357*** (0.000)	0.124 (0.550)
<i>R<sup>2</sup></i>	0.196	0.214	0.219
<i>Observations</i>	3946	5939	3736

Note: the model (1) examines  $Bank\ Efficiency_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Crisis\ dummy_{it} * Political\ Institution_{it} + \beta_3 Controls_{it} + \varepsilon_{it}$  by interacting crisis period and *Political institution*, and the model (2) examines  $Bank\ Efficiency_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Crisis\ dummy_{it} * Regulatory\ Institution_{it} + \beta_3 Controls_{it} + \varepsilon_{it}$  by interacting crisis period and *Activity restriction* (regulatory institution). The model (3) examines  $Bank\ Efficiency_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Crisis\ dummy_{it} * Political\ Institution_{it} * Regulatory\ Institution_{it} + \beta_3 Controls_{it} + \varepsilon_{it}$  by interacting crisis period, *Political institution* and *Activity restriction* (regulatory institution). Bank efficiency is calculated by the data envelopment analysis (DEA). The models further include control variables, which include *Total asset*, *Equity to total asset*, *Return on assets*, *Corruption rate*, *GDP growth*, and *Inflation*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses



The current study aims to examine how the financial crisis affects the impact of institutions on bank efficiency by employing the interaction effect with the crisis period dummy and various institutional indicators. Much research uses the interaction effect of crisis to examine the impact of the crisis on various banking performance values (*see*: Beck et al., 2013; Diaz & Huang, 2017). The crisis dummy is defined as 1 for the period 2007-2009. Table 12 shows the interaction effect of various institutions on bank efficiency. By using the interaction effect, this study aims to show how the impact of institutions varies according to the presence of good quality political institutions both in normal times and crisis times. This test empirically supports the hierarchy of institutions hypothesis (HIH) theory that emphasizes the importance of political institutions. Also, this test is in line with the earlier empirical studies, which show the different impact of country's institutions according to the presence of good quality political institutions. Some empirical studies find the vital role of political institutions in ensuring the function of other institutions, such as economic and regulatory institutions. For instance, Baum and Lack (2003) and Agoraki et al. (2019) argue that democracy is an effective tool and prerequisite for economic and financial freedom and an appropriate financial regulatory framework. Moreover, Anginer and Dermirguc-Kunt (2013) find that the negative impact of financial openness is reduced when a country has a sound institutional environment. Regarding bank efficiency, Chortareas et al. (2013) find that countries with a high degree of economic freedom and good governance system have a higher cost efficiency. Since regulatory intervention and financial freedom are closely related, this study employs regulatory intervention to be interacted with political institutions.

Model (1) shows how the political institution's influence on bank efficiency varies during the 2008 Global financial crisis. The result indicates that the impact of political institutions becomes negative during the financial crisis (coefficient 0.063, p-value 0.004). As shown from model (2), the positive impact of regulatory intervention on bank activity (normal time without financial crisis) turns negative during the crisis with a coefficient of 0.030 and a p-value of 0.057. This result implies that the sole impact of regulatory institutions did not help to increase bank efficiency during the crisis.

Model (3) integrates *political institution* and *regulatory intervention* during the crisis. The result shows that the impact of regulatory intervention in the presence of good quality political institutions during the crisis becomes positive on bank efficiency (coefficient 0.410, p-value 0.000). In other words, particularly during a crisis period, more regulation with a more democratic atmosphere within a country help to increase bank efficiency.

The result here implies that while democracy helps increase bank efficiency during normal times (in the absence of financial crisis), it leads to a drop in bank efficiency during a financial crisis. In other words, more democratic countries experience less bank efficiency during a crisis. This might be due to insufficient regulation, particularly in developing countries, where law and order do not develop without forcing rules or strong regulations, particularly during a turbulent period. Banks may experience low efficiency due to free deposit withdrawals and loan non-payment, which eventually affects cost and profit efficiency. Moreover, political power can negatively impact banking performance, including efficiency in developing countries, if insufficient regulation exists. As sample countries employed here are mostly developing, where proper infrastructures and institutions have not developed, a political institution without proper regulations might negatively affect bank efficiency. Additionally, as can be seen from the model (2) in table 12, the positive impact of regulatory intervention on banking turns negative during the crisis. This result implies that the sole impact of regulatory institutions does not help to increase bank efficiency during a crisis.

However, regulatory intervention can positively help increase bank efficiency in the presence of good quality political institutions (democratic institutions) during a crisis. In other words, more regulatory intervention can increase bank efficiency in a country with a democratic atmosphere during a crisis or any turbulent period. This result contradicts the interaction effect of political and regulatory institutions in normal times, as shown in table 11. In such times, once good quality political institutions (more democratic institutions) interact with regulatory intervention, the impact of regulatory intervention on efficiency turns negative. This implies that less regulatory intervention is more helpful in increasing bank efficiency in more democratic countries in normal times. However, during a crisis with unexpected risks and uncertainty, more regulation on bank activity is required. This result is in line with the view that deregulation of financial services and institutions is a fundamental factor that evokes a crisis (Chortareas et al., 2013).

### **3.4.3. Robustness test**

This section presents the robustness tests' results. First, this study conducts the regression analysis by using alternative bank efficiency measurements (stochastic frontier analysis). The second robustness test uses propensity score matching (PSM) to address the imbalance problem among samples (conventional vs. Islamic banks). Lastly, this study conducts the endogeneity test using two-stage least square (2SLS) to correct the endogeneity problem.

### **3.4.3.1. Alternative efficiency measurement**

**Table 13: Effect of institutions on bank efficiency using alternative efficiency measurement (SFA)**

Variable	Full sample					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Political institution</i>	0.019*** (0.000)					
<i>Financial freedom</i>		-0.050*** (0.000)				
<i>Activity restriction</i>			0.016* (0.061)			
<i>Islamic political institution</i>				-0.092*** (0.000)		
<i>Islamic economic institution</i>					-0.079*** (0.000)	
<i>Islamic legal institution</i>						-0.084*** (0.000)
<i>Total asset</i>	0.002* (0.052)	0.000 (0.599)	0.000 (0.927)	0.002** (0.045)	0.002* (0.061)	0.002** (0.047)
<i>Equity to total asset</i>	0.005 (0.446)	-0.001 (0.790)	-0.000 (0.972)	-0.003 (0.583)	-0.003 (0.616)	-0.003 (0.590)
<i>Return on assets</i>	0.004 (0.575)	0.008* (0.089)	0.009* (0.057)	0.010** (0.029)	0.010** (0.036)	0.010** (0.036)
<i>Inflation</i>	0.333*** (0.000)	-0.204*** (0.000)	-0.208*** (0.000)	-0.279*** (0.000)	-0.279*** (0.000)	-0.253*** (0.000)
<i>Unemployment rate</i>	-0.219 (0.116)	-0.203** (0.042)	0.081 (0.417)	-0.161* (0.096)	-0.108 (0.263)	-0.183* (0.058)
<i>Muslim population</i>	-0.365*** (0.000)	-0.146** (0.016)	-0.205*** (0.001)	-0.056 (0.346)	-0.068 (0.254)	-0.081 (0.172)
<i>Intercept</i>	0.814*** (0.000)	0.970*** (0.000)	0.766*** (0.000)	0.746*** (0.000)	0.750*** (0.000)	0.763*** (0.000)
<i>R<sup>2</sup></i>	0.013	0.015	0.015	0.064	0.058	0.062
<i>Observations</i>	3949	6056	5952	6281	6281	6281

Note: the current study examines  $Bank\ Efficiency_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  by using the fixed effect model. Alternatively, bank efficiency is calculated by stochastic frontier analysis (SFA). Control variables include Total asset, Equity to total asset, Return on assets, Inflation, Unemployment rate and Muslim population. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

**Table 14: Effect of institutions on bank efficiency using alternative efficiency measurement (SFA) – comparing conventional and Islamic banks**

Variable	Panel A: Conventional Banks						Panel B: Islamic Banks					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
<i>Political institution</i>	0.024*						0.032*					
	(0.050)						(0.082)					
<i>Financial freedom</i>		-0.185***						0.086***				
		(0.000)						(0.005)				
<i>Activity restriction</i>			-0.090***						-0.115***			
			(0.000)						(0.000)			
<i>Islamic political institution</i>				-0.236***						0.104***		
				(0.000)						(0.000)		
<i>Islamic economic institution</i>					-0.210***						0.102***	
					(0.000)						(0.000)	
<i>Islamic legal institution</i>						-0.224***						0.105***
						(0.000)						(0.000)
<i>Total asset</i>	-0.001	-0.001	-0.003	0.001	0.001	0.001	0.003	0.003	0.005**	0.000	-0.000	-0.000
	(0.759)	(0.578)	(0.122)	(0.710)	(0.764)	(0.714)	(0.499)	(0.202)	(0.036)	(0.943)	(0.934)	(0.981)
<i>Equity to total asset</i>	0.019	0.009	0.012	0.002	0.003	0.003	0.052*	0.043***	0.041***	0.033**	0.034**	0.034**
	(0.225)	(0.439)	(0.300)	(0.840)	(0.795)	(0.806)	(0.053)	(0.007)	(0.007)	(0.032)	(0.029)	(0.024)
<i>Return on assets</i>	0.017	0.019*	0.017	0.023**	0.022**	0.022**	0.027	0.006	0.015	0.006	0.005	0.006
	(0.235)	(0.069)	(0.112)	(0.019)	(0.031)	(0.029)	(0.245)	(0.638)	(0.242)	(0.659)	(0.684)	(0.671)
<i>Unemployment rate</i>	0.474	-1.093***	-0.754***	-1.283***	-1.142***	-1.337***	-0.411	-0.258	-0.424	-0.520	-0.604*	-0.518
	(0.129)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.579)	(0.465)	(0.217)	(0.135)	(0.082)	(0.134)
<i>Intercept</i>	0.550***	1.429***	0.898***	0.832***	0.822***	0.835***	0.584***	0.326***	0.917***	0.638***	0.637***	0.633***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)	(0.000)	(0.000)	(0.000)	(0.000)
<i>R<sup>2</sup></i>	0.004	0.028	0.008	0.108	0.101	0.107	0.023	0.024	0.037	0.051	0.059	0.061
<i>Observations</i>	2967	4263	4231	4400	4400	4400	445	946	916	1007	1007	1007

Note: samples are dividing into conventional and Islamic banks. The current study examines  $Bank\ Efficiency_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  by using the fixed effect model. Alternatively, bank efficiency is calculated by stochastic frontier analysis (SFA). Control variables include Total asset, Equity to total asset, Return on assets, Inflation, Unemployment rate and Muslim population. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

This study conducts several robustness tests to confirm the initial result. The current study uses alternative efficiency measurement using stochastic frontier analysis (SFA). The stochastic frontier analysis is one of the popular methods in the parametric approach. Although data envelopment analysis (DEA) is still widely used in efficiency literature, due to its limitations with the approach and the data set, the use of stochastic frontier analysis (SFA) has also been increasing in many empirical studies (*see*: Avkiran, 2013; Hjalmarsson et al., 1996; Nguyen, 2018). Stochastic frontier analysis (SFA) examines a parametric best practice frontier based on standard cost or profit functions (Silva et al., 2017). Therefore, this method is considered suitable for economic efficiency measurements since the approach concerns the cost and profit efficiency concepts (Nguyen, 2018).

Table 13 shows the full sample analysis. As shown in the table, most institutions' impact on bank efficiency aligns with the baseline model. For example, *political institution* positively impacts bank efficiency. This result means that more democratic countries tend to have a higher bank efficiency than low democratic countries. This result empirically supports the theory of the hierarchy of institutions hypothesis (HIH) by confirming the vital role of political institutions on banking performance. In general, the decreased corruption level due to strong political institutions such as robust law and order and a check and balance system (Asutay & Sidek, 2020) might contribute to increasing bank efficiency. Additionally, political institutions can positively influence bank efficiency by affecting other institutions, such as economic and regulatory (*see*: Anginer & Dermirguc-Kunt, 2014; Chortareas et al., 2103). The finding of the positive impact of political institutions on bank efficiency strengthens the argument that political-institutional environments are not only essential for economic growth and development but also play a significant role in banking performance (*see*: Acemoglu et al., 2019; Agoraki et al., 2019; Ashraf, 2017; Chortareas et al., 2012; Durham, 1999).

Following the baseline result, while *financial freedom* negatively affects bank efficiency, *activity restriction* positively affects bank efficiency. This result means that less financial freedom and more restriction on bank activity can increase bank efficiency. The negative impact of financial freedom might be due to the increased costs of operations, restructuring of bank portfolios, and risk management due to financial freedom and openness (Agénor, 2003). Further, the negative impact of bank competition can contribute to low bank efficiency. To survive in the competitive market, banks tend to take higher risks (Chortareas et al., 2013), negatively affecting bank efficiency. This result is in line with Luo et al. (2016). They use the

stochastic frontier analysis (SFA) measure and find a negative impact of financial openness on bank efficiency by increasing risks. Instead, this study confirms a positive impact of regulatory interventions on bank activities on bank efficiency. Higher restrictions on bank activities can prevent banks from taking higher risks by engaging in a broader range of activities (Pasiouras et al., 2009), which eventually positively affects bank efficiency. Additionally, unlike some studies that found that financial openness can reduce bank margins (*see*: Classens & Laeven, 2004), Dermiguc-Kunt et al. (2004) argue that regulatory restrictions on banking activities can lead to higher interest margins, which can positively affect bank profit efficiency. By employing the stochastic frontier analysis (SFA), Pasiouras et al. (2009) also find a positive impact of restrictions on bank activities on bank profit efficiency.

By reinforcing the baseline result, all Islamic institutions (*political, economic, and legal institutions*) have a negative impact on bank efficiency. The conflicting feature between conventional and Islamic economic institutions in banking activity may lead to these results. Islamic economic institutions' components have additional components that conventional economic institutions do not consider. For example, economic and social justice and human beings' welfare in the economy by stressing on income distribution, donations, and provision of aid for human need are not included in the conventional economy and financial system. Further, Islamic economic principles such as the prohibition of interests may conflict with the general banking system. Given that the conventional banking system is a leading banking and financial system, this incompatibility between Islamic institutions negatively affects bank efficiency in general.

Table 14 shows the sub-sample analysis (conventional vs. Islamic banks) using alternative efficiency measurement (SFA). Most results are in line with the initial results. *Political institution* positively affects both conventional and Islamic bank efficiency, meaning that more democratic countries tend to have high bank efficiency irrespective of the types of banks. This result empirically supports the political institution theory and the hierarchy of institutions hypothesis (HIH), which stresses the role of political institutions as ultimate institutions that determine and influence other institutions and their vital role in the overall economy and banking areas. The democratic nature that suppresses corruption, in general, might lead to increased bank efficiency since democratic institutions such as law and order and a strong check and balance system can constrain negative political power (Asutay & Sidek, 2020). Moreover, the political institution can influence other institutions, such as

economic and regulatory institutions, which eventually affect bank efficiency (*see*: Anginer & Dermirguc-Kunt, 2014; Chortareas et al., 2013). Empirically, some research finds that economic and regulation's positive impact tends to be pronounced in good political-institutional environments (*see*: Chortareas et al. 2012).

Following the baseline result, *financial freedom* has a negative impact on conventional banks' efficiency. This is probably because of increased costs such as operational costs, restructuring costs of bank portfolios, and risk management costs resulting from financial freedom (Agénor, 2003). Moreover, high bank competition due to financial freedom and openness might increase bank risks to survive in the competitive atmosphere (Chortareas et al., 2013) and by diversifying their opportunities in foreign markets or non-traditional activities (Cubillas & ález, 2014). This result supports the 'market risk hypothesis', which argues that banks that operate abroad may have a higher risk due to the market-specific factors that make their foreign assets risky (Berger et al., 2015, cited in Luo et al., 2016).

While most results follow the initial result, *activity restriction* turns negative. This might be due to the frontier changes with the change in specification. Luo et al. (2016) also find some divergence in their results when using stochastic frontier analysis (SFA) as a robustness test.

As for *Islamic institutions*, while all institutions negatively impact conventional banks' efficiency, it positively affects Islamic banks' efficiency, as shown in panel B. This result is due to the incompatibility of institutions between conventional and Islamic banking activities. According to the Islamicity index's components, Islamic economic institutions should be concerned with additional values in their economic areas, such as economic and social justice and human beings' welfare. Further, Islamic principles that prohibit interests may not be compatible with the conventional banking system and increase their costs. This result empirically supports the theory of political economy and the new institutional economics (NIE). Those theories emphasize that the proper institutional environments derived from their philosophy and purpose are necessary for the performance of the banking system. This result is also consistent with Bitar et al. (2017) and Asutay and Sidek (2020), which examine the Islamic environment's impact on Islamic banking performance, although they do not test the bank efficiency.

#### **3.4.3.2. Propensity Score Matching (PSM)**



**Table 15: Effect of institutions on bank efficiency using propensity score matched sample**

Variable	(1)	(2)	(3)	(4)	(5)	(6)
<i>Political institution</i>	0.035*** (0.000)					
<i>Financial freedom</i>		-0.145*** (0.000)				
<i>Activity restriction</i>			0.083*** (0.000)			
<i>Islamic political institution</i>				-0.108*** (0.000)		
<i>Islamic economic institution</i>					-0.069*** (0.000)	
<i>Islamic legal institution</i>						-0.136*** (0.000)
<i>Total asset</i>	0.002 (0.416)	0.001 (0.710)	-0.001 (0.717)	-0.000 (0.737)	-0.001 (0.705)	-0.000 (0.768)
<i>Equity to total asset</i>	0.020* (0.068)	0.011 (0.167)	0.017** (0.035)	0.014* (0.071)	0.015* (0.064)	0.014* (0.071)
<i>Return on assets</i>	-0.007 (0.455)	-0.004 (0.610)	-0.006 (0.441)	-0.004 (0.576)	-0.005 (0.512)	-0.004 (0.579)
<i>Corruption</i>	-0.068*** (0.000)	-0.060*** (0.000)	-0.070*** (0.000)	-0.046*** (0.000)	-0.053*** (0.000)	-0.039*** (0.000)
<i>GDP growth</i>	-0.522*** (0.000)	-0.488*** (0.000)	-0.420*** (0.000)	-0.392*** (0.000)	-0.400*** (0.000)	-0.434*** (0.000)
<i>Inflation</i>	0.178 (0.185)	0.121** (0.016)	0.094** (0.035)	0.062 (0.148)	0.063 (0.146)	0.097** (0.024)
<i>Unemployment rate</i>	-1.454*** (0.000)	-1.175*** (0.000)	-0.750*** (0.000)	-0.839*** (0.000)	-0.774*** (0.000)	-0.933*** (0.000)
<i>Muslim population</i>	-0.698*** (0.000)	-0.073 (0.446)	-0.164* (0.096)	-0.047 (0.616)	-0.062 (0.516)	-0.068 (0.473)
<i>Intercept</i>	1.043*** (0.000)	1.253*** (0.000)	0.573*** (0.000)	0.665*** (0.000)	0.675*** (0.000)	0.683*** (0.000)
<i>R<sup>2</sup></i>	0.205	0.228	0.212	0.211	0.208	0.214
<i>Observations</i>	3910	5976	5874	6200	6200	6200

Note: the current study examines  $Bank\ Efficiency_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  by using the propensity score-matched sample where bank efficiency is calculated by data envelopment analysis (DEA). The independent variable includes political institution (*Polity 2*), economic institutions (*Financial freedom*), regulatory institution (*Activity restriction*) and Islamic institutions (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). Control variables include *Total asset*, *Equity to total asset*, *Return on assets*, *Corruption rate*, *GDP growth*, *Inflation*, *Unemployment rate* and *Muslim population*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

Table 15 presents the effect of institutions on bank efficiency using a propensity score-matched sample. This method addresses the imbalance problem between samples. In the current study sample, the number of conventional banks is much bigger than that of Islamic banks. Thus, this method provides the quality of the match between the two groups. Much empirical research that uses comparative analysis between conventional and Islamic banks employs this method (*see*: Bitar et al., 2017; Berger et al., 2019).

After matching the samples, the current study examines the impact of institutions on bank efficiency. This result reinforces the initial regression model's result. For instance, *political institution* positively affects bank efficiency, meaning that democratic institutions play a vital role in increasing bank efficiency. This finding empirically supports the theory of political institutions and the hierarchy of institutions hypothesis (HIH) that emphasizes the ultimate role of political institutions in determining and affecting other institutions and their significant impact on the economy and banking sectors.

As for economic institutions, *financial freedom* negatively affects bank efficiency, which implies that less financial freedom in a market can create high bank efficiency. This is because financial freedom and openness can cause additional costs for banks, such as operational costs, restructuring bank portfolio costs, and new risk management costs, which negatively affect overall bank efficiency (Agénor, 2003). Additionally, increased bank competition in the market due to economic and financial freedom can increase bank risks since banks may take more risks for their profits to survive in the competitive market, which eventually negatively affects bank efficiency (Chortareas et al., 2013). Cubillas and ález (2014) empirically find that both developing and developed countries increase bank risk-taking after financial freedom.

Meanwhile, *regulatory intervention* in bank activities positively affects bank efficiency, strengthening the baseline result. This result means that more regulatory restrictions on bank activities are required to increase bank efficiency. This is because more restrictions can prevent banks from taking higher risks due to engaging in diverse risky activities (Pasiouras et al., 2009), and these low risks can positively affect bank efficiency. Fernandez and Gozalez (2005) empirically find the significant impact of stricter restrictions on bank activities in reducing bank risks. Other than risk issues, Dermiguc-Kunt et al. (2004) find that regulatory restrictions on banking activity can create higher interest margins, positively

increasing bank profit efficiency. This is because if there is less regulatory control, banks may fail to manage their diverse activities, leading to lower profitability (Barth et al., 2003).

In line with the initial result, all Islamic institutions (*Islamic political institutions, economic institutions, and legal institutions*) negatively affect bank efficiency. This result is also in line with the baseline result. The Islamic institutions' conflicting features from that of conventional ones may cause a negative impact on bank efficiency in general since the conventional banking system is a leading banking system in sample countries.

#### **3.4.3.3. Endogeneity test**

**Table 16: Effect of institutions on bank efficiency employing two-stage least square method**

Variable	Full sample					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Political institution</i>	0.087*** (0.000)					
<i>Financial freedom</i>		-0.264* (0.066)				
<i>Activity restriction</i>			0.271*** (0.000)			
<i>Islamic political institution</i>				-0.201*** (0.000)		
<i>Islamic economic institution</i>					-0.246*** (0.000)	
<i>Islamic legal institution</i>						-0.207*** (0.000)
<i>Total asset</i>	0.006*** (0.000)	-0.007*** (0.006)	0.012*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.008*** (0.000)
<i>Equity to total asset</i>	0.018 (0.156)	0.018 (0.461)	-0.021** (0.032)	0.003 (0.735)	0.000 (0.986)	-0.004 (0.643)
<i>Return on assets</i>	-0.015 (0.274)	-0.019 (0.301)	-0.021** (0.048)	-0.006 (0.612)	-0.005 (0.632)	-0.007 (0.528)
<i>Corruption</i>	-0.062*** (0.000)	0.402*** (0.000)	-0.061*** (0.000)			
<i>GDP growth</i>	-0.299*** (0.010)	-0.253* (0.092)	-0.694*** (0.000)	-0.945*** (0.000)	-1.071*** (0.000)	-1.030*** (0.000)
<i>Inflation</i>	-0.658*** (0.000)	0.262* (0.091)	-0.422*** (0.000)	-0.889*** (0.000)	-0.903*** (0.000)	-0.885*** (0.000)
<i>Unemployment rate</i>	0.283** (0.040)	-0.718*** (0.002)	0.037 (0.701)	-0.631*** (0.000)	-0.675*** (0.000)	-0.626*** (0.000)
<i>Muslim population</i>	-0.202*** (0.000)	-0.071*** (0.008)	-0.411*** (0.000)			
<i>Intercept</i>	0.508*** (0.000)	0.034 (0.906)	0.225** (0.017)	0.551*** (0.000)	0.599*** (0.000)	0.555*** (0.000)
<i>R<sup>2</sup></i>	0.208	0.191	0.112	0.077	0.097	0.065
<i>Observations</i>	3713	1945	5939	6267	6267	6267

Note: the table reports result of the two-stage least square method of the full sample. Bank efficiency is calculated by data envelopment analysis (DEA). The key independent variable is institutional variables, which are political institution (*Polity 2*), economic institution (*Financial freedom*), regulatory institution (*Activity restriction*) and Islamic institutions (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). Instrumental variables include *Regime durability* index for political institution; *Fiscal health* index for financial freedom; *market discipline* for regulatory institution; *Muslim population* and *Corruption* for Islamic institution. Control variables include *Total asset*, *Equity to total asset*, *Return on assets*, *Corruption rate*, *GDP growth*, *Inflation*, *Unemployment rate* and *Muslim population*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

**Table 17: Effect of institutions on bank efficiency employing two-stage least square – conventional vs. Islamic banks**

Variable	Panel A: Conventional Banks						Panel B: Islamic Banks					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
<i>Political institution</i>	0.130*** (0.000)						0.080** (0.049)					
<i>Financial freedom</i>		-1.338 (0.160)						-0.118 (0.217)				
<i>Activity restriction</i>			0.160*** (0.002)						0.377* (0.099)			
<i>Islamic political institution</i>				-0.223*** (0.000)						0.667** (0.036)		
<i>Islamic economic institution</i>					-0.273*** (0.000)						9.746 (0.575)	
<i>Islamic legal institution</i>						-0.231*** (0.000)						0.557** (0.032)
<i>Total asset</i>	0.006*** (0.002)	-0.013*** (0.004)	0.009*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.008*** (0.000)	0.014* (0.057)	0.009 (0.115)	0.025*** (0.000)	0.015*** (0.002)	-0.008 (0.858)	0.008 (0.143)
<i>Equity to total asset</i>	0.005 (0.739)	-0.157 (0.273)	-0.034*** (0.001)	0.001 (0.908)	-0.006 (0.580)	-0.009 (0.409)	0.105** (0.020)	0.018 (0.615)	-0.073** (0.013)	-0.046 (0.114)	-0.243 (0.537)	-0.025 (0.373)
<i>Return on assets</i>	-0.048*** (0.001)	-0.066 (0.119)	-0.048*** (0.000)	-0.024** (0.047)	-0.026** (0.034)	-0.028** (0.025)	0.127*** (0.004)	0.031 (0.388)	0.050* (0.098)	0.037 (0.268)	-0.353 (0.641)	0.037 (0.254)
<i>Corruption</i>	-0.059*** (0.000)	1.157* (0.073)	-0.065*** (0.000)				-0.086*** (0.000)	0.312*** (0.000)	-0.079*** (0.000)	-0.196*** (0.000)	-2.164 (0.671)	-0.190*** (0.000)
<i>GDP growth</i>	-0.022 (0.857)	-0.603 (0.115)	-0.368*** (0.000)	-0.937*** (0.000)	-1.066*** (0.000)	-1.041*** (0.000)	-0.909** (0.017)	-0.747** (0.016)	-1.816*** (0.000)	-1.102*** (0.000)	3.856 (0.739)	-1.035*** (0.000)
<i>Inflation</i>	0.189 (0.297)	1.348* (0.064)	-0.375*** (0.000)	-0.928*** (0.000)	-0.932*** (0.000)	-0.920*** (0.000)	-2.991*** (0.000)	-1.086*** (0.000)	-1.219*** (0.000)	-1.080*** (0.919)	2.037 (0.624)	-1.189*** (0.628)
<i>Unemployment rate</i>	0.446*** (0.003)	-2.283* (0.066)	0.007 (0.955)	-0.707*** (0.000)	-0.740*** (0.000)	-0.670*** (0.000)	0.603 (0.171)	0.764** (0.040)	0.264 (0.327)	-0.024 (0.002)	1.491 (0.564)	0.125 (0.001)
<i>Muslim population</i>	-0.247*** (0.000)	-0.033 (0.554)	-0.365*** (0.000)				-0.090* (0.089)	0.058 (0.403)	-0.352** (0.032)			
<i>Intercept</i>	0.438*** (0.000)	1.610 (0.277)	0.501*** (0.000)	0.614*** (0.000)	0.666*** (0.000)	0.619*** (0.000)	0.606*** (0.000)	-0.203 (0.555)	0.159 (0.690)	0.780*** (0.000)	1.229 (0.186)	0.823*** (0.000)
<i>R<sup>2</sup></i>	0.228	.	0.180	0.091	0.123	0.079	0.251	0.302	0.135	0.106	.	0.143
<i>Observations</i>	3261	1578	4961	5206	5206	5206	458	368	990	1073	1073	1073

Note: the table reports result of the two-stage least square method of the conventional and Islamic banks sample. Bank efficiency is calculated by data envelopment analysis (DEA). The key independent variable is institutional variables, which are political institution (*Polity 2*), economic institution (*Financial freedom*), regulatory institution (*Activity restriction*) and Islamic institutions (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). Instrumental variables include *Regime durability* index for political institution; *Fiscal health* index for financial freedom; *market discipline* for regulatory institution; *Muslim population* and *Corruption* for Islamic institution. Control variables include *Total asset*, *Equity to total asset*, *Return on assets*, *Corruption rate*, *GDP growth*, *Inflation*, *Unemployment rate* and *Muslim population*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

The current study employs the two-stage least square (2SLS) to address the endogeneity problem. Table 16 shows the full-sample analysis using the two-stage least square (2SLS), which confirms the initial regression results. For example, the *political institution* still positively impacts bank efficiency. This means that banks in more democratic countries have high efficiency. This result empirically confirms the theory of the hierarchy of institutions hypothesis (HIH) by emphasizing the importance of political institutions, not only economic but also banking performance.

In line with the initial result, *financial freedom* negatively affects bank efficiency because if great financial freedom is imposed on the market, bank efficiency tends to decrease. Additional costs for operations, restructuring of bank portfolios, and risk management can occur due to excessive financial freedom (Agénor, 2003). Further, to survive in a competitive market with great financial freedom, banks may take higher risks (Chortareas et al., 2013), which can lead to lower efficiency. This result aligns with Luo et al. (2016), who find a negative impact of financial openness on bank efficiency by increasing risks.

By contrast, *activity restriction* on bank activity positively affects bank efficiency. Stricter restrictions may prevent banks from engaging in various activities, which can increase risks (Pasiouras et al., 2009). By reducing risks to banks, restrictions on bank activity can positively increase bank efficiency. Additionally, Dermiguc-Kunt et al. (2004) find that regulatory restrictions on banking activities tend to lead to higher interest margins, positively affecting bank profit efficiency.

When it comes to Islamic institutions (*political, economic, and legal*), all have a negative impact on bank efficiency, which supports the initial result. This is probably because Islamic economic institutions and conventional ones are not compatible in their complex components. For instance, Islamic economic institutions embrace economic and social justice and human welfare and redistribution issues, which are not included in the conventional economy and financial system. Further, Islamic principles that prohibit interests may conflict with the general banking system. Considering that the conventional system is still the leading banking system in most countries, this incompatibility between Islamic and conventional institutions negatively impacts bank efficiency.

Table 17 shows the result of the sub-sample analysis. This result is mostly in line with the initial result (table 10). *Political institution* positively affects both conventional and Islamic bank efficiency. This means that any conventional and Islamic banks in more developed

democratic countries have higher efficiency. This result empirically supports the political institution theory and the hierarchy of institutions hypothesis (HIH), which emphasizes the role of political institutions as the ultimate institution and its vital role in banking performance.

*Activity restriction* on banking also positively affects both banking systems: conventional and Islamic banks, meaning that more banking regulations cause higher efficiency regardless of banking type. This is probably due to the role of regulations in reducing risks. The higher restrictions on banking can prevent engaging in diverse activities, increasing risks (Pasiouras et al., 2009). This positive role might positively affect bank efficiency. Additionally, regulatory banking restrictions tend to cause higher interest margins, positively impacting bank profit efficiency (Dermiguc-Kunt et al., 2004).

When it comes to *Islamic institutions*, while they negatively affect conventional bank efficiency (panel A), they positively affect Islamic bank efficiency (panel B). This result implies that Islamic institutional environments significantly help increase Islamic bank efficiency but do not help increase conventional bank efficiency. This finding empirically supports the theory of political economy and the new institutional economics (NIE) that emphasizes the proper institutional environments originates from their philosophy and purpose on banking system performance. The institutional incompatibility between conventional and Islamic banking activities may affect this result. According to the Islamicity index, Islamic economic institutions should also be concerned with economic and social justice and human welfare, which is not included in conventional economic institutions. Further, Islamic principles that prohibit interest may negatively affect the conventional banking system.

After conducting the two-stage least square (2SLS) test using instrumental variables (Ullah et al., 2021), the current study conducts the Stock-Yogo test/F-statistic to identify whether the instrumental variables are weak. This test examines the correlation level between additional instrumental and endogenous variables (Ullah et al., 2021). The results show F-statistic is significant, so this study can reject the null hypothesis that instrumental variables are weak. Thus, this test confirms that the instrumental variables employed in this study are strong.

### **3.5. Conclusion**

Increasing and maintaining efficiency within a firm and bank operations is important to optimize revenues and profits using limited resources. Additionally, amid changing

regulatory environments, particularly after the financial crisis, banks must establish an intelligent strategy for efficiency management. Identifying bank efficiency determinants is first required to increase and manage efficiency levels. Due to the availability of cross-country data on national institutional variables such as banking regulation and supervision, there has been increasing research on various institutional environments on bank efficiency (Gaganis & Pasiouras, 2013). Nevertheless, the results of the impact of institutional variables are still inconclusive (Luo, 2016; Chen, 2022; Djalilov, 2019; Gaganis, 2013). Moreover, there has been less research on the impact of political institutions on bank efficiency despite the importance of political institutions raised from political economy, the new institutional economies (NIE) and the hierarchy of institutions hypothesis (HIH) theories. Considering the growing importance of efficiency within bank operations and the political economy discipline, research on these areas is necessary.

This study conducted an empirical investigation by employing political, economic, regulatory and Islamic institutions to examine the impact of those institutions on bank efficiency of both banking types: conventional and Islamic. This study produced essential findings. First, political institutions, namely democratic institutions, have a significant positive impact on bank efficiency regardless of banking type. Second, while financial freedom negatively affects bank efficiency, when integrated with good quality political institutions (more democratic institutions), its impact on efficiency turns positive. Moreover, while greater restrictions on banking activity increase bank efficiency, fewer restrictions on banking activity are necessary for the presence of democratic institutions. According to the presence and absence of political institutions, the impact of an economic and regulatory institution varies. Third, greater bank regulation with a more democratic atmosphere is required during a crisis to increase bank efficiency. Lastly, this study found that Islamic institutions positively influence Islamic bank efficiency, which empirically supports the theory of political economy and the new institutional economies (NIE).

The current study contributes to the literature on the political economy of banking efficiency and Islamic banking performance by filling existing research gaps. First, this study provides an empirical study of banking performance from the political economy perspective. While there is much empirical research on the political economy of economic growth measured, there is still a lack of empirical studies on the political economy of banking performance. Second, this study empirically proves the critical role of political institutions in conventional and Islamic banking efficiency, both in normal times and during a crisis. Third, this study



provides empirical research on the political economy of Islamic banking performance. Lastly, this study empirically proves the importance of Islamic environments in increasing Islamic bank efficiency. This study provides empirical support for the political economy and new institutional economics (NIE) theory. According to those theories, every organization and firm needs an appropriate institutional environment, including a political system, laws and regulations, and enforcement institutions.

The findings here have significant policy implications for policymakers, regulators, and other stakeholders. First, the results may require policy changes, as this study found the significant importance of political institutions (democratic institutions) in the market to increase both conventional and Islamic bank efficiency. Possible examples are promoting democratic institutions such as enhancing sound check and balance systems and electoral rules and opening a new channel for a public voice for political participation within a country's political system. Second, as this study found the different impacts of economic and regulatory institutions according to the presence of good quality political institutions, proper economic and regulatory policies are needed considering a country's political environments. Lastly, this study's findings may have important policy implications for Islamic bank-operating countries' policymakers to increase Islamic banks' efficiency. Policymakers in these countries need to equip and improve proper Islamic institutions. For instance, implementing institutions for income distribution, money donations, and volunteering to aid human needs are good examples. In addition, Islamic economic institutions that adhere to Islamic finance principles, such as the prohibition of interest on loan contracts, should be created.

This study has limitations. First, the compatibility and consistency issues between the components of the Islamic and conventional indices matter. This problem stems from the limited number of available proxies for the Islamic system. This is one of the key challenges and difficulties when engaging in political economy research in general. Thus, more sophisticated and specific measures of institutional variables are needed (Scully, 1988). Second, the sample countries here were limited mainly to Muslim-majority countries. Consequently, they are mostly developing countries. There was no way to avoid this as the selected countries needed at least two Islamic banks operating for an accurate comparison. As Islamic banks continue to increase in number worldwide, future research will have better data to draw from.

**CHAPTER 4: POLITICAL, ECONOMIC, AND REGULATORY  
INSTITUTIONS AND BANK LIQUIDITY CREATION**

## 4.1. Introduction

As financial intermediaries, banks play a pivotal role in liquidity creation. Banks satisfy the demand for liquidity from both sides: depositors' and borrowers'. This function contributes to capital allocation and consequently improves economic growth (Berger et al., 2019; Bouwman, 2018; Casu et al., 2019; Diaz & Huang, 2017; Jiang et al., 2019). However, if excessive levels of liquidity are created, banks may be exposed to various risks, including liquidity risks (Bouwman, 2018; Diaz & Huang, 2017). This is because banks reduce their liquidity positions to create and provide liquidity to the market (AbdulGaniyy et al., 2017; Bouwman, 2013, cited in Diaz & Huang, 2017). Banks' liquidity risk may negatively affect the stability of entire financial and economic sectors, as witnessed in the 2008 financial crisis (Bandt et al., 2021; Berger et al., 2019; Diaz & Huang, 2017). Moreover, an excessive level of liquidity in a market causes an asset bubble, which can also lead to a financial crisis (Berger et al., 2019). Some empirical studies find a negative impact of bank liquidity creation on the stability of banks and the market (Bouwman, 2017). Therefore, banks' liquidity creation function needs to be carefully used and managed. To do this, it is important to identify the determinants of liquidity creation. Since the performance of banking sectors do not solely rely on economic factors; instead, it engages broader environments of a society, each country's political and institutional environments are essential determinants (Quintyn & Verdier, 2010).

As underlying theories, the political economy discipline and the new institutional economics (NIE) theory emphasise the importance of each country's political and institutional environments in banking performance (Quintyn & Verdier, 2010). Therefore, it is essential to identify the political and institutional determinants of banking performance to develop the banking sector. Considering the importance of bank liquidity creation and the need for political economy research, theoretical and empirical research on these issues is necessary. Nevertheless, there has been insufficient empirical research on liquidity creation generally due to the difficulty associated with its measurement. Moreover, research on bank liquidity creation from the political economy perspective is scant.

A few earlier studies examine the impacts of institutional environments on bank liquidity creation (*see*: Berger & Bouwman, 2017; Berger et al., 2016; Bouwman, 2018; Dang & Dang, 2021; Roberts et al., 2018). These studies focus on economic and regulatory institutions' perspectives on bank liquidity creation. For example, the monetary policy of a country and

economic freedom variables are widely used in many empirical studies on bank liquidity creation. As regulatory institutions, regulatory intervention variables are used in some empirical studies, and their impact on bank liquidity creation has been explored. Given the scarce research on the impacts of political institutions on bank liquidity creation, the present study fills this gap. The current study utilises various institutions to extend the existing literature on the political economy of banking performance. Also, this study includes Islamic institutions to investigate their influence on Islamic bank liquidity creation to empirically support the theory of the political economy and the new institutional economics (NIE), which emphasizes the importance of proper institutional environments developed from the sources and philosophy for each banking type. To the best of the author's knowledge, no study has employed conventional and Islamic political, economic and regulatory institutions, which provides more comprehensive information.

The current study aims to examine the impact of institutional environments on banks' liquidity creation, including political, economic, regulatory, and Islamic institutions. Additionally, the study aims to examine the hierarchy of the institutions and how banks' liquidity creation varies to support the theory of political institutions and the hierarchy of institutions hypothesis (HIH) using the interaction effect between institutions.

The study adopts a cross-country analysis using 584 banks (468 conventional and 116 Islamic banks) from 18 countries from 2000 to 2020. It conducts a two-stage analysis: The first stage measures each bank's liquidity creation using Berger and Bouwman (2009)'s and Berger et al. (2019)'s measurements. The second stage is a panel regression analysis to examine the relationships between banks' liquidity creation and institutional environments. This study employs conventional and Islamic political, economic, and regulatory institutions. Various robustness tests are conducted to confirm the initial results and address endogeneity problems. Endogeneity is among the problematic issues in regression analysis in many fields of study. To determine whether there was an endogeneity problem in the research model, this study first used the Ramsey regression equation specification error test (Ramsey RESET test) and found an omitted-variable problem. Therefore, the current study employs a two-stage least square (2SLS) method to address the issue. The two-stage least square (2SLS) approach is among the most popular methods for working with instrumental variables, while the use of instrumental variables is common for addressing endogeneity problems, particularly for cross-sectional and panel datasets.

This study obtains important findings: first, political institutions have a significant positive role in bank liquidity creation, regardless of banking type, either directly or through their impacts on other institutions. This result implies that political institutions, a country's democratic institutions, significantly increase bank liquidity creation by both conventional and Islamic banks in low- and high-income countries. Furthermore, the impact of political institutions in a country can vary depending on individual banks' liquidity creation status and the country's corruption level. Second, this study confirms that economic and regulatory institutions significantly affect bank liquidity creation. Moreover, in finding that the impacts of economic and regulatory institutions become stronger in the presence of good-quality political institutions, the study confirms the ultimate role of political institutions. This result supports the theory of political institutions and the hierarchy of institutions hypothesis (HIH). Third, this study finds a negative impact of regulatory interventions in bank activities on liquidity creation, regardless of banking type and the presence or absence of political institutions. This result implies that less regulatory intervention in bank activities may help to increase bank liquidity creation. Lastly, the study finds a significant role of Islamic institutions in increasing bank liquidity creation and that their impacts are more significant on Islamic banks' liquidity creation. This result empirically supports the political economy and the new institutional economics (NIE) theories.

This study contributes to the literature on the political economy of bank liquidity creation and Islamic banking by filling certain research gaps. First, this study provides empirical research on banking efficiency from a political economy perspective by investigating political, economic, and regulatory institutions' impact on bank liquidity creation. There has been no research that employs comprehensive institutional variables (political, economic and regulatory institutions) and Islamic institutions; and examines their impact on bank liquidity creation. Second, it empirically demonstrates the critical role of political institutions in bank liquidity creation, either directly or through their impacts on other institutions, which supports the hierarchy of institutions hypothesis (HIH). Moreover, from various subsample analyses, this study finds differential impacts of political institutions depending on banks' liquidity creation statuses and countries' corruption levels. Several empirical studies have examined the impact of economic and regulatory institutions on bank liquidity creation; however, political institutions' effect on banks' liquidity creation has not been sufficiently explored. Besides, by employing the interaction effect and various sub-sample analyses, this study shows the differential impacts of political institutions. Third, this study provides

comparative research between conventional and Islamic banking performance. Existing literature on Islamic banking performance from a political economy perspective either examines the effect of conventional political institutions (*see*: Asutay & Sidek, 2020) or compares conventional political systems versus *shariah*-based legal systems (*see*: Bitar et al., 2017). This study extends the existing literature by employing conventional and Islamic political, economic and regulatory institutions. Last, the study also empirically demonstrates the critical role of the Islamic environment in bank liquidity creation, particularly Islamic banks' liquidity creation. The study provides empirical support for the political economy and new institutional economics (NIE) theories. According to these theories, every organisation and firm requires an appropriate institutional environment, including a political system, laws and regulations, and enforcement institutions.

Key implications for policymakers, regulators, and bank management emerge from this study. It demonstrates the importance of political institutions (democratic institutions) for bank liquidity creation. Thus, policymakers need to introduce and establish high-quality political institutions within a country. Rather than changing a society's political structure or regime types, introducing and promoting democratic institutions within a country's political system can effectively increase bank liquidity creation. From a regulatory perspective, because the study finds that high regulatory intervention in bank activities leads to decreased bank liquidity creation, fewer regulatory interventions are necessary to increase bank liquidity creation. Moreover, the finding that a bank's capital positively impacts its liquidity creation may provide important implications for bank management in controlling its liquidity creation. Setting a high level of capital may help increase banks' liquidity creation, whereas low capital levels can lead to a decrease in liquidity creation. Lastly, this study provides important policy implications for Islamic bank-operating countries. Since this study confirms the positive and significant impacts of Islamic environments on Islamic banks' liquidity creation, it is recommended that appropriate Islamic environments be implemented within countries. To establish these institutions and implement these policies, the government's role and active participation are essential.

The remainder of this study is organised as follows: Section 2 provides a theoretical background along with a literature review and consequent hypothesis development. Section 3 lays out the methodology by presenting the specifications of the empirical model, sample, variables, and data sources used. Section 4 presents and discusses the empirical results.

Section 5 concludes with a summary of the results, providing policy implications, highlighting the limitations, and indicating future research directions.

## **4.2. Theoretical discussion and hypothesis development**

### **4.2.1. Research motivation**

Liquidity in the banking sector is crucial: entities face severe problems and troubles when liquidity is inadequate, such as insolvency risks in extreme cases. Moreover, inadequate liquidity may affect the overall financial sector and economy, both at the country and global levels, as was the case during the 2008 financial crisis (Lange et al., 2015). As banks' liquidity can be defined as the 'proportion of the assets which is held in cash or near cash' (Hunt-Ahmed, 2013, p.121), it also refers to banks' ability to meet their financial obligations by selling and liquidating assets to satisfy the demand for funds at a reasonable cost (Bello et al., 2017; Rose & Hudgins, 2008; Wahyudi et al., 2015).

As an intermediary institution, a bank plays a crucial role in an economy. One function is that of liquidity creation for the market and economy through risk transformation (Berger et al., 2019; Diaz & Huang, 2017). Banks produce liquidity by transforming relatively low-risk and liquid liabilities (deposits) to fund risky and illiquid assets (loans) (Berger et al., 2019; Diaz & Huang, 2017). Therefore, banks provide demand for liquidity from both sides: depositors' and borrowers'. This function contributes to capital allocation and consequently improves economic growth (Berger et al., 2019; Bouwman, 2018; Casu et al., 2019; Diaz & Huang, 2017; Jiang et al., 2019).

However, excessive levels of liquidity creation by banks expose them to various risks, such as liquidity risk, along with withdrawal and maturity transformation risks (Bouwman, 2018; Diaz & Huang, 2017). Liquidity risk was among the factors that deepened the global financial crisis in 2008 (Hunt-Ahmed, 2013; Lange et al., 2015). Berger and Bouwman (2017) empirically found that liquidity increased immediately before the crisis. Moreover, excessive levels of liquidity in markets may create asset bubbles, which can lead to financial crises (Berger et al., 2019). Some empirical studies find a negative impact of liquidity creation on the stability of banks and the market (Bouwman, 2017).

Thus, bank liquidity creation must be appropriately used and managed, which requires that the determinants of liquidity creation be identified. However, empirical research on bank liquidity creation is scant due to the difficulty of its measurements. Furthermore, current empirical research on these issues is more likely to focus on bank-level determinants or

country-specific analysis. This is due to a lack of detailed data on countries' institutional environments. However, according to the political economy and the new institutional economics (NIE) theories and the hierarchy of institutions hypothesis (HIH), more comprehensive country-level determinants are expected to affect bank liquidity creation. The growing importance of the political economy perspective and the current research gap motivate the current study.

As alternative intermediary institutions, Islamic banks have received much global attention due to their relative resilience amid the 2008 financial crisis. Due to Islamic banks' different nature and principles, derived from Islamic law, they operate differently from their conventional counterparts. For instance, from a liquidity creation perspective, although the basic mechanism that creates liquidity is similar, due to their different products and services, which are based on *shariah* principles, Islamic banks' balance sheets are different in nature and structure, which results in different processes of liquidity creation. Moreover, Islamic banks are expected, according to *shariah* law, to play the role of liquidity providers by contributing to the real economy (Mohammad et al., 2020), which may also affect the different perspectives of liquidity creation and risks.

Considering the growing number of Islamic banks and global interest in this industry as an alternative model, as well as the importance of bank liquidity creation, research on Islamic banks that focused on their liquidity creation would be valuable. Furthermore, country-level institutional determinants of bank liquidity creation have not been sufficiently explored. The prominent underlying theories (the political economy and the new institutional economics theories and the hierarchy of institutions hypothesis) that emphasise the importance of institutions, especially the ultimate and upper-rank institutions, for financial and banking performance, motivate the current study.

The current theoretical section focuses on the issues of bank liquidity creation from both conventional and Islamic banks' perspectives by first identifying the theoretical differences between the balance sheet structures and liquidity creation procedures of the two banking types.

#### **4.2.2. Liquidity of banks**

Banks' liquidity is defined as the 'proportion of the assets which is held in cash or near cash' (Hung-Ahmed, 2013, p.121). This includes banks' ability to meet their financial obligations by selling and liquidating assets to satisfy demand for funds by depositors and borrowers at a



reasonable cost (Bello et al., 2017; Rose & Hudgins, 2008; Wahyudi et al., 2015). Institutions must have adequate levels of liquidity and the ability to raise liquid funds in case of need. Otherwise, entities may face extreme liquidity and insolvency risks, which may affect the overall and global financial sectors and economy, as was the case during the 2008 global financial crisis (Lange et al., 2015). However, there is a trade-off relationship between liquidity and banks' profitability, since liquid assets do not create sufficient returns for entities (Hunt-Ahmed, 2013). Therefore, while financial institutions tend to hold minimum levels of cash reserves, they invest in less liquid or longer-maturity assets (business lending) to earn revenues (Lange et al., 2015), which may lead to an increase in the financing gap and negatively affect the stability of banks (Mohammad et al., 2020).

To understand the process of banks' liquidity creation and related risk, it is essential to understand their balance sheet structures, since a large proportion of bank liquidity creation is made through banks' on-balance sheet activities, with interactions between banks' assets and liabilities (Wahyudi et al., 2015). Thus, the composition and structure of banks' balance sheets are essential indicators of both their liquidity creation status and liquidity risk.

#### **4.2.2.1. Balance sheet structure**

A banks' balance sheet is one of the main financial statements that banks, customers, and regulators consider. This statement, also called the report of condition, reflects the sizes and compositions of banks' sources and uses of funds on any given date (Rose & Hudgins, 2008). It is used to examine a bank's operation and identify the relevant risks, since changes in balance sheet composition indicate changes in the underlying risks (Wahyudi et al., 2015).

The composition of each bank's balance sheet varies across banks according to the different business orientations, models, each country's market, and economic environments. The current study summarises the most common balance sheet elements for both conventional and Islamic banks. Table 18 shows the common factors of the conventional bank's balance sheet.

The asset side of a balance sheet is also called the use of funds, which creates a bank's income. The principal uses of funds are 1) cash reserves and deposits, 2) investments in securities, 3) loans and leases, and 4) other assets, including fixed assets. While some level of cash reserves is kept to meet a bank's obligations towards depositors' withdrawals and customers' requirements for loans and other unexpected cash needs, investment in securities

is also a typical source of liquidity and income (Rose & Hudgins, 2008). Loans are a bank's primary income source.

The liability side of a balance sheet represents the sources of the funds used (Lange et al., 2015; Rose & Hudgins, 2008). The major components of the liquidity side are as follows: 1) deposits, 2) non-deposit borrowings, 3) other liabilities, and 4) equity capital. Deposits are a bank's main source of funds, including demand, saving, time, and money market deposits. Non-deposit borrowings are those from money and capital markets. Other liabilities include repurchase agreements, such as temporary security swaps (Lange et al., 2015).

**Table 18: Conventional bank's balance sheet**

Asset (Uses of funds)	Liability (Sources of funds)
<ul style="list-style-type: none"> <li>• Cash and deposits in other institutions</li> <li>• Investments in securities</li> <li>• Loans and leases</li> <li>• Other assets</li> </ul>	<ul style="list-style-type: none"> <li>• Deposits from the public</li> <li>• Non-deposit borrowings</li> <li>• Other liabilities</li> <li>• Equity capital from stockholders (stock, surplus, retained earnings)</li> </ul>

#### 4.2.2.2. Islamic banks' balance sheet structure

Due to the *shariah* principles that determine the Islamic economic and financial system, Islamic banks have a distinct balance sheet structure, with unique instruments and services. This section summarises the most important Islamic principles that are applied in the structure of banks' balance sheets. The first and most significant Islamic principle in the Islamic financial system is the prohibition of interest exchange (*riba*). Although the Arabic term, *riba*, has a comprehensive meaning, the most used meaning in the financial system is that of an additional premium or increase on a loan amount (ISRA, 2016). *riba* is attached with a fixed amount of money, which is tied to the period of the loan and for which guaranteed payment is the principal (Askari et al., 2014b), regardless of the performance and outcome of the said loan (Iqbal & Mirakhor, 2011; ISRA, 2016). The Holy *Quran* and *Sunnah* prohibit the use of interest:

*'God permits commerce (trade) and prohibits riba (usury)'* (2:275)

In *Sunnah*, which is reported by Ubadah bin As-Samit (Ahmed, 2011), the *riba* in the form of ex-ante is also prohibited:

*'Gold for gold, silver for silver, wheat for wheat, barley for barley, dates for dates, salt for salt, like for like, same for same, hand to hand. But if these commodities differ, then sell as you like, as long as it is hand to hand'*

This *Sunnah* describes the violation of the principle of the same products, which leads to *riba* of excess (*riba al fadl*) and also violates the hand to hand (spot) transaction, which leads to the *riba* of delay (*riba al nasi'ah*) (increments for postponing a debt) (Ahmed, 2011; Ginene & Hamid, 2015). Based on the prohibition in both The Holy *Quran* and *Sunnah*, Islamic jurists have expanded the interpretation and consequently prohibit all forms of interest-bearing loans (Ahmed, 2011). The rationale for the prohibition of the exchange of interest can be summarised as follows.

First, it violates the Islamic principle of property rights. The Islamic economic system guarantees private property rights, ensuring individual freedom in which all individuals have the right to access and hold resources and property (Askari et al., 2014a; Asutay, 2007; Behdad, 1992). However, there is a distinct feature in Islamic property rights compared to conventional property rights. The first and most integral concept regarding property and resources is the ownership issue. According to Islamic principles, without any doubts among scholars, all resources and property on Earth are owned by God, whereas people only have a trusteeship (Askari et al., 2014a; Behdad, 1992; Choudhury, 1992; Naqvi, 1994). Consequently, individuals cannot have absolute ownership over property. Behdad (1992) refers to some Quranic verses regarding this issue:

*'Unto Allah whatsoever is in heavens and whatsoever is in earth' (2:284)*

*'Believe in Allah and his messenger, and spend of what whereof He had made you trustee' (57:7)*

Moreover, Islam does not acknowledge property that, by definition, has not been acquired through hard work and effort (Choudhury, 1992). In other words, work and labour are essential parts of acquiring the right to private property (Askari et al., 2014a; Naqvi, 1994). Behdad (1992) finds the Quranic verse regarding this issue:

*'And that man hath only that for which he marketh effort' (53:39)*

According to Ali (2013), the Prophet Muhammad also mentions this issue:

*'Some sins can be abolished only by working hard to get earnings'*

Under this principle, certain activities without labour and effort are not allowed, and the consequent outcomes and property rights are not acknowledged. The exchange of *riba* on a loan contract is one of these cases explicitly prohibited in Islam (Askari et al., 2014b; Behdad, 1992; Choudhury, 1992; Kuran, 1992).

Second, *riba*-based contracts are of a risk-transfer nature, which Islam considers unjust and immoral. The risks derived from interest-based contracts all shift to the borrowers without considering the contract outcomes, causing inequality in society (Askari et al., 2014b; Kuran, 1992). Thus, the Holy *Quran* explicitly prohibits such interest. Behdad (1992) refers to the Quranic verse:

*'Those who swallow riba cannot rise up save as he ariseth whom the devil hath prostrated by [his] touch' (2:275)*

The Holy *Quran* states that one's property should be appropriately consumed and not harm others.

*'do not consume one another's wealth unjustly' (2:188)*

*'you who believe, do not wrongfully consume each other's wealth but trade by mutual consent' (4:29)*

*'and [for] their taking of usury while they had been forbidden from it, and their consuming of the people's wealth unjustly' (4:161)*

According to the principles above, property gained by interest profit is considered unjust and unacknowledgeable (ISRA, 2016). Thus, prohibiting and eliminating *riba* in the financial system enable a just society in which people equitably access assets and justly distribute them (Iqbal & Mirakhor, 2011).

The second Islamic principle applied to the balance sheet structure is the use of risk-sharing, instead of risk-transferring, as an underlying mechanism in Islamic economic activities for the sound distribution of wealth (Askari et al., 2014b). Profit and loss should be shared between two contractual parties without fixed and guaranteed returns (Berger et al., 2019). This is based on the liability principles in Islam, in which profit is acknowledged and justified once responsibility and liability are taken (Iqbal & Mirakhor, 2011; Wahyudi et al., 2015). This principle is primarily based on The *Sunnah* that profit always bears liability or risks.

*'[the right to] profit [from something] goes with liability [for it]'*

[*al-kharaj bi al-daman*] (Mejelle article 85 cited in ISRA, 2016).

The last Islamic principle regarding financial transactions is the prohibition of *gharar*. In simple terms, it means danger, uncertainty, and risk (Ahmed, 2011). Uncertainty and missing information on essential elements of financial transactions such as quantity, quality, exact sale price, and the subject matter's existence (Iqbal & Mirakhor, 2011) are considered *gharar* and are prohibited since they lead to excessive risks. In this regard, the use of derivatives is a controversial issue in the Islamic world since it involves asymmetric information and excessive uncertainty and risks. Table 19 shows the common compositions of the Islamic bank's balance sheet.

**Table 19: Islamic bank's balance sheet**

Asset (Uses of funds)	Liability (Sources of funds)
<ul style="list-style-type: none"> <li>• Cash reserve</li> <li>• Financing assets (<i>murabahah, salam, ijarah, istisna</i>)</li> <li>• Investing assets (<i>sukuk, mudarabah, musharakah</i>)</li> <li>• Fee-based services (<i>wakalah, ju'alah, ijarah</i>)</li> <li>• Non-banking assets (land, buildings, equipment)</li> </ul>	<ul style="list-style-type: none"> <li>• Deposits:               <ul style="list-style-type: none"> <li>- Current deposits (<i>amanah</i> or <i>Qard Hassan</i>)</li> <li>- Saving deposits (<i>Wadia</i>)</li> <li>- Investment account (<i>mudarabah, musharakah</i>)</li> </ul> </li> <li>• Equity capital and Reserves</li> </ul>

Islamic banks' asset structures comprise various instruments, with various modes, maturities, and risk portfolios (Iqbal & Mirakhor, 2011; Wahyudi et al., 2015). The asset side of an Islamic bank's balance sheet commonly comprises the following: 1) cash reserves, 2) financing assets, 3) investing assets, 4) fee-based services, and 5) non-banking assets or other fixed assets, such as land, buildings, and equipment. The financing and investing assets are the most significant and distinct features of Islamic banks compared to their conventional counterparts, by virtue of the forbidden exchange of interest on loans. There are various underlying Islamic instruments with different maturities and risk-return profiles (Greuning & Iqbal, 2008). Islamic instruments and products are categorised into two: equity-based instruments, such as *mudaraba* and *musharakah*, and debt-based products, such as *murabaha* and *ijara* (Berger et al., 2019). The above underlying instruments can be further subdivided

based on their maturities. While *murabaha* and *salam* can be used for short-term financing, *ijara* and *istisna* are used for intermediate-term financing, whereas *mudaraba* and *musharakah* are employed for long-term financing (Wahyudi et al., 2015).

The major components of the liquidity side of Islamic banks' balance sheets are 1) deposits and 2) equity capital and reserves. Islamic banks' primary source of funds are customers' deposits, which comprise current, saving, and investment deposits. Current deposits (or demand deposits) are operated based on the principle of safe custody for customers' convenience (Kettell, 2011). Although the treatment of a current deposit varies across banks, some Islamic banks treat it as an *Amanah* (a trust) (Greuning & Iqbal, 2008), while others consider it as *Qard Hasan* (an interest-free loan) (Kettell, 2011). Although a current deposit guarantees the total amount, any profit that derives from the utilisation of the funds is not paid to the depositors as interest (Ahmed, 2011; Iqbal & Mirakhor, 2011). A savings deposit operates similarly to a current deposit. Based on the principle of *Al-wadia*, customers look for the safe custody of their funds rather than guaranteed profits from the business of using the funds, although some gifts can be provided (Kettell, 2011). Last, investment accounts, also called special investment accounts, are based on the PLS, whereby the principal and return are not guaranteed; instead, profit and loss are shared between banks and depositors (Hassan & Mollah, 2018; Kettell, 2011), generally based on the *mudaraba* mode (Iqbal & Mirakhor, 2011). This is the most distinct feature compared to conventional banks, whose system is based on interest. Thus, Islamic banks' investment accounts are not considered to be full liabilities since the relationship between depositors and banks is akin to that between partners (Greuning & Iqbal, 2008). The returns from investment accounts are linked to the banks' profits or specific investment accounts on the asset side of their balance sheets (Berger et al., 2019). Equity capital refers to the owner's capital and reserves. A distinct feature of equity is that Islamic banks are not allowed to carry any debt-based capital, which is a crucial source of capital for conventional banks (Iqbal & Mirakhor, 2011). As shown above, the different nature of an Islamic bank's balance sheet indicates a different process of liquidity creation compared to conventional banks. The following section examines the process of liquidity creation for both banking types.

#### **4.2.3. Liquidity creation**

liquidity creation is among banks' crucial roles, contributing to overall economic growth (Berger et al., 2019; Bouwman, 2018; Casu et al., 2019; Diaz & Huang, 2017; Jiang et al., 2019; Nguyen et al., 2020). Banks produce liquidity by transforming relatively low-risk and

liquid liabilities (deposits) to fund risky and illiquid assets (loans) (Berger et al., 2019; Diaz & Huang, 2017; Nguyen et al., 2020). In other words, bank liquidity creation can be accomplished through the asset and risk transformation process. Therefore, banks resolve the liquidity problems that arise for borrowers and depositors. Banks provide loans to borrowers who need liquidity and provide liquidity in the form of on-demand deposits to depositors (Diamond & Rajan, 2001). This contributes to the enhancement of credit flow and allocation of capital and, consequently, improves economic growth (Diamond & Rajan, 2001; Jiang et al., 2019). Since liquidity creation is the core function of banks, it is also considered the best and most comprehensive measure of bank output, among other measures that include total assets or growing total assets (Berger et al., 2019; Nguyen et al., 2020).

Bank liquidity creation through on-balance-sheet activities can be divided into asset-side and liability-side liquidity creation. According to the financial intermediation theory, a bank provides liquidity to an economy by funding relatively illiquid assets, such as loans, using relatively liquid liabilities, such as deposits (Baltas et al., 2017; Bouwman, 2018; Casu et al., 2019; Jiang et al., 2019). In particular, on the one hand, asset-side liquidity is created by providing credit (loans) to firms, which expands investments in the real economy (Bouwman, 2018). On the other hand, liability-side liquidity is created by enabling depositors (savers) to access liquid funds (deposits) and payment services (Berger et al., 2019). Thus, banks satisfy both depositors' and borrowers' demand for liquidity (Jiang et al., 2019). In other words, banks enable non-bank agents such as households, firms, and governments to become liquid and, consequently, financially safer (Berger et al., 2019) by holding illiquid assets and providing liquidity to the economy (Baltas et al., 2017).

Additionally, banks provide liquidity through off-balance-sheet transactions using loan commitments and claims to other liquid funds (Baltas et al., 2017; Berger et al., 2019; Bouwman, 2018; Casu et al., 2019; Nguyen et al., 2020), as well as derivatives that reduce the financial risks (Berger et al., 2019). Loan commitments provide liquidity to customers by requiring them to plan their investments and expenditures through the mandatory fund agreements (Berger & Bouwman, 2017). Considerable empirical research has found that the function of bank liquidity creation is one of the factors that contribute to economic growth (Berger et al., 2019; Bouwman, 2018; Casu et al., 2019; Diaz & Huang, 2017; Horvath et al., 2016; Jiang et al., 2019).

#### 4.2.3.1. Islamic banks' liquidity creation

The Islamic principles regarding the bank's liquidity creation can be found in the objective of *shariah* (Islamic law). According to Ghazali, one of the most prominent Muslim philosophers, cited in ISRA (2016), the objective of *shariah* (Islamic law) can be considered as follows:

*'the objective of the shariah is to promote the well-being of all mankind, which lies in safeguarding their faith (din), their human self (nafs), their intellect ('aql), their posterity (nasl) and their wealth (mal). Whatever ensures the safeguard of these five serves public interest and is desirable'*

Referring to the objective of *shariah*, the purpose of liquidity creation should be analysed to protect human wealth and promote the welfare of humans. Given bank liquidity creation in an economy, customers can store their money safely and, simultaneously, earn relatively safe and positive returns (Berger et al., 2019). In other words, the bank liquidity creation function allows people (depositors and savers) to hold liquid assets, which improves human financial welfare; otherwise, people would suffer a shortage of liquidity (money) and interim liquidity shocks (Bouwman, 2018).

Moreover, wealth and property in Islam should always be managed justly, without harm to others.

*'do not consume one another's wealth unjustly or send it [in bribery] to the rulers in order that [they might aid] you [to] consume a portion of the wealth of the people in sin, while you know [it is unlawful] (2:188)'*

Consistent herewith, even property and wealth in banks' deposits should be managed and used justly (AbdulGaniyy et al., 2017). This basic verse that indicates the proper use and management of wealth guides the management of cash and liquidity within a bank.

The process of banks' liquidity creation varies according to bank characteristics and business models (Berger & Bouwman, 2009). Due to the different structure and composition of balance sheets based on Islamic principles and restrictions, such as the prohibition of interest-based activities and the sale of debt, Islamic banks create liquidity differently from asset- and liability-side off-balance sheet transactions. In this process, the *Shariah* Supervisory Board (SSB) plays a crucial role in supervising banks' activities (Safiullah et al., 2020).

On the asset-side of their balance sheets, Islamic banks create liquidity through equity- and debt-based instruments for investors or borrowers. On the liability side, liquidity for



depositors is created through demand and investment deposits such as *mudarabah* and *musharakah* deposits, which are based on profit- and loss-sharing principles, without fixed and guaranteed returns (Berger et al., 2019). The returns from investment accounts are linked to a bank's profit or a specific investment account on the asset-side of its balance sheet (Berger et al., 2019). Although Islamic banks provide liquidity through off-balance sheet transactions, they are more restricted than conventional banks. For instance, the use of derivatives such as futures, swaps, options, and credit derivatives is limited in Islamic banks (Safiullah et al., 2020).

#### **4.2.4. Institutions and bank liquidity creation**

While many researchers examine the relationship between institutions, firms' liquidity, and the stock market, few focus on the bank perspective. Moreover, these studies have focused on bank-level institutional determinants of liquidity such as capital and credit ratios (Cash et al., 2019; Dang & Dang, 2021). However, the influence of macro-economic or national-level external environments, including political institutions, on financial institutions has received considerable academic attention, given the crucial impact of comprehensive institutional environments (Chen & Yu, 2021; Lai et al., 2020). The current section explores the relationships between institutions and bank liquidity creation in the relevant literature by subdividing institutions into economic, regulatory, Islamic, and political.

##### **4.2.4.1. Economic institutions**

With the growing importance of and interest in the influence of macro- and country-level institutional environments, many empirical studies examine the impact of institutional environments such as economic, regulatory, and governance institutions on banks' liquidity creation. However, it is difficult to distinguish between these as they are closely linked; instead, they are alternatively and interchangeably used in many studies.

Economic and financial freedom, two of the primary variables for economic institutions, are employed in many empirical studies that deal with banking performance (Chortareas et al., 2013; Dutta & Williamson, 2016; Gropper et al., 2015; Tanna et al., 2017). Financial liberalisation is one component of economic liberalisation, meaning an 'economy's banking system effectiveness as well as independence from government control and interference in the financial sector' (Chortareas, Girardone, & Ventouri, 2013, p.1230). However, the terms 'economic liberalisation' and 'financial liberalisation' are used interchangeably in many research studies as economic liberalisation usually encompasses financial liberalisation.

Economic and financial freedom can impact banks' liquidity creation through banking competition. As the financial and banking sectors become global and open to the international market, banking competition is inevitable. There are two opposing views on the impact of banking competition on bank liquidity creation: the 'price channel' view supports a positive impact of banking competition on liquidity creation (Horvath et al., 2016). Increased competition may affect pricing policies due to pricing competition and market determination through reduced loan rates and increased deposit rates (Ahmed, 2013; Cubillas & ález, 2014; Horvath et al., 2016). Some empirical research supports a relationship between competition and low lending rates (Love & Peria, 2015). Thus, increased competition promotes increased demand for loans and deposits, consequently increasing bank liquidity creation.

Meanwhile, according to the 'fragility channel' hypothesis, an increase in bank competition may increase banks' fragility, reducing bank profits (Petersen & Rajan, 1995). Consequently, banks tend to reduce liquidity creation by reducing the volumes of both loans and deposits to prevent bank runs (Horvath et al., 2016). Horvath et al. (2016) empirically support this hypothesis: they find that increased bank competition reduces liquidity creation by reducing lending and deposits.

As can be seen from the impact of economic freedom, countries' monetary policies, manifested mainly by the interest rate, have a significant impact on liquidity creation. Monetary policy has been dealt with the most in many theoretical and empirical studies (*see*: Berger & Bouwman, 2017; Dang & Dang, 2021; Yeddou & Pourroy, 2020). The purpose of a country's monetary policy is to stabilise the country's price level and appropriately manage the business cycles (Chen et al., 2017). The monetary policy transmission theory that emphasises the impact of monetary policy on bank lending behaviour through banks' credit volumes has been well explored. For example, Kashyap and Stein (2000) find that when monetary policy is tightened by raising rates, banks tend to reduce their lending when they cannot substitute deposits with non-deposit external finance. However, the impact of monetary policy on banks' credit channels varies with different banks (size and liquidation) and market-specific factors (Chen et al., 2017).

However, compared with studies on the monetary policy transmission theory that emphasises the impact of monetary policy on bank lending behaviour through the bank lending channel (or credit channel), research on the bank liquidity creation channel is a relatively new and growing area (Dang & Dang, 2021). The bank liquidity creation channel of monetary policy transmission is more comprehensive because it considers other banks' activities that create

liquidity than lending behaviour. According to this theory, monetary policy can affect both on- and off-balance sheet liquidity creation. For example, monetary policy is generally eased by lowering rates during economic recessions or downturns to provide liquidity and stimulate the economy through the purchase of large-scale assets and capital injections to large banks (Berger & Bouwman, 2016; Chatterjee, 2015). Consequently, monetary expansion in the form of a low-interest rate can increase a bank's net worth since banks tend to issue more loans to their customers at decreased interest rates and on relaxed lending terms (Berger & Bouwman, 2017; Dang & Dang, 2021). This may increase banks' deposits and loan volumes, increasing bank liquidity creation (Berger & Bouwman, 2017; Dang & Dang, 2021; Yeddou & Pourroy, 2020). Regarding off-balance-sheet transactions, banks can provide more commitments to customers with more loanable funds at cheaper costs (Dang & Dang, 2021). However, lower interest rates can cause lower savings and investments, ultimately reducing business volumes, and thus liquidity (Kitchen, 1986, cited in Ahmed, 2013). Meanwhile, higher interest rates may positively impact savings levels and increase credit supply (Ahmed, 2013), which eventually increases banks' liquidity creation.

Some empirical studies have examined the impact of monetary policy on bank liquidity creation. Berger and Bouwman (2017) identify the relationships between bank liquidity creation, monetary policy, and financial crises. They find that the impact of monetary policy, proxied by the federal fund rates, varies with time and bank size. For example, monetary policy has a statistically significant (but economically minor) impact on liquidity creation in small banks during normal times, whereas the effect weakens during crises. Meanwhile, this impact is minimal on medium and large banks. This result is consistent with findings by Dang and Dang (2021) and Chatterjee (2015). Dang and Dang (2021) use Vietnamese commercial banks and short-term lending rates as a monetary policy proxy and find that the impact of monetary policy is more profound on smaller and more liquid banks once the monetary policy is eased. This is because, since large banks employ higher non-deposit funding, which is sensitive to market conditions, they are more exposed to market conditions and, consequently, their liquidity creation is more sensitive to market-dependent variables (Berger, 2012, cited in Chatterjee, 2015).

#### **4.2.4.2. Regulatory institutions**

Regulatory institutions, such as those responsible for regulatory monitoring, intervention, and capital and liquidity requirements, play an essential role in creating bank liquidity (Bouwman, 2018). Many studies have found a negative impact of regulatory intervention (Berger et al.,

2016; Bouwman, 2018). Regulatory intervention can reduce portfolio risk: a bank may reduce risky lending activities and bank liquidity creation to adjust its portfolios (Berger et al., 2016). Bouwman (2018) empirically supports a negative impact of regulation by finding that restrictions on lending activities significantly reduce bank liquidity creation. This finding is consistent with Berger et al.'s (2016) results. Based on a sample of German banks, they find that regulatory interventions such as restrictions on deposit-taking, lending activities, profit distribution, and business activities, and limits on managerial decisions decrease liquidity creation. Consistent with previous research, Kladakis et al. (2021) find that banks in countries with greater official supervisory power create more liquidity, whereas those faced with tighter capital regulations, more activity restrictions, and more robust private monitoring create less liquidity. Increased activity restrictions may prevent banks from diversifying their portfolios and taking advantage of the synergy effect from complimentary activities.

Capital and liquidity requirements also affect bank liquidity creation. If a higher capital requirement is imposed, less liquidity is created by banks. This is because a higher capital requirement means reduced total assets or total assets plus off-balance sheet exposures and risk-weighted assets as a denominator in the capital requirements formula, which can be reduced by reducing business loans or off-balance sheet guarantees, which leads to a reduction in liquidity creation (Berger & Bouwman, 2016). Thus, this requirement is more likely to affect banks' liability sides by requiring banks to hold equity (Berger & Bouwman, 2016). Basel III imposed liquidity requirements at the international level in December 2010, in response to the 2008 financial crisis: the LCR and the NSFR (Roberts et al., 2018). In addressing the shortcomings of Basel I and II, Basel III requires higher-quality capital and introduces liquidity ratios (Bouwman, 2018). While the LCR aims to promote the short-term resilience of banks' liquidity profiles, the NSFR aims to maintain a stable funding profile by implementing minimum liquidity standards (Bai et al., 2018; Bandt et al., 2021). However, these requirements were not enforced on all banks; instead, they were proposed to be implemented gradually from 2015 (Mohammad et al., 2020). These liquidity requirements are also expected to affect banks' liquidity creation. While liquidity requirements can address the withdrawal risk on the liability side and off-balance sheet transactions by requiring banks to hold cash-like assets, this holding may reduce banks' liquidity creation practice (Berger & Bouwman, 2016). Empirically, Roberts et al. (2018) found that banks on which the LCR had been imposed reduced their liquidity creation from 2013 compared to those that were not

required to satisfy the LCR requirement by reducing commercial and residential real estate loans on the asset side of the balance sheet.

Meanwhile, a view that supports a positive impact of regulation on liquidity creation argues that restricting banks from engaging in risky and new activities allows them to engage in and focus more on their core objectives, such as liquidity creation, to generate profits (Kladakis et al., 2021). Empirically, Ongena et al. (2013) find that banks tend to relax their lending standards and issue more loans to offset activity restrictions on profitability.

#### **4.2.4.3. Islamic institutions**

From the literature on Islamic banks' liquidity creation, Berger et al. (2019) empirically examine Islamic banks' liquidity creation performance relative to conventional banks using cross-country analysis. They find that Islamic banks create more liquidity than conventional banks, particularly on the asset-side of the balance sheet. This result is consistent with the argument that since Islamic banks are better positioned in terms of capital (high capitalisation), they can absorb more risks (Bourkhis & Nabi, 2013). This may increase lending practices and consequently increase the banks' asset-side liquidity creation. Additionally, because Islamic banks hold fewer liquid funds due to the *shariah* restrictions prohibiting the holding and trading of non-*shariah*-compliant fixed-income securities, they may create more asset-side liquidity than conventional banks. Their finding is consistent with the finding by Farooq and Zaheer (2015) that Islamic banks issued more credit than conventional banks during the financial crisis. However, Berger et al. (2019)'s study does not explore the determinants of Islamic banks' liquidity creation.

According to the political economy and the new institutional economics (NIE) theories, God's law, the basic foundation and fundamental source of Islam, manifested by the Holy *Quran* and *Sunnah* (Choudhury & Malik, 1992), provides the rationale behind the distinct discipline and system of Islamic economics (Haqqi, 2015). This creates an underlying worldview, order, and economic norms and, within this framework, Islamic economics and other related systems and institutions such as legal, social, and political are located (Asutay, 2007; Choudhury & Malik, 1992). Thus, a proper Islamic institutional environment is necessary for the performance of the Islamic financial system and banks, since the system also originates from the ultimate Islamic principles.

Although few, some empirical studies consider the impact of Islamic environments on Islamic banking performance, and draw a comparison with conventional bank performance.

For example, Bitar et al. (2017) compared the financial soundness of conventional and Islamic banks, measured by capital, efficiency, volatility of returns, liquidity, profitability, and banks' credit risk that arises from the influence of a country's political and legal systems. They found that Islamic banks performed better under a hybrid and *shariah*-based legal system than under a conventional, democratic, political system (in terms of capital, efficiency, profitability, and credit risk measures). This finding is consistent with Asutay and Sidek (2020)'s finding that Islamic banks' performance is negatively affected under a conventional regulatory system due to unfavourable conditions under the latter. These findings empirically support the political economy and the new institutional economics (NIE) theories as well as the present study's hypothesis. However, it should be noted that Bitar et al.'s study compares a political system (democratic system) with a legal system (*shariah*-based legal system), while Asutay and Sidek only employ a conventional political system.

From a bank liquidity creation perspective, Islamic environments affect Islamic banks' liquidity creation through various Islamic institutions. Among them, the SSB, as a governance institution, significantly affects Islamic banks' liquidity creation. The SSB's core role is to ensure that Islamic banks are compliant with *shariah* principles in terms of their instruments and activities by monitoring and supervision. This monitoring and advisory role of the SSB affects all Islamic banks' on- and off-balance sheet activities. Thus, better SSB governance ensures greater compliance with *shariah* principles, resulting in higher liquidity creation by Islamic banks (Safiullah et al., 2020). This is because, by principle, Islamic banks have a liquidity buffer due to the *shariah* constraints on transactions involving interest-based instruments, which may alleviate bank managers' moral hazard of excessive risk-taking and encourage more prudent liquidity creation (Safiullah et al., 2020). This is consistent with the 'risk-absorption' hypothesis, which emphasises a positive impact of higher capital on banks' liquidity creation (Safiullah et al., 2020). Furthermore, a well-functioning SSB plays a role in addressing the *shariah*-related operational issues, which encourage more prudent liquidity creation by expanding *shariah*-compliant instruments and activities (Safiullah et al., 2020). Safiullah et al. (2020) empirically find a positive role of the SSB in Islamic banks' on-balance sheet liquidity creation.

Using subsample analysis, the current study expands the existing literature by exploring other institutional determinants (political, economic, and regulatory institutions) of bank liquidity creation by the two banking types: conventional and Islamic banks.

#### 4.2.4.4. Political institutions

Although the definition and classification of political institutions differ across studies, political institutional variables can theoretically and empirically affect banks' liquidity creation, either directly or through their impacts on other institutions. Among political institutional variables, political stability is mainly used in some empirical studies as a governance variable with a direct impact on liquidity creation (*see*: Baradwaj et al., 2016; Mohammad et al., 2020). Political stability can reduce expropriation and corruption in a country, thus reducing banks' political risk. Consequently, the decreased risk to reserves may induce banks to expand their lending and create liquidity (Baradwaj et al., 2016). Baradwaj et al. (2016) empirically demonstrate a positive role for political stability in bank liquidity creation. Moreover, political factors or pressures have historically been found to be closely connected to banking performance. For example, Abdelsalama et al. (2017) find that politically connected banks in the middle east and north Africa (MENA) region are less efficient (Bitar et al., 2017).

Meanwhile, Nys et al. (2015) found that politically connected banks in Indonesia had more capacity for obtaining deposits (Bitar et al., 2017). According to the private interest view, regulations are implemented to realise and facilitate the interest of the few (and not the public), which impedes the banking system's efficient operation (Kladakis et al., 2021). Depending on politicians' interests, banking performance, including liquidity creation, can be affected. Consequently, political institutions are either favourable or unfavourable to incumbent politicians; thus, political parties can determine banks' liquidity creation.

However, political institutions' direct effect on banks' liquidity creation has not been sufficiently explored. Nonetheless, political institutions can influence liquidity creation through sub-ordinate economic and regulatory institutions. This is based on the hierarchy of institutions hypothesis (HIH), which emphasises the ultimate role of political institutions that determine other sub-ordinate institutions. Additionally, various studies have empirically demonstrated strong relationships with other institutions (economic, regulatory, and governance institutions) and their interaction impacts on economic growth and banking performance. Flachaire et al. (2014) find different roles for political and economic institutions on growth rates; while political institutions have an indirect impact by providing a stage on which economic institutions can operate, economic institutions have a more direct impact. This finding is similar to that obtained by Quintyn and Verdier (2010), who noted the short-term effects of economic institutions and long-term effects of political institutions on

financial development. Slesman et al. (2019) empirically demonstrated the previous findings, and argued that political institutions were among the core components of financial growth. Meanwhile, they claimed that weak political institutions led to an inefficient financial system. Furthermore, Bartolini and Santolini (2017) found a critical connection between political institutions and governance, arguing that political institutions (type of government and electoral rule in the research) affected governance (performance of the governments), and eventually impacted economic outcomes and development. Rivera-Batiz's (2002) study obtained a similar finding. He observed the role of governance as a medium variable. The presence of democratic institutions influenced the quality of governance, which significantly impacted economic growth. In sum, democratic institutions can play a role in increasing economic growth, but only when paired with high-quality governance. Considerable research emphasises that political and regulatory institutions are closely related, while many studies employ these variables together as interaction variables or as a channel. Ashraf (2017) argues that legal institutions are among the channels through which political institutions influence financial development, emphasising political institutions over legal institutions. This is because stable and well-functioning political institutions ensure both consistency and the implementation of legal institutions such as legal rules, courts, and regulators that affect the banking industry. Ashraf (2017) empirically finds complementary and interdependent relationships between political and regulatory institutions that influence bank risk-taking behaviour. This finding is consistent with that obtained by Roe and Siegal (2011), cited in Ashraf (2017), that legal institutions were among the channels through which political instability could impede financial development.

More specifically, political institutions are linked to economic freedom, which is one of the variables associated with economic institutions. Bum and Lack (2003) argue that democracy ensures economic freedom. Agoraki et al. (2019) concur with this argument, and argue that democracy is a prerequisite for financial liberalisation and an adequate financial regulatory framework. Empirically, Choartareas et al. (2013) observed a significant impact of economic institutions, namely, financial freedom, on overall bank efficiency. The latter study also emphasised the relationship between economic and political institutions by showing that the positive impact of financial freedom on bank efficiency was more prevalent in more politically free and open environments, in countries with democratic political systems. In these environments, governments can formulate and implement better-quality policies and engage in high-quality governance. Furthermore, the more democratic the nature of a



country's political institutions, the higher the competition in the banking sector, which in turn has a positive impact on its development. The historical examples of the banking industries in the US and Mexico support the argument: While the US, with limited authority of the government, shows the most advanced banking and finance system in the world, Mexico, with a system of political anarchy, has an uncompetitive banking industry and a relatively undeveloped financial system (Haber et al., 2008). Although divergent views have been proposed on the impact of banking competition resulting from open political participation and political competition on banking performance and stability, a competitive atmosphere in the banking sector promotes the development of products and services and consequently that of the industry (Ashraf, 2017). Moreover, political competition encourages banking and market competition by promoting access to and participation in financial markets (Ashraf, 2017). For instance, the banking sector's liberalisation of entry was possible after suffrage was expanded in France and other European countries (Haber et al., 2008). This market competition is critical to economic growth (Beck et al, 2000; Rajan & Zingales, 1998).

Among the factors behind the development of the US banking sector is active banking competition, with liberal entry barriers in banking as a result of the political competition (Agoraki et al., 2019) manifested by 'the suffrage, party competition, a bicameral legislature and federal system of government' (Haber et al., 2008). In contrast, the lack of a competitive atmosphere in the concentrated banking systems of Mexico and Brazil produces small credit allocations in both countries (Haber, 2003). Even among autocratic countries, the competitive, authoritarian regime of Malaysia, where elections institutionalise political competition, is actively developing Islamic finance industry products, for which it has become a pioneer country (Apaydin, 2018). Meanwhile, under a federal autocracy by elite competition, the United Arab Emirates (UAE) has low product development and relatively low industry development (Apaydin, 2018). This is because, under an atmosphere of political competition, a few people cannot monopolise industry, which leads to the opening of new financial institutions and products (Apaydin, 2018).

Only a few studies examine the relationship between political institutions and monetary policy. King (2004) argues that economic institutions require a broad base of political support, which is more important than the design of the policy regime itself. This is because a political system influences and shapes the economic policies that affect financial decisions and economic growth (Bitar et al., 2017). Specifically, first, countries with high-quality political institutions have sound check-and-balance systems, which grant monetary institutions greater

autonomy by constraining politicians' abuse of power (Hielscher & Markwardt, 2012; Persson, 2002). In other words, the more accountable a government is, the less discretion in the conduct and implementation of fiscal policy (Arezki et al., 2011). Otherwise, politicians' preferences affect monetary policy. For instance, politicians generally prefer lower interest rates to assign relatively less weight on inflation in their preferred monetary policy reaction and boost their re-election chances (Ehrmann & Fratzscher, 2011). Conversely, it is considered that any government that maintains high interest rates is deemed unlikely to win re-election since a high-interest rate means and proves a politically unsustainable government to some extent (King, 2004). Thus, high-quality political institutions assume their role of controlling or inhibiting incumbent politicians' pressure or preferences (Bernhard et al., 2002). Persson (2002) also emphasises the role of electoral rules: 'policy is the equilibrium outcome of a delegation game, where the interaction between rational voters and politicians is modelled on extensive form'. The author empirically finds that electoral rules and political regimes impact the size and composition of government spending (economic and monetary policy). Meanwhile, less democratic countries and leaders with shorter horizons tend to make opportunistic decisions, with long-run costs that outweigh the short-run benefits, hindering development (Beck et al., 2001).

Thus, a high quality of political institutions influences trust in government decisions and legal arrangements, which affects the reputation of a country's monetary policy and determines its effect (Hielscher & Markwardt, 2012). This is supported by the example of Chile's and Venezuela's different monetary policy impacts on their inflation rates. Although both countries increased their central banks' independence, whereas Chile achieved price stability with its high-quality political institutions (political stability, the rule of law, and democratic accountability), Venezuela's inflation problems persisted, with its low-quality political institutions (Hielscher & Markwardt, 2012). Campillo and Miron (1997, cited in Hielscher and Markwardt (2012), also show that countries under unstable political conditions tend to experience higher inflation rates. Furthermore, political stability, which is closely related to highly political institutions, influences other policies and the legal system (Boubakri et al., 2013). This may also affect the reputation, credibility, and effect of the policies. Thus, the current study assumes that the effect of a country's monetary policy on liquidity creation and liquidity risks can depend on the country's political institutions.

Political institutions can affect a bank's liquidity creation through regulatory institutions since there is a clear relation between a country's regulatory institutions (regulatory

intervention) and liquidity creation, and between the political and regulatory institutions. For instance, the political stability of a country links to the consistency of the country's legal institutions, which is supported by the hierarchy of institutions hypothesis (HIH). However, there remains a contradiction in the interaction relationships among institutions. Although Glaeser et al. (2004) employ property rights as an economic institution, they find that the impact of economic institutions outweighs that of political institutions when the human capital variable is controlled for. The latter study argues that, regardless of government type and political institution, good governance and economic institutions (namely, property rights) are particularly crucial for economic growth, consistent with Persson and Tabellini's (2006). Although the latter authors noted the vital role of democratisation and economic liberalisation in economic growth, they found that countries that liberalised their economies before expanding their citizens' political rights experienced accelerated growth.

Thus, based on the importance of political institutions, and the close relationships among institutions, the current study assumes that political institutions may affect banks' liquidity creation either directly or through their impacts on other institutions. However, the empirical literature on conventional and Islamic banks' liquidity creation and the determinants thereof heavily focuses on individual economic, regulatory, and governance institutions. Since the macro-environments and political institutions in financial markets and institutions must be considered, there is a need for research in these areas. The current study examines both the direct and indirect impacts of political institutions using individual political institutions and their interactions with other sub-ordinate institutions (economic and regulatory institutions).

#### **4.2.5. Hypothesis development**

Liquidity creation is among the crucial functions that banks perform. Through liquidity creation, banks provide the demand for liquidity from both sides: depositors' and borrowers'. This function contributes to capital allocation and consequently improves economic growth (Berger et al., 2019; Bouwman, 2018; Casu et al., 2019; Diaz & Huang, 2017; Jiang et al., 2019). However, an excessive level of liquidity creation exposes banks to various risks and asset bubbles in the market, which in turn affects the entire financial and economic markets (Berger et al., 2019; Bouwman, 2018; Diaz & Huang, 2017). Therefore, an appropriate use and management of banks' liquidity creation is essential. To achieve this, the determinants of liquidity creation must be identified. However, empirical research on banks' liquidity creation is generally scant, due to the difficulty in its measurements. Furthermore, current empirical studies on these issues are more likely to focus on bank-level determinants or country-

specific analysis. This is due to a lack of detailed data on countries' institutional environments and the difficulty of conducting political economy research.

However, as discussed above, following the political economy and new institutional economics (NIE) theories, banking performance, including liquidity creation, depends on various kinds of institutions in a country. Additionally, the development of each level of institutions in society results from the impact of the primary and ultimate institutions in a country (Ahmed, 2012), and the interactions among the institutions at each level. Thus, the study proposes that more comprehensive country-level institutions may affect bank liquidity creation, and develops the following hypothesis:

*H<sub>1</sub>: Political, economic, and regulatory environments affect banks' liquidity creation.*

According to the hierarchy of institutions hypothesis (HIH), political institutions have an ultimate role that determines and affects other sub-ordinate institutions, such as a country's economic, regulatory and governance institutions. Consistent with the theory, King (2004) argues that economic institutions require a broad base of political support, which is more important than the design of the policy regime itself. Accordingly, political institutions influence banking performance, including bank liquidity creation, either directly or by influencing sub-ordinate institutions. Empirically, Baradwaj et al. (2016) find a positive relationship between a country's political stability and banks' liquidity creation. This is because political stability can reduce expropriation and corruption in a country, thus reducing banks' political risk. Consequently, the decreased risk to reserves may induce banks to expand their lending and create liquidity. Based on the hierarchy of institutions hypothesis (HIH) and past empirical research findings, the current study formulates the sub-hypothesis below:

*H<sub>1a</sub>: Political institutions have a positive impact on banks' liquidity creation.*

Some studies deal with economic institutions and bank liquidity creation. Economic and financial freedom, among the primary variables for economic institutions, are employed in many empirical studies that deal with banking performance (*see*: Chortareas et al., 2013; Dutta & Williamson, 2016; Gropper et al., 2015; Tanna et al., 2017). A country's economic freedom can impact bank liquidity creation through banking competition. However, the impact can be divided into two opposing views: positive and negative. Additionally, economic freedom can affect liquidity creation through the interest rate. A country's monetary policy, manifested mainly by the interest rate, significantly impacts bank liquidity

creation. Monetary policy has been dealt with the most in many theoretical and empirical studies (*see*: Berger & Bouwman, 2017; Dang & Dang, 2021; Yeddou & Pourroy, 2020). However, no consensus has been reached on the impact of economic institutions (economic freedom and monetary policy) on bank liquidity creation since the result varies according to bank size and crisis-time variance. Considering the samples used in this study, which are mainly developing countries, more regulations may be needed rather than freedom in the market. Thus, the current study proposes a second sub-hypothesis as follows:

*H<sub>1b</sub>: Economic institutions have an inverse impact on banks' liquidity creation.*

Regulatory institutions such as those responsible for regulatory monitoring, intervention, and capital and liquidity requirements play an important role in bank liquidity creation (Bouwman, 2018). Many studies have found a negative impact of regulatory intervention (*see*: Berger et al., 2016; Bouwman, 2018). Regulatory intervention can reduce portfolio risk: a bank may reduce risky lending activities and bank liquidity creation to adjust its portfolios (Berger et al., 2016). Bouwman (2018) empirically supports the negative impact of regulation through a finding that restrictions on lending activities significantly reduce bank liquidity creation, which is consistent with Berger et al.'s (2016) results. The latter use a sample of German banks and find that regulatory interventions such as restrictions on deposit taking, lending activities, profit distribution, business activities, and managerial decisions decrease liquidity creation. Consistent with previous research, Kladakis et al. (2021) find that banks in countries with greater official supervisory power create more liquidity, whereas those with tighter capital regulations, more activity restrictions, and more robust, private monitoring create less liquidity. Increased activity restrictions may prevent banks from diversifying their portfolios and taking advantage of the synergy effect from complimentary activities. However, the literature has been inconclusive on the impact of regulatory institutions. For instance, as an opposite view, those who support a positive impact of regulation argue that when banks are restricted from engaging in risky and new activities, they engage in and focus more on their core objectives, such as liquidity creation, to generate profits (Kladakis et al., 2021). The sample countries used in this study are mainly developing countries; thus, more regulations seem necessary to increase bank liquidity creation. A sub-hypothesis for liquidity creation is proposed as follows:

*H<sub>1c</sub>: Regulatory institutions have a positive impact on banks' liquidity creation.*

According to the political economy and new institutional economics (NIE) theories, God's law, manifested by the Holy *Quran* and *Sunnah*, provides the rationale behind Islamic economics and finance (Haqqi, 2015). Thus, an appropriate Islamic institutional environment is necessary for Islamic banks to perform well. Although few, some empirical studies examine the impact of Islamic environments on Islamic banking performance and use conventional banks in their comparative analyses. Bitar et al. (2017) investigated the influence of a country's political and legal systems on the financial soundness of both banking systems. They found that Islamic banks performed better under a hybrid and *shariah*-based legal system than under a conventional, democratic political system. This finding is consistent with that obtained by Asutay and Sidek (2020), who found that Islamic banks' performance was negatively affected under a conventional regulatory system due to the latter system's unfavourable conditions. The latter two studies empirically support the political economy and new institutional economics (NIE) theories. However, both studies compare a political system (democratic system) with a legal one or use only a conventional political system. Moreover, there is a lack of research on Islamic banks' liquidity creation. The current study aims to fill the research gap by investigating liquidity creation using both conventional and Islamic institutions. Consequently, the last sub-hypothesis for liquidity creation is proposed as follows:

*H<sub>1d</sub>: Islamic institutions have a positive impact on Islamic banks' liquidity creation.*

### **4.3. Methodology**

#### **4.3.1. Introduction**

To examine the impact of institutional environments, including political, economic, regulatory, and Islamic, on banks' liquidity creation, this study employs a two-stage empirical approach. In the first stage, each bank's liquidity creation is measured, and in the second stage, a panel regression analysis is performed to identify the relationship between institutions and bank liquidity creation. This chapter includes the measurements of liquidity creation employed in the previous literature, introduces the most widely used measurement, and specifies the method employed in this study. The empirical model for the study, sample, variables, and data follow.

#### **4.3.2. Liquidity creation measurement**

Bank liquidity creation is considered to be a more comprehensive measure of bank output than other commonly used measures, such as total assets or gross total assets (Berger et al.,

2019). However, despite the importance of bank liquidity creation, empirical research on this issue remains scant. One of the reasons for this is a lack of liquidity creation measures. In contrast to studies on capital regulation, in which there is a consensus on capital measurement, those on liquidity regulation have little consensus due to the difficulty of the measurements (Bai et al., 2018). Historically, bank liquidity creation has been measured using conventional ratios such as loan to asset or cash and related liquid items to total asset ratios (Baltas et al., 2017). However, these measures have been criticised because they do not consider banks' comprehensive liquidity creation mechanisms and the development of market conditions (Baltas et al., 2017).

Consequently, there have been attempts to construct liquidity creation measurements. Deep and Schaefer (2004) constructed a liquidity transformation measurement and applied it to US bank data. However, this measurement has also been criticised because it also does not consider off-balance-sheet activities, which are essential for creating banks' liquidity. Moreover, it is only based on maturity (Baltas et al., 2017).

Berger and Bouwman (2009) constructed a more comprehensive measurement that dealt with both on- and off-balance sheet activities. Following the development of this measurement, empirical research on the issue of bank liquidity creation has been expanded and increased. Most empirical studies on liquidity creation use the measurement or a slightly modified version (Berger et al., 2019; Chartterjee, 2015; Dang & Dang, 2021; Diaz & Huang, 2017; Jiang et al., 2019; Safiullah et al., 2020; Yeddou & Pourroy, 2020). The current study also employs the Berger and Bouwman (2009) measurement for each bank's liquidity creation. An in-depth explanation of this measurement follows.

In response to the 2008 financial crisis, Basel III imposed liquidity requirements at the international level in December 2010: the LCR and NSFR (Roberts et al., 2018). These requirements are used to measure banks' liquidity positions. In addressing the shortcomings of Basel I and II, Basel III required higher-quality capital and introduced liquidity ratios (Bouwman, 2018). However, these requirements were not enforced on all banks, and were instead proposed to be implemented gradually from 2015 (Mohammad et al., 2020).

Later, Brunnermeier et al. (2012) and Bai et al. (2018) developed and implemented the liquidity mismatch index (LMI). According to Brunnermeier et al.'s (2012) definition, the LMI measures the mismatch between the market liquidity of assets and the funding liquidity of liabilities (the liquidity on the asset side minus the funding liquidity on the liability side).

A distinctive feature of the LMI is that it can be used not only for the measurement of banks' liquidity creation (*see*: Roberts et al., 2018), but also for banks' liquidity risk using stress test analysis (*see*: Bai et al., 2018; Brunnermeier et al., 2012).

The most significant difference between the LMI, LCR, and Berger and Bouwman (2009)'s measure lies in the weighting of liquidity and categorisation of balance sheet items. The liquidity weights for the three measures are based on the market price, pre-specified by the researcher and regulator's preference, (Roberts et al., 2018). While the LMI is calculated based on time-varying weights that incorporate market conditions and repo haircuts, Berger and Bouwman (2009)'s measure is based on fixed weights (Bouwman, 2018). Moreover, the LMI can provide a more macroprudential outlook (Bai et al., 2018). Consequently, the LMI can be used to examine banks' liquidity risk using stress test analysis (Bai et al., 2018) (Brunnermeier et al., 2012). In their empirical study, Roberts et al. (2018) employ the LMI as a liquidity creation measure to examine the impact of the LCR on banks' liquidity creation using US banks from 2009 to 2017. Additionally, Bai et al. (2018) use the LMI to examine banks' liquidity risk, and find that larger and more profitable banks tend to be exposed to more liquidity risk, whereas banks with higher capital and lower leverage face less liquidity risk. However, this measure is more appropriate for the measurement of liquidity risk since the aim of the LMI is to identify bank's exposure to liquidity risk (Bouwman, 2018).

#### **4.3.2.1. Berger and Bouwman (2009)'s measurement**

The current study mainly employs Berger and Bouwman (2009)'s and Berger et al. (2019)'s measures for liquidity creation. Berger and Bouwman (2009)'s bank liquidity creation measure is currently the most popular in many empirical studies (*see*: Jiang et al., 2019; Nguyen et al., 2020). This method comprehensively measures liquidity creation by including off-balance sheet activities. Considering the fact that banks also produce liquidity through off-balance sheet activities such as loan commitments and other claims to liquid funds (Baltas et al., 2017), it is important to include such activities. Berger and Bouwman (2009)'s measure entails a three-step procedure. In the first step, they classify all banks' assets, liabilities, equity, and off-balance sheet activities into liquid, semi-liquid, and illiquid. This classification is based on the ease, cost, and time for customers and banks to obtain funds and dispose of their obligations to meet their liquidity demands.



**Table 20: Berger and Bouwman (2009)'s bank activity classification**

<b>Assets</b>		
<b>Illiquid Assets (weight = 1/2)</b>	<b>Semiliquid Assets (weight = 0)</b>	<b>Liquid Assets (weight = -1/2)</b>
Residential Mortgage Loans (Low-income Countries)	Residential Mortgage Loans (High-income Countries)	Reserve Repos and Cash Collateral
Other Consumer / Retail Loans (Low-income Countries)	Other Consumer/Retail Loans (High-income Countries)	Trading Securities and at FV through Income
Other Mortgage Loans	Loans and Advances to Banks	Available for Sale Securities
Corporate and Commercial Loans ( <i>Mudaraba, Musharaka, Murabaha</i> )		Held to Maturity Securities
Other Loans		At-equity Investment in Associates
Investment in Property		Other Securities
Other Earning Assets		Cash and Due from other Banks
Foreclosed Real Estate		Insurance Assets
Fixed Assets ( <i>Ijara</i> )		
Goodwill		
Other Intangibles		
Current Tax Assets		
Deferred Tax Assets		
Discontinued Operations		
Other Assets		
<b>Liabilities and Equity</b>		
<b>Liquid Liabilities (weight =1/2)</b>	<b>Semiliquid Liabilities (weight =0)</b>	<b>Illiquid Liability and Equity (weight=-1/2)</b>
Customer Deposits ( <i>Amanah, Mudaraba and Musharaka</i> )	Other Deposits and Short-Term Borrowing	Senior Debt Maturing after 1 Year
Deposits from Banks		Subordinated Borrowing
Repos and Cash Collateral		Other Funding
Trading Liabilities		Fair Value Portion of Debt
		Credit Impairment Reserves
		Reserves for Pensions and Other
		Current Tax Liabilities
		Deferred Tax Liabilities
		Other Deferred Liabilities
		Insurance Liabilities
		Other Liabilities
		Pref. Shares and Hybrid Capital accounted for as Debt
		Pref. Shares and Hybrid Capital accounted for as Equity
		Common Equity
		Non-controlling Interest
		Securities Revaluation Reserves
		Foreign Exchange Revaluation Reserves
		Fixed Assets Revaluation and other Accumulated OCI
<b>Off-balance Sheet</b>		
<b>Illiquid Guarantees (weight = 1/2)</b>	<b>Semiliquid Guarantees (weight =0)</b>	<b>Liquid Guarantees (weight =-1/2)</b>
Guarantees	Other Off-Balance Sheet Exposure to Securitizations	(Prohibited by <i>Gharar</i> )
Acceptances and Documentary Credits Reported Off-Balance Sheet		
Committed Credit Lines		
Other contingent Liabilities		

In the second step, they assign weights to all the activities classified in the first step, which process is based on the liquidity creation theory. According to the theory, maximum liquidity is created when illiquid assets are transformed into liquid liabilities. In contrast, maximum liquidity is destroyed when liquid assets are transformed into illiquid liabilities or equity. Consequently, a weight of  $\frac{1}{2}$  is assigned to illiquid assets and liquid liabilities, while  $-\frac{1}{2}$  is assigned to liquid assets and illiquid liabilities. Last, they assign the intermediate weight of 0 to semi-liquid assets and liabilities and apply the same logic to off-balance-sheet guarantees and derivatives. The reason for assigning  $\frac{1}{2}$  is because half of the total amount of liquidity creation is attributable to the source and use of funds (Berger et al., 2019). For example, transforming \$1 of customer deposits (liquid liabilities) into \$1 of corporate and commercial loans (illiquid assets) creates \$1 of liquidity for the public (Berger et al., 2019).

The third step constructs the four liquidity creation measures by combining the activities (a dollar amount) classified in the first step and weights assigned in the second step.

*Liquidity Creation = Asset-side liquidity creation +*

*Liability-side liquidity creation +*

*Off-balance sheet liquidity creation*

*Liquidity Creation = [1/2\*illiquid assets + 0\*semiliquid assets – 1/2\*liquid assets] +*

*[1/2\*illiquid liabilities + 0\*semiliquid liabilities – 1/2\*liquid liabilities – 1/2\*equity] +*

*[1/2\*illiquid guarantees + 0\*semiliquid guarantees – 1/2\*liquid guarantees]*

Their measurements are classified into four categories based on whether loans are category-based (*cat*) or maturity-based (*mat*), and whether off-balance activities are included (*fat*) or not (*non-fat*). Of these categories, Berger and Bouwman (2009) prefer the *cat-fat* measurement, and contend that the maturity-based measure is a worse indicator than the category-based one, considering the time, cost, and ease for banks to obtain liquid funds when needed. Additionally, this is because loan maturity is relatively less important than a bank's function to securitise and sell loans (Nguyen et al., 2020). Consequently, many empirical studies follow the category-based measure and include off-balance activities (Diaz & Huang, 2017; Nguyen et al., 2020). The current study also adopts the *cat-fat* measure, including off-balance sheet activities.

Additionally, this study adopts the measurement used by Berger et al. (2019), which involves cross-country analysis by considering different levels of capital market development. This

measurement compensates for the limitation in Berger and Bouwman (2009)'s measure, which is designed for application to US banks. Based on the different levels of capital market development, some assets can be semi-liquid for banks in high-income countries and illiquid for those in low-income countries (Berger et al., 2019). Additionally, while Berger and Bouwman (2009) use the gross fair values of derivatives, the Bankscope (Bankfocus) database does not include fair value. Thus, Berger et al. (2019) exclude derivatives in the international bank liquidity creation data. Moreover, Berger et al. (2019)'s measure is designed for Islamic banks' balance sheets as it includes various Islamic underlying instruments throughout on- and off-balance sheet activities, and excludes liquid guarantees due to the *gharar* issue. Since the current study employs cross-country analysis from the Bankscope (Bankfocus) database and Islamic bank samples, Berger and Bouwman (2009)'s and Berger et al., (2019)'s measures are the most appropriate.

Islamic banks collect various forms of deposits, including investment deposits offering an ex-post profit rate. All the deposits offered by the Islamic banks have different underlying Islamic contracts, which have been originated from the sources of *Shariah*. However, unlike conventional banks, Islamic banks offer various types of profit-loss based financing (alternative to interest-based loans) products, which are again tied to various Islamic contracts. Islamic banks do not deal with interest within a banking operation, and Islamic banks do not offer loans in the same way as conventional banks (Johnes et al., 2014). Gross financing amount in Islamic banks include both equity- and debt-based Islamic products. Thus, Islamic bank uses different terms for gross loans. For instance, CIMB Islamic bank berhad uses 'financing advances and other financing/loans', and Bank Islamic Malaysia uses 'financing, advances and others' in their annual reports. However, most international bank databases, including Bankfocus and Fitchconnect use the common template and generic terms in compiling and publishing financial statement data for all banks, including conventional and Islamic banks. Nevertheless, the total amount reported in the international bank database and each bank's annual report is equitable considering the exchange rate. Hence the current study uses internationally recognized data terminologies and formats.

Following the previous literature (Berger et al., 2019; Jiang et al., 2019; Roberts et al., 2018), the current study normalises the liquidity creation measures by each bank's total assets. This is to ensure comparability of the liquidity creation measures with those of other banks (Jiang et al., 2019) and to prevent the domination of the largest banks in the regression results (Berger et al., 2019).

### 4.3.3. Econometric modelling

To investigate the impact of institutional environments on bank liquidity creation, this study adopts a two-stage empirical approach: the first stage measures liquidity creation as a dependent variable; the second stage conducts a regression analysis to identify the relationship between institutional environments and bank liquidity creation.

#### 4.3.3.1. Empirical model

For the second stage analysis, following Asutay and Sidek's (2020) empirical model, the current study employs a fixed-effects panel regression model. Since the current study uses institutional variables that vary within each country, the degree of autocracy and democracy varies with each sample country. The use of the fixed-effects approach is more appropriate since it controls for country-specific, time-invariant traits that are not accounted for by the control variables (Asutay & Sidek, 2020). Additionally, this study conducted the F-test, which determined that the more suitable model for the dataset between the pooled OLS and fixed-effects models was the latter. Furthermore, the Hausman test that was conducted determined that the more appropriate panel data model between the random- and fixed-effects models was the latter.

The main empirical model to test the impact of institutional environments on bank liquidity creation is as follows:

$$H_{1a}: \text{Liquidity creation}_{it} = \alpha_{it} + \beta_1 \text{Political institutions}_{it} + \beta_2 \text{Controls}_{it} + \varepsilon_{it}$$

$$H_{1b}: \text{Liquidity creation}_{it} = \alpha_{it} + \beta_1 \text{Economic institutions}_{it} + \beta_2 \text{Controls}_{it} + \varepsilon_{it}$$

$$H_{1c}: \text{Liquidity creation}_{it} = \alpha_{it} + \beta_1 \text{Regulatory institutions}_{it} + \beta_2 \text{Controls}_{it} + \varepsilon_{it}$$

$$H_{1d}: \text{Liquidity creation}_{it} = \alpha_{it} + \beta_1 \text{Islamic institutions}_{it} + \beta_2 \text{Controls}_{it} + \varepsilon_{it}$$

#### 4.3.3.2. Sub-sample analysis

The current study conducts several sub-sample analyses: 1) conventional versus Islamic banks sample; 2) low- and high-liquidity creation banks; 3) low- and high-corruption countries; and 4) low- and high-income countries. To split samples, this study uses the median. The median is widely used for subsample analysis. For instance, Doidge et al. (2007) examine the impact of country characteristics such as legal protection and economic and financial development on corporate governance and transparency. They split the sample according to sample countries' degrees of economic development using the above- and below-median GNP per capita and GDP ratios. In the liquidity creation literature, Berger et al.

(2016) employ the median equity ratio to examine the impact of regulatory intervention and capital support on German banks' liquidity creation; specifically, whether unhealthy banks react more to the impact. Shu-Chun et al. (2018) also employ subsample analysis using the median capital ratio to examine the impact of CEO optimism on US bank liquidity creation. Moreover, when the sample is split into conventional and Islamic banks and their liquidity creation is compared, the components of liquidity creation between the two banking types are not considered. The ultimate results of liquidity creation are only considered since the overall objective of intermediary theory is the same between the two banking types, while the operating system and components of the balance sheet in the two banking types differ. Sample splitting according to countries' income statuses in cross-country analysis is widely used to investigate the impact of specific factors on different development levels (*see*: Ashraf, 2017; Berger et al., 2019).

#### **4.3.3.3. Robustness test**

Firstly, to confirm the initial result, the current study conducts regression analysis using alternative institutional factors. Regarding political institutions, this study employs the *democracy* score from the Polity IV database to substitute for the *polity 2* scores. Polity IV's six polity component variables and three concept variables constitute the degrees of democracy (*democ*) and autocracy (*auto*), ranging from fully democratic (+10) to fully autocratic (-10). Thus, the *democracy* score denotes the extent to which a country is democratic. Many studies on the impact of political institutions use this variable (*see*: Acemoglu et al., 2019; Asutay & Sidek, 2020; Slesman et al., 2019).

For economic institutions' alternative variables, following Berger et al. (2019), this study uses the *lending interest rate* as an alternative variable for the *short-term interest rate*. Financial liberalisation or freedom is one component of economic liberalisation, which means an 'economy's banking system effectiveness as well as independence from government control and interference in the financial sector' (Chortareas, Girardone, & Ventouri, 2013, p.1230). However, the terms 'economic liberalisation' and 'financial liberalisation' are used interchangeably in many studies, as economic liberalisation usually encompasses financial liberalisation. Thus, the current study employs the *financial freedom* from the Heritage Foundation's Index of Economic Freedom to substitute for the *overall economic freedom* index. Many empirical studies utilise the Heritage Foundation's Index of Economic Freedom (*see*: Chortareas et al., 2013; Cubillas & ález, 2014).

Following the existing empirical studies that examine the impact of regulatory intervention on the banking sector using supervisory power, market discipline, and activity restrictions (*see: Agoraki et al., 2011; Barth et al., 2013; Pasiouras et al., 2009*), the current study uses *Supervisory power* and *Market discipline* as alternatives for the regulatory institutional variable (*activity restrictions*). Last, the *Islamicity overall* index proxies for Islamic institutions (*Islamic political, economic, and legal institutions*). This index assesses a country's overall Islamicity level, including the extent to which the country reflects Islamic economic, political, legal, social, human, and governance values.

Secondly, propensity score matching (PSM) is employed to address the imbalance between the two banking types (conventional and Islamic banks), which might produce a biased result. Islamic banks are much fewer than conventional banks. Propensity score matching (PSM) provides a better comparison between conventional and Islamic banks by providing the quality of the match between two groups (treatment and control groups), where Islamic banks are the treatment group and conventional banks the control group. The propensity score matching (PSM) method is conducted to compare the treatment group's outcomes to those of the control group. Thereafter, a comparison between Islamic and conventional banks is conducted based on the matched sample. This study utilises the propensity score matching with common support and this study employs GDP growth, inflation rate, unemployment rate, total assets, equity to total asset, Lerner index, and non-performing loans as controls. To conduct propensity score matching (PSM), this study creates an Islamic bank dummy, which assumes a value of 1 for Islamic banks and a value of 0 for conventional banks. Then, the logit model is estimated where the Islamic bank dummy is regressed on the control variables used in the baseline model and the year-fixed effects (Bitar et al., 2017). Many empirical studies that compare conventional and Islamic banking performance use propensity score matching (PSM) (*see: Bitar et al., 2017; Berger et al., 2019*).

Lastly, the endogeneity test is conducted. The current study first determines whether an endogeneity problem exists in the research model. Endogeneity is among the issues of concern in regression analysis in many fields of study. Roberts and Whited (2013, p.493, cited in Abdallah et al., 2015) defined endogeneity as a 'correlation between the explanatory variables and the error term in a regression'. Endogeneity can arise for several reasons. First, it can arise due to the omission of explanatory variables in a regression model, which leads to correlation with the error term, which is a violation of one of the assumptions of OLS regression analysis since the impacts of the omitted variables can be found in the error term

(Wooldridge, 2010). Additionally, it can occur as a result of dependent variables either being influenced by one or several explanatory variables or simultaneously impacting one or more of the explanatory variables (Abdallah et al., 2015; Ullah et al., 2021). Last, it can also arise when the past values of a dependent variable influence its current values (Ullah et al., 2021).

To determine whether there is an omission of variables, the current study conducted the Ramsey RESET test. The Ramsey RESET test is a widely used test to detect endogeneity problems in an empirical model, particularly those arising from omitted variables and model misspecification such as inappropriate functional form (Stock & Watson, 2003). This method was first proposed by Ramsey in his 1969 study (Clements & Hendry, 2002; Ramsey, 1969). The p-value of the test was significant, rejecting the null hypothesis that the model had no omitted variables. This meant that there was an omitted variable problem in the research model.

The endogeneity checks above determined that there was an endogeneity issue in the research model. Thus, the current study adopted the two-stage least square (2SLS) method to address the issue. Two-stage least square (2SLS) is among the popular methods for using instrumental variables. Instrumental variables are not correlated with the error term; instead, they are correlated with the endogenous explanatory variables (independent variables) and should be exogenous (Ullah et al., 2021). Using an instrumental variable is common for addressing endogeneity problems, particularly for cross-sectional and panel datasets (Bascle, 2008; Sargan, 1958, cited in Ullah et al., 2021). However, finding and selecting appropriate and strong instrumental variables can be challenging (Abdallah et al., 2015). Irrelevant or inadequate instrumental variables may lead to a worse and biased result (Bettis, Gambardella, Helfat, & Mitchell, 2014, cited in Ullah et al., 2021).

First, to select appropriate, valid, and strong instrumental variables, the current study refers to theories and the literature to find exogenous and instrumental variables that are strongly related. *Regime durability* is used for political institutional variables, *democracy* and *polity 2*, as one of their components. As instrumental variables for interest rates, different interest rates are used. *Property rights*, *government integrity*, and *government spending* are used for the *economic freedom* index. The *capital adequacy ratio* is employed as an instrumental variable for regulatory institutions. For Islamic institutions, the *Muslim population* and *corruption rate* are used. This is because Islamic institutional variables, particularly political variables such as democracy, are closely related to corruption. Corruption can be reduced and suppressed with the appropriate implementation of law and order, which is one institutional outcome of

democracy (Asutay & Sidek, 2020). Barro (1999) examines the determinants of democracy using the political corruption variable. Conversely, Rivera-Batiz (2002) examines the impact of democracy on the quality of governance, including corruption in a country. The latter study finds that the quality of governance tends to be higher in more democratic countries. This is because democratic institutions play the role of constraining corrupted officials' actions. As seen above, many empirical studies examine the close relationship between democracy and corruption in both directions. Consequently, it may be concluded that the two are closely related, irrespective of direction.

#### **4.3.4. Sample**

The empirical analysis includes 584 banks (468 conventional and 116 Islamic banks) from 18 countries for the period 2000 to 2020. Countries in which both conventional and Islamic banks operate (and where there are more than two Islamic banks for a more accurate comparison) are chosen for a reliable comparison of conventional and Islamic banks. Sudan and Iran are excluded from the sample since they both only have an Islamic banking system. Data availability and the need for consistency limit the sample choice in this study. Furthermore, following Berger and Bouwman (2009), this study excludes banks that do not have commercial loans and deposits. For data consistency, this study attempted to collect data from the same source (Bankfocus and Fitchconnect) as much as possible. Appendix 5 shows all sample banks included, sorted by country.

#### **4.3.5. Variables and data**

##### **4.3.5.1. Institutional variables**

Many empirical studies employ political institutional variables to examine their impact on various economic and financial outcomes, such as corporate and bank performance and risk-taking behaviour (*see*: Agoraki et al., 2019; Ashraf, 2017; Jackowicz et al., 2013). The definition and classification of political institutions vary across studies. For instance, Beck et al. (2001) employ the Database of Political Institutions (DPI), which contains 108 variables, including the following: elections; electoral rules; type of political system; party composition, along with the checks-and-balances system; and political stability as a political institutional variable, since they recognise that the fundamental characteristics of a political system are the relationship between the executive and legislative branches and competitiveness of elections. Persson (2002) acknowledges that political institutions have many dimensions, and argue that the central role of a constitution is to guide the decision on how control rights over policy are



achieved and exercised. Similarly to Beck et al. (2001), Persson (2002) employs electoral rules and political regimes, since electoral rules and legislation are closely associated with the form of government (regime type), as important political institutional variables. Additionally, Hielscher and Markwardt (2012) use the stability and effectiveness of government, bureaucratic system, democratic accountability, and the rule of law to assess institutional quality. Similarly, Lee and Lin (2016) find that political stability is important for insurance companies' performance and risk-taking behaviour. They find that insurance companies perform better in the presence of stable political institutions. In contrast to Hielscher and Markwardt (2012), Hearn (2014) employs political risk, along with democratic accountability, as a political institutional variable, and its impact on firms' liquidity. Among the various political institutional variables, many empirical studies employ the type of government or democracy score. Rodrik (1999, cited in Klomp & Haan, 2009) uses democracy and finds its positive role in handling economic shocks. Klomp and Haan (2009) employ government and political stability and examine the relationship between these political institutional variables and economic volatility. They find that while democracy plays an important role in reducing economic volatility, political instability and policy uncertainty increase economic volatility. Boubakri et al. (2013) employ Henisz's (2010) political constraints index, according to which greater political constraints mean stronger political institutions.

As shown in the various studies above (*see*: Beck et al., 2001; Boubakri et al., 2013; Hearn, 2014; Hielscher & Markwardt, 2012; Klomp & Haan, 2009; Lee & Lin, 2016; Persson, 2002), although some diverse standards and criteria define the political institution, the most commonly used political institutional variables are the type of government (democracy or autocracy), election-related institutional variables, and political stability.

The current study uses the Polity IV database, one of the popular datasets for political institutional research, to capture the type of government. Many studies employ this variable (*see*: Flachaire et al., 2014; Giavazzi & Tabellini, 2005; Glaeser et al., 2004; Persson & Tabellini, 2006) to examine the impact of political institutions as well as to identify the interaction effects between institutions. Polity IV comprises six polity components and three concept variables, which constitute the degrees of democracy (*democ*) and autocracy (*auto*), ranging from fully democratic (+10) to fully autocratic (-10). The component variables are as follows: the regulation of chief executive recruitment (*xrreg*); the competitiveness of executive recruitment (*xrcomp*); the openness of executive recruitment (*xropen*); executive constraints (*xconst*); the regulation of participation (*parreg*); and the competitiveness of

participation (*parcomp*). The concept variables, which are alternatives to and are compatible with the components variables, are as follows: the executive recruitment (*exec*), executive constraints (*exconst*), and political competition concepts (*polcomp*). This study adopts the *polity 2* score for a political institution, which is the revised combined *polity* score that subtracts the *auto* from *democ*, and *democ* (degree of democracy) as alternative variables. This score aims to capture a country's overall political institutions. As can be seen from the theory section on institutions and banks, political institutional variables, particularly democratic institutional variables such as the check-and-balance system and electoral rules or political regime, are closely related to economic and regulatory institutional variables. Thus, Polity IV is most appropriate since it comprehensively covers democratic institutional variables, including regime types.

The current study employs two economic institutional variables: the economic freedom index and interest rate. Economic freedom is a popular economic institutional variable in contemporary research (*see*: Bennett et al., 2017; Chortareas et al., 2013; Cubillas & ález, 2014; Sufian & Habibullah, 2010). The *overall economic freedom* and *financial freedom* indexes are used in the current study, and are obtained from the Heritage Foundation's Index of Economic Freedom. Many studies on economic institutions and freedom use this database (*see*: Bennett et al., 2017; Chortareas et al., 2013; Cubillas & ález, 2014; Sufian & Habibullah, 2010). The Heritage Foundation's Index of Economic Freedom covers various freedoms in 186 countries. Freedom is measured using 12 components: property rights, government integrity, judicial effectiveness, government spending, tax burden, fiscal health, business freedom, labour freedom, monetary freedom, trade freedom, investment freedom, and financial freedom. Remarkably, this database has a financial freedom index, which distinguishes it from other databases. Thus, some studies have employed these financial freedom data from the Heritage Foundation (*see*: Choartareas et al., 2013).

The most popular monetary policy variable regarding bank liquidity creation is the interest rate (*see*: Berger et al., 2019; Chen et al., 2007; Dang & Dang, 2022; Gloker & Towbin, 2015). This rate affects not only on-balance sheet but also off-balance-sheet activities. The second most popular monetary policy variable is the federal funds rate, particularly for research on US banks (*see*: Berger & Bouwman, 2017; Chatterjee, 2015). Alternatively, the reserve requirements rate is used as a supplementary monetary policy variable, especially in emerging market research (*see*: Chen et al., 2017; Gloker & Towbin, 2015; Nguyen & Boateng, 2015). While central banks in advanced economies use the interest rate as the main

policy instrument, in emerging markets, a non-interest rate variable such as the reserve requirements rate is used as a complement or supplement to the interest rate. Central banks in emerging countries are reluctant to change and adjust interest rates to avoid either capital inflow or capital flight. During a credit boom, raising interest rates to curtail the boom might stimulate more capital inflows and currency appreciation (Chen et al., 2017; Federico et al., 2014; Glocker & Towbin, 2015). Thus, to avoid an unnecessary appreciation and depreciation of their currency, emerging and developing countries employ alternative monetary policies to manage their credit conditions. The reserve requirements rate can affect bank liquidity creation since it affects the quantity of banks' lending. As a result of increased reserve requirements, credit volumes may decline. By keeping a minimum percentage of deposits as reserves, banks cannot use this source to provide credit or buy securities (Glocker & Towbin, 2015). Empirically, Glocker and Towbin (2015) find a decrease in credit due to an increase in the reserve requirements rate. The current study employs the interest rate (*short-term and lending interest rates*) data obtained from the World Development Indicators, International Financial Statistics, and Fitchconnect databases. The selection of interest rates follows previous studies (*see*: Berger et al., 2019; Dang & Dang, 2021).

For regulatory institutions, many empirical studies examine the impact of regulatory intervention on liquidity creation using various variables. For instance, Berger et al. (2016) employ regulatory intervention variables: restrictions and prohibition on deposit taking, lending activities, and profit distribution. Additionally, Kladakis et al. (2021) employ the regulatory intervention variable from the Bank Regulation and Supervision Survey by the World Bank, the most widely used regulatory intervention variable (*see*: Mohammaed & Asutay 2020).

As additional regulatory variables, the capital and liquidity requirements imposed by Basel III have increasingly been used. The ultimate roles of capital and liquidity requirements differ. While capital requirements deal with asset-substitution risk by stipulating that a fraction of a bank's liabilities be in the form of equity, liquidity requirements deal with the withdrawal risk on the liability side by stipulating that the bank hold a fraction of its assets as cash or deposits with the central bank (Bouwman, 2018). Especially since the subprime crisis, the importance of liquidity requirements has been growing. Whereas before the crisis, bank regulation tended to be microprudential, focusing on individual banks' regulation and capital requirements, macroprudential regulation emphasising country-level liquidity requirements became important following the crisis (Bouwman, 2018). In their empirical study, Roberts et

al. (2018) examine the liquidity creation per unit of assets by banks in relation to the LCR using the LMI and Berger and Bouwman (2009)'s measure. They find that banks subject to the LCR requirement tend to have reduced liquidity creation.

However, due to the difficulty and constraints in obtaining data, confidentiality and incomplete disclosure by banks, and limited-time coverage of data (Bandt et al., 2021; Zhang et al., 2020), using the Basel III requirements is not adequate. Consequently, most studies that examine the impact of liquidity requirements and liquidity creation focus on other proxies for the liquidity ratios, such as the deposits to loans ratio (*see*: Tabak et al. 2010 cited in Bandt et al., 2021), or a country's specific alternative measurements (*see*: Bandt et al., 2021). Moreover, the current literature that employs the requirements tends to be limited in some countries with extensive disclosure and better data availability, such as the US (Berger et al., 2016). Considering the sample countries of this study, which are mainly developing countries, data availability and open data sources are issues of concern.

Alternatively, numerous studies use regulatory intervention variables constructed based on the World Bank's Bank Regulation and Supervision Survey (*see*: Chortareas et al., 2012; Kladakis et al., 2021; Pasiouras et al., 2009). Four of the regulatory variables are 1) bank system capital adequacy ratio, 2) supervisory power, 3) activity restrictions and 4) market discipline. The capital adequacy ratio is the ratio of a bank's capital to risk, or the ratio of the bank's capital to its risk-weighted credit exposures. For this study, the capital adequacy ratio was obtained from the Fitchconnect database. Regulatory capital and capital requirement reforms are important variables that influence liquidity creation; consequently, many recent studies have investigated the impact of these variables (*see*: Bowe et al., 2019). Supervisory power represents the level of power held by supervisors or supervisory authorities. Activity restrictions measure the level of restrictions on a bank's activities, especially on securities, insurance, real estate, and ownership of non-financial firms. Enforcement action is discussed at length in a recent study on banks' liquidity creation (*see*: Nguyen et al., 2020). Market discipline is an indicator that measures the degree to which banks are allowed to disclose their off-balance sheet items and risk management procedures to the public, and whether certified auditors are mandatory within a bank. The current study employs the *Activity restriction*, *Supervisory power*, and *Market discipline* variables, based on the World Bank's Bank Regulation and Supervision Survey's relevant questions. The questions differ slightly depending on the version. However, the current study draws from studies that construct a regulatory index based on the World Bank's Bank Regulation and Supervision Survey (*see*:

Ashraf, 2017; Barth et al., 2013; Djalilov & Piesse, 2019; Luo et al., 2016; Pasiouras et al., 2009). In our study, the variables are constructed using the different versions as follows: version 1 (the 2001 database), version 2 (the 2003 database), and version 3 (the 2007 database) for 2000-2009; version 4 (the 2011 database) for 2010-2014; and version 5 (the 2019 database) for 2015-2020.

For Islamic political, economic, and legal institutions, this study employs the Islamicity index. The Islamicity index covers diverse areas of a society (economic, political, governance, legal, and international aspects). The *Islamicity index* was constructed by the Islamicity Foundation, a non-profit corporation in the US comprising diverse country partners, specialists, and *shariah* scholars. The index assesses a country's Islamicity level: the extent to which the country reflects Islamic economic, political, social, human, and governance values, and how they conform to the teachings of the Holy *Quran*. Thus, this index serves as a benchmark to assess Islamic compliance in a country. The index comprises five elements: the *overall Islamicity score*; *economy*; *legal and governance*; *human and political rights*; and *international relations*. However, the index does not measure personal religiosity, such as 'belief commitment, daily prayers, fasting and pilgrimage' (Askari & Mohammadkhan, 2016). Instead, it assesses Islamic values and *society's* adherence to those values. Annually, 151 countries, including Muslim-minority countries, are scored and ranked. The index is reported every five years until 2015, and annually thereafter, with scores that range from 0 to 10 (0 is highly un-Islamic and 10 is highly Islamic). Although using the index is challenging and has been criticised, there has not been any attempt to examine the impact of the Islamic environment on Islamic banks' liquidity creation and risks. Thus, such a study would be worthy.

#### **4.3.5.2. Control variables**

To control for other factors in bank liquidity creation, bank-, industry- and country-level control variables are employed. The selection of control variables follows previous studies.

As bank-level variables, the natural logarithm of banks' *total assets* is used. This variable is widely used to control for bank size (*see*: Ashraf, 2017; Asutay & Sidek, 2020; Bitar et al., 2017). From a liquidity creation perspective, Berger et al. (2019) and Nguyen et al. (2020) employ the logarithm of gross total assets as a control variable. Moreover, the ratio of *equity to total assets* is used to control for a bank's capital, also a widely-used variable (*see*: Chortareas et al., 2013; Tanna et al., 2017; Tanna et al., 2011). Capital is an important

variable that affects liquidity creation. This is because an insufficient level of bank capital can hinder the ability of banks to create liquidity (Nguyen et al., 2020). Thus, many studies use the impact of capital either as a control variable or as an independent variable. For instance, Berger (2017) uses capital requirements as a control variable, while Berger et al. (2019) use banks' equity to gross total assets. Nguyen et al. (2020) use the ratio of equity to total assets. *Return on average assets (ROAA)* is used in this study. Banks' profitability from liquidity creation is widely used in the literature (*see*: Nguyen et al., 2020). Last, *non-performing loans (NPLs)* are used as a variable in this study. NPLs are often used to measure credit risk in banking areas (Nguyen et al., 2020). Credit risk can affect banks' ability to create liquidity by isolating the effect of banks' capital and reducing the role of banks' risk transformation function (Nguyen et al., 2020). All bank-level variable data were obtained from the Bankfocus and Fitchconnect databases.

As industry-level control variables, *bank concentration*, *bank credit to the private sector*, and *the Lerner index* are used. The bank concentration ratio is obtained from the World Bank database, and is the ratio of the three largest commercial banks' assets to the total assets of all the commercial banks in a country. It is used to control for the market structure of a country. The bank credit to the private sector (%), which is a proxy for a country's financial development, is measured by the ratio of banks' claims on the private sector to GDP. This indicator is obtained from the Fitchconnect database. These two variables are widely used as industry-level variables that deal with bank performance (*see*: Luo et al., 2016; Pasiouras et al., 2009; Tanna et al., 2017). Last, the Lerner index is widely used in studies on liquidity creation and bank competition (*see*: Beck et al., 2013; Fiordelisi & Mare, 2014). The index is a measure of market power in the banking market (Beck et al., 2013; Berger et al., 2019), and is closely related to banks' liquidity creation since market power facilitate banks' investment in lending, which increases liquidity creation (Petersen & Rajan, 1995). This index is obtained from the Global Financial Development Database.

For country-level variables, Annual *GDP growth rate*, *inflation*, *corruption perception index*, *unemployment rate*, and *Muslim population* are employed as country-level control variables. GDP growth and inflation are widely used to control for macroeconomic environments in many studies (*see*: Ashraf, 2017; Berger et al., 2019; Bitar et al., 2017; Pasiouras et al., 2009; Tanna et al., 2017). These variables were obtained from the World Bank database and the Global Market Information Database (GMID). The corruption perception index (CPI) was drawn from the Transparency International Database. The CPI measures the extent to which

experts and business executives perceive corruption in a country or territory. A high score indicates low corruption, while a low score represents high corruption. The CPI is the most popular index for measuring the corruption level. Generally, corruption is used to control for a country's macroeconomic factors in many studies (*see*: Ashraf, 2017; Asutay & Sidek, 2020). From a liquidity creation perspective, according to Boubakri et al. (2021), a country's corruption can reduce banks' ability to create liquidity. Unemployment rate data were obtained from the IMF database, while Muslim population data were collected from the Pew Research Center and Muslim Population. Appendix 6 describes all variables and data sources used in this study.

#### 4.3.5.3. Summary statistics

**Table 21: Summary statistics**

Full sample				
Variables	Mean	Std. Dev.	Skewness	Kurtosis
<i>Political institution</i>	1.916	0.514	-2.523	9.445
<i>Short-term interest rate</i>	0.047	0.038	1.542	7.407
<i>Overall economic freedom</i>	4.158	0.134	0.042	1.826
<i>Activity restriction</i>	2.224	0.319	-0.623	2.879
<i>Islamic political institution</i>	0.519	0.272	-0.061	1.832
<i>Islamic economic institution</i>	0.578	0.277	-0.286	1.652
<i>Islamic legal institution</i>	0.552	0.288	-0.099	1.638
<i>GDP growth</i>	0.035	0.043	-1.661	17.569
<i>Inflation</i>	0.052	0.062	5.497	55.241
<i>Bank concentration</i>	0.551	0.169	0.690	2.730
<i>Unemployment rate</i>	0.060	0.039	0.988	3.279
<i>Lerner index</i>	0.330	0.131	-0.248	3.450
<i>Corruption</i>	2.989	1.174	-0.654	1.978
<i>Muslim population</i>	0.738	0.331	-1.452	3.452
<i>Bank credit to private sector</i>	0.690	0.465	0.858	2.659

	Panel A: Full sample				Panel B: Conventional Banks				Panel C: Islamic Banks			
	Mean	Std. Dev.	Skewness	Kurtosis	Mean	Std. Dev.	Skewness	Kurtosis	Mean	Std. Dev.	Skewness	Kurtosis
<i>Liquidity creation</i>	0.667	0.344	-0.268	3.856	0.651	0.314	-0.249	4.157	0.731	0.444	-0.500	2.979
<i>Total asset</i>	3.400	0.870	0.138	3.402	3.419	0.890	0.198	3.401	3.321	0.776	-0.339	2.895
<i>Equity to total asset</i>	0.165	0.163	2.926	11.960	0.157	0.148	3.111	13.752	0.201	0.212	2.227	7.110
<i>Non-performing loans</i>	0.075	0.127	4.358	26.964	0.077	0.126	4.277	26.555	0.067	0.129	4.752	29.122
<i>Return on assets</i>	0.011	0.031	-4.208	93.669	0.012	0.029	-5.053	119.73	0.008	0.036	-2.101	39.049

Note: *Liquidity creation* is calculated by using Berger and Bouwman (2009) and Berger et al. (2019)'s measures. This method comprehensively measures liquidity creation by including on- and off-balance sheet activities. The natural logarithm of bank's *Total assets* (USD m) is used to control for bank size. *Equity to total asset* is calculated as the amount of equity divided by total asset of banks. *Non-performing loans* are used to measure credit risk in banks. *Return on asset* is calculated as the net income divided by total assets of banks. *GDP growth* is calculated as the change in the GDP of the countries in comparison to an earlier period. *Inflation* is the rate at which prices increases over time. *Bank concentration* is the ratio of the three largest commercial banks' assets to the total assets of all the commercial banks in a country. It is used to control for the market structure of a country. *Unemployment* is the unemployment rate of the countries. *Lerner index* is a measure of market power in the banking market. *Corruption* is the corruption index of sample countries. *Muslim population* represents the percentage of Muslims of the countries. *Bank credit to private sector* is a proxy for a country's financial development, is measured by the ratio of banks' claims on the private sector to GDP. *Political institution* indicates the country's polity score, subtracting the degree of autocracy from the degree of democracy. *Short-term interest rate* is a rate at which short-term borrowings are affected between financial institutions; or a rate at which short-term government paper is issued and traded in the market. *Overall economic freedom* is calculated based on 12 components of freedom to measure the impact of

liberty and free markets within a country. *Activity restriction* measures the level of restrictions on a bank's activities. *Islamic institutions* measure how much the country reflects Islamic political, economic and legal values.

Table 21 shows the summary statistics for the main variables of this study, including bank-, industry-, and country-level control variables. It shows the mean, standard deviation, skewness, and kurtosis values of each variable. From the statistics of the dependent variable, the mean and standard deviation for *Liquidity creation* are 0.667 and 0.344, respectively. For Islamic banks, the liquidity creation mean value and standard deviation are 0.731 and 0.444, respectively, higher than the corresponding values for conventional banks, at 0.651 and 0.314, respectively. The mean and standard deviation for *political institution* are 1.916 and 0.514, respectively, with a skewness of -2.523 and kurtosis of 9.445. For economic institutions, the mean, standard deviation, skewness, and kurtosis for the *short-term interest rate* are 0.047, 0.038, 1.542, and 7.407, respectively, while the corresponding values for *Overall economic freedom* are 4.158 and 0.134, respectively. The mean and standard deviation for *overall economic freedom* are 0.042 and 1.826, respectively. For regulatory institutions, the mean, standard deviation, skewness, and kurtosis for *activity restriction* are 2.224, 0.319, -0.623, and 2.879, respectively. For Islamic institutions, the mean, standard deviation, skewness, and kurtosis for *Islamic political institution* are 0.519, 0.272, -0.061, and 1.832, respectively, while the corresponding values for *Islamic economic institution* are 0.578, 0.277, -0.286, and 1.652, respectively. The corresponding values for *Islamic legal institution* are 0.552, 0.288, -0.099, and 1.638, respectively.

The statistics for the full-sample control variables show a mean and standard deviation for *total assets* of 3.400 and 0.870, respectively. The mean value for conventional banks' *total assets* is 3.419, which is higher than that for Islamic banks (3.321); this means that, on average, conventional banks are larger than Islamic banks. The *equity to total asset* ratio has a mean and standard deviation of 0.165 and 0.163, respectively. Islamic banks have a higher mean value of *equity to total asset* ratio (0.201) than conventional banks (0.157). This finding means that Islamic banks have relatively more capital than conventional banks. *Return on assets* has a mean and standard deviation of 0.011 and 0.031, respectively. The mean value of conventional banks' *Return on assets* (0.012) is higher than that of Islamic banks (0.008). *GDP growth* and *Bank concentration* average 0.035 and 0.551, respectively. *Inflation* has a mean and standard deviation of 0.052 and 0.062, respectively. The mean values for *unemployment rate*, the *Lerner index*, *corruption*, *Muslim population*, *non-performing loans*, and *bank credit to private sector* are 0.060, 0.330, 2.989, 0.738, 0.075, and 0.690, respectively.



## **4.4. Results and discussion**

### **4.4.1. Introduction**

This section presents the results of the regression analysis to investigate the effect of institutional environments on banks' liquidity creation. The base line regression results are first presented based on a split of the analysis into full- and subsample analyses, followed by a discussion. Various robustness tests then follow: 1) regression using alternative institutional variables, 2) propensity score matching (PSM), and 3) two-stage least square (2SLS).

### **4.4.2. The impact of institutional environments on bank liquidity creation**

#### **4.4.2.1. Full-sample analysis**

**Table 22: Effect of institutions on bank liquidity creation**

Variable	Full sample						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Political institution</i>	0.080*** (0.006)						
<i>Short-term interest rate</i>		-0.842* (0.054)					
<i>Overall economic freedom</i>			0.290*** (0.005)				
<i>Activity restriction</i>				-0.159*** (0.001)			
<i>Islamic political institution</i>					0.173** (0.011)		
<i>Islamic economic institution</i>						0.146** (0.020)	
<i>Islamic legal institution</i>							0.153** (0.013)
<i>GDP growth</i>	-0.209 (0.517)	-0.460** (0.019)	-0.193 (0.172)	-0.056 (0.734)	0.005 (0.976)	0.024 (0.879)	0.030 (0.846)
<i>Inflation</i>	0.560** (0.046)	0.929*** (0.000)	0.383*** (0.002)	0.236** (0.048)	0.328*** (0.004)	0.314*** (0.006)	0.310*** (0.007)
<i>Bank concentration</i>	-0.633*** (0.000)	-0.346** (0.019)	0.122** (0.023)	-0.248** (0.043)	-0.245** (0.040)	-0.246** (0.040)	-0.238** (0.046)
<i>Unemployment rate</i>	-2.677*** (0.000)	-1.622** (0.011)		-0.587 (0.324)	-1.249** (0.024)	-1.330** (0.016)	-1.294** (0.019)
<i>Total asset</i>	0.163*** (0.000)	0.216*** (0.000)	0.172*** (0.000)	0.292*** (0.000)	0.266*** (0.000)	0.274*** (0.000)	0.268*** (0.000)
<i>Equity to total asset</i>	0.422** (0.015)	0.215 (0.219)	-0.358*** (0.000)	0.287* (0.068)	0.290* (0.059)	0.301** (0.050)	0.297* (0.053)
<i>Lerner index</i>	0.116 (0.323)	0.220** (0.025)		0.120 (0.181)	0.190** (0.025)	0.178** (0.034)	0.168** (0.044)
<i>Corruption</i>	0.019** (0.021)	0.019*** (0.002)	0.033*** (0.000)	0.017*** (0.006)	-0.007 (0.551)	-0.005 (0.691)	-0.006 (0.591)
<i>Non-performing loans</i>	-0.339** (0.018)	-0.078 (0.562)		-0.180* (0.066)	-0.224** (0.020)	-0.220** (0.023)	-0.223** (0.021)
<i>Return on assets</i>	-0.217 (0.626)	0.005 (0.990)	0.411*** (0.010)	-0.181 (0.655)	-0.384 (0.330)	-0.381 (0.334)	-0.366 (0.354)
<i>Bank credit to private sector</i>			0.058* 0.074				
<i>Intercept</i>	0.236 (0.258)	0.053 (0.812)	-1.281*** (0.002)	0.028 (0.896)	-0.227 (0.183)	-0.249 (0.142)	-0.230 (0.177)
<i>R<sup>2</sup></i>	0.265	0.157	0.126	0.192	0.193	0.192	0.193
<i>Observations</i>	982	1482	3875	1599	1736	1736	1736

Note: the current study examines  $Liquidity\ creation_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  by using the fixed-effect model where bank liquidity creation is calculated by Berger and Bouwman (2009) and Berger et al. (2019)'s measurement. The key independent variable is institutional variables, which are political institution (*Polity 2*), economic institution (*Short-term interest rate* and *Overall economic freedom*), regulatory institution (*Activity restriction*) and Islamic institution (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). Control variables include *GDP growth*, *Inflation*, *Bank concentration*, *Unemployment rate*, *Total asset*, *Equity to total asset*, the *Lerner index*, *Corruption rate*, *Non-performing loans*, *Return on assets* and *Bank credit to private sector*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

Table 22 shows the fixed-effects regression results for the effect of institutions on bank liquidity creation for the full sample. The *political institution* variable significantly positively impacts bank liquidity creation (coefficient 0.080, p-value 0.006). This suggests that countries that are more democratic tend to have higher levels of liquidity creation.

Regarding economic institutions, the first economic institutional variable used in this analysis, *short-term interest rates*, negatively impacts liquidity creation (coefficient 0.842, p-value 0.054), which suggests that the higher the interest rates, the lower the level of bank liquidity creation. This result supports a previous finding in the literature (*see*: Kashyap & Stein, 2000). Meanwhile, as another economic institutional variable, *Overall economic freedom* positively impacts liquidity creation (coefficient 0.290, p-value 0.005), which suggests that more economically free countries have higher levels of bank liquidity creation. This may be due to the positive impact of banking competition, as espoused by the ‘price channel’ view.

As a regulatory institutional variable, *activity restriction* negatively influences bank liquidity creation (coefficient 0.159, p-value 0.001), which indicates that less regulation creates more bank liquidity. Many empirical studies have found a negative impact of regulatory intervention on bank liquidity creation (*see*: Berger et al., 2016; Bouwman, 2018).

Interestingly, all Islamic institutions, including *Islamic political*, economic, and *regulatory institutions*, positively impact bank liquidity creation, which is probably due to Islamic institutions’ comprehensive features.

Table 22 also shows the impacts of the control variables on bank liquidity creation. Generally, these confirm the theoretical effects indicated in previous studies. Among the variables, inflation is a significant factor in bank liquidity creation. The current study finds a positive impact of *inflation* on bank liquidity creation, which contradicts Berger et al. (2019) and Boubakri et al. (2021), who find a negative impact of inflation on bank liquidity creation. Additionally, *bank concentration rate* and *unemployment rate* harm bank liquidity creation, which is consistent with the ‘quiet life’ hypothesis (Berger & Mester, 1997, cited in Safiullah et al., 2020), which proposes that a high bank concentration rate can induce managers to work less, which can lead to a lower level of liquidity creation. The current study also finds a positive impact of the *Lerner index* on liquidity creation. This result is consistent with previous findings (*see*: Berger et al., 2019; Petersen & Rajan 1995). Berger et al. (2019) find that the *Lerner index* is significantly related to banks’ liquidity creation because less competitive markets tend to lead to higher levels of liquidity creation. The *corruption rate*

variable has a positive impact because low-corruption countries produce higher levels of bank liquidity creation, consistent with Boubakri et al. (2021). Corruption can result in higher bank risk, which reduces banks' ability to create liquidity (Weill, 2011). Banks' *total assets* shows a positive association with bank liquidity creation, which suggests that larger banks tend to create more liquidity than smaller banks. This finding is consistent with the literature (see: Berger et al., 2019; Boubakri et al., 2021). Indeed, based on the dataset used in this study, high-liquidity creation banks are mostly large banks. However, the impact of *equity to total asset* contradicts previous findings (Berger & Bouwman, 2009; Berger et al., 2019; Casu et al., 2019). The latter studies find a negative impact of capital on bank liquidity creation. Casu et al. (2019) find a trade-off relationship between capital and banks' liquidity creation, while Boubakri et al. (2021) find a negative impact of a higher capital ratio on bank liquidity creation because capital may crowd out deposits, which reduces liquidity creation. Meanwhile, banks with a lower capital ratio tend to search for borrowers, thus increasing loans and liquidity creation (Boubakri et al., 2021). This result supports the 'financial fragility-crowding out' effect (Berger & Bouwman, 2009). In contrast, the current study finds a positive impact of capital on bank liquidity creation, which supports the 'risk-absorption' hypothesis that proposes that a bank's higher capital enhances the bank's ability to create liquidity by absorbing its risks (Berger & Bouwman, 2009; Safiullah et al., 2020) since the bank's capital can support its risk transformation function (Nguyen et al., 2020). Diaz and Huang (2017) and Safiullah et al. (2020) empirically demonstrate a positive role of capital on bank liquidity creation. *Non-performing loans* harm bank liquidity creation, consistent with Nguyen et al.'s (2020) finding. The latter authors also find a negative impact of non-performing loans, which proxy for credit risk. Thus, the current study demonstrates that higher credit risk negatively affects banks' liquidity creation.

In this analysis, the current study evaluates the impact of various institutions on bank liquidity creation, including political, economic, regulatory, and Islamic institutions, which is a new academic attempt, with some interesting findings. Firstly, and most interestingly, this study finds that political institutions, namely, democratic institutions significantly impact banks' liquidity creation. In other words, the more democratic a country, the higher the level of banks' liquidity creation. In confirming the vital role of political institutions on banking performance, this result supports the hierarchy of institutions hypothesis (HIH). The political institutional variables employed in this study can theoretically and empirically promote banks' liquidity creation either directly or through their impacts on other institutions. Directly, good-

quality political institutions can reduce corruption and increase political stability, which increases liquidity creation by reducing banks' political risk. The relationship between regime type and corruption has been well documented; most studies find a positive impact of democracy on a country's corruption level (Nur-tegin, 2012). For instance, Nur-tegin (2012) compares democracies and dictatorships, and find that even unstable democracies reduce their corruption levels to a greater extent than stable dictatorships because the public officials endeavour to be less corrupt for re-election (Chowdury, 2004; Persson et al., 2003). Furthermore, components or institutions that develop as a result of the good quality of political institutions, such as journalism, public scrutiny, civil liberties, and an independent judiciary, assume their roles in monitoring public officials' behaviour (Da Silva, 2000; Gigliolo, 1996; Moran, 2001, cited in Nur-tegin, 2012; Rose-Ackerman, 1999; Schwartz, 1999). Thus, the increased political stability and consequent decreased political risk to reserves might induce banks to expand their lending and create liquidity (Baradwaj et al., 2016). Empirically, Baradwaj et al. (2016) find a positive relationship between political stability, proxied by the country governance variable, and banks' liquidity creation.

Secondly, political institutions can influence banks' liquidity creation through their impacts on economic and regulatory institutions. For instance, the political system, particularly the check-and-balance system, of a country affects the economic and financial policies since the check-and-balance system can provide more autonomy to monetary institutions and affect the reputation of the country's policies by constraining political power. Thus, these democratic institutions can affect the stability of a country's monetary policy, which eventually affects its banks' liquidity creation (Hielscher & Markwardt, 2012). Moreover, stable and better political institutions can ensure the consistency and implementation of legal institutions by constraining negative political power. To examine whether political institutions influence bank liquidity creation through other institutions, this study analyses the interaction between political, economic, and regulatory institutions. Table 27 presents the results in detail, followed by a detailed discussion of the impact of the interaction between political and other institutions.

Concerning the monetary policy perspective, short-term interest rates negatively affect the liquidity creation of all bank types, which supports theory as well as previous findings in the literature (*see*: Kashyap & Stein, 2000). Generally, a lowering of rates eases monetary policy during economic recessions or downturns to provide liquidity and stimulate the economy through the purchase of large-scale assets and capital injections to large banks (Berger &

Bouwman, 2016; Chatterjee, 2015). Consequently, monetary expansion in the form of a low-interest rate can increase banks' net worth since banks tend to issue more loans to their customers at decreased interest rates and on relaxed lending terms (Berger & Bouwman, 2017; Dang & Dang, 2021). This may increase bank deposits and loan volumes, thus increasing bank liquidity creation (Berger & Bouwman, 2017; Dang & Dang, 2021; Yeddou & Pourroy, 2020). Furthermore, on the off-balance-sheet side, banks can provide more commitments to customers with more loanable funds at cheaper costs (Dang & Dang, 2021). Meanwhile, empirically, Kashyap and Stein (2000) find that when monetary policy tightens (i.e. rates rise), banks tend to reduce their lending when they cannot substitute deposits with non-deposit external finance.

As another economic institutional variable, *overall economic freedom* positively affects bank liquidity creation, which means that more economically free countries have higher levels of bank liquidity creation. This may be due to the positive impact of banking competition, as proposed by the theory of the 'price channel' view. Increased competition may affect pricing policies because pricing competition reduces loan rates and increases deposits rates (Ahmed, 2013; Cubillas & ález, 2014; Horvath et al., 2016). Some empirical research supports a relationship between competition and low lending rates (*see*: Love & Peria, 2015). Thus, increased competition might raise demand for loans and deposits, consequently creating more bank liquidity.

Regulatory institutions negatively impact liquidity creation in this study, which suggests that less regulatory intervention may promote banks' liquidity creation. This is consistent with theory and previous findings in the literature. Many studies have found that regulatory intervention can negatively impact bank liquidity creation. Since regulatory intervention can reduce portfolio risk, banks may reduce risky lending activities and bank liquidity creation to adjust their portfolios (Berger et al., 2016). Bouwman (2018) finds that restrictions on lending activities significantly reduce bank liquidity creation, thus offering empirical support for a negative impact of regulation on liquidity creation. This finding is consistent with the results obtained by Berger et al. (2016), who, based on a sample of German banks, found that regulatory interventions such as restrictions on deposit-taking, lending activities, profit distribution, business activities, and managerial decisions decreased liquidity creation. Consistent with previous research, Kladakis et al. (2021) find that banks in countries with greater official supervisory power create more liquidity than those subject to tighter capital regulations, more activity restrictions, and more robust private monitoring. Activity

restrictions may prevent banks from diversifying their portfolios and taking advantage of the synergy effect from complimentary activities.

Interestingly, Islamic institutions positively influence bank liquidity creation regardless of banking type. This is probably because the comprehensive Islamic institutional variables embrace many aspects of society, including politics, the economy, human development, the legal system and governance, and international affairs. Moreover, Islamic institutions are not entirely different from their conventional counterparts. Instead, Islamic political, economic, and regulatory institutions share their nature with the conventional perspective of democratic values, as pointed out in the theory section. Moreover, considering that the sample in the current study comprises primarily Muslim-majority countries, this might affect the result. Thus, the presence of Islamic institutions should increase banks' liquidity creation, regardless of banking type.

These research results are consistent with the view that bank liquidity creation is highly affected by county-level institutions, including political, economic, regulatory, and governance institutions (Baradwaj et al., 2016; Berger et al., 2016; Bouwman, 2018; Jiang et al., 2019). This study provides strong evidence that, along with heavily researched bank-level variables, country-level institutional environments play a significant role in increasing bank liquidity creation; political institutions, as the ultimate institutions, play a vital role. The current study is distinguished from the earlier studies by finding that both political and Islamic institutions significantly impact bank liquidity creation. This result carries an important implication for policymakers: democratic institutions can help increase bank liquidity creation. Moreover, regardless of banking type, Islamic political, economic, and legal institutions can increase bank liquidity creation.

#### **4.4.2.2. Subsample analysis**

##### **– Conventional and Islamic banks**

**Table 23: Effects of institutions on bank liquidity creation – conventional vs. Islamic banks**

Variable	Panel A: Conventional Banks							Panel B: Islamic Banks						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Political institution</i>	0.081*** (0.007)							-0.072 (0.714)						
<i>Short-term interest rate</i>		-0.689* (0.093)							-3.726 (0.107)					
<i>Overall economic freedom</i>			-0.186 (0.300)							0.255 (0.707)				
<i>Activity restriction</i>				-0.150*** (0.001)							-0.202 (0.257)			
<i>Islamic political institution</i>					0.096 (0.146)							0.604** (0.017)		
<i>Islamic economic institution</i>						0.034 (0.589)							0.639*** (0.003)	
<i>Islamic legal institution</i>							0.054 (0.382)							0.587*** (0.005)
<i>GDP growth</i>	-0.042 (0.906)	-0.517** (0.011)	0.069 (0.679)	-0.050 (0.768)	0.104 (0.528)	0.134 (0.414)	0.131 (0.424)	-3.831** (0.033)	-0.423 (0.405)	-0.284 (0.513)	-0.401 (0.402)	-0.481 (0.264)	-0.519 (0.225)	-0.483 (0.258)
<i>Inflation</i>	0.511* (0.066)	0.994*** (0.000)	0.722*** (0.000)	0.384*** (0.001)	0.451*** (0.000)	0.447*** (0.000)	0.442*** (0.000)	1.372 (0.572)	-0.093 (0.894)	-0.382 (0.516)	-0.880* (0.061)	-0.731* (0.090)	-0.772* (0.072)	-0.808* (0.060)
<i>Bank concentration</i>	-0.294* (0.099)	-0.048 (0.759)	-0.095 (0.453)	-0.094 (0.469)	-0.065 (0.604)	-0.054 (0.643)	-0.054 (0.666)	-1.339* (0.085)	-1.482*** (0.001)	-1.328*** (0.002)	-1.430*** (0.001)	-1.213*** (0.004)	-1.141*** (0.006)	-1.147*** (0.006)
<i>Unemployment rate</i>	-3.043*** (0.000)	-2.216*** (0.000)	-2.096*** (0.000)	-1.291** (0.020)	-1.758*** (0.001)	-1.781*** (0.001)	-1.770*** (0.001)	-4.172 (0.495)	1.543 (0.672)	1.771 (0.575)	1.865 (0.555)	1.836 (0.534)	1.475 (0.614)	1.536 (0.600)
<i>Total asset</i>	0.156*** (0.000)	0.243*** (0.000)	0.334*** (0.000)	0.323*** (0.000)	0.320*** (0.000)	0.329*** (0.000)	0.326*** (0.000)	-0.034 (0.924)	0.043 (0.789)	0.011 (0.930)	0.070 (0.596)	-0.035 (0.772)	-0.029 (0.803)	-0.041 (0.732)
<i>Equity to total asset</i>	0.518*** (0.004)	0.693*** (0.000)	0.753*** (0.000)	0.727*** (0.000)	0.739*** (0.000)	0.751*** (0.000)	0.746*** (0.000)	-0.712 (0.587)	-1.530** (0.033)	-0.902* (0.089)	-0.834 (0.146)	-0.790 (0.129)	-0.825 (0.109)	-0.808 (0.118)
<i>Lerner index</i>	0.135 (0.268)	0.064 (0.496)	0.076 (0.378)	-0.048 (0.594)	0.052 (0.540)	0.036 (0.672)	0.038 (0.654)	0.735 (0.540)	0.851** (0.033)	0.935*** (0.005)	0.972*** (0.004)	0.842*** (0.007)	0.784** (0.012)	0.771** (0.014)
<i>Corruption</i>	0.016* (0.083)	0.009 (0.135)	0.009 (0.143)	0.005 (0.409)	-0.007 (0.556)	0.002 (0.842)	-0.001 (0.928)	0.025 (0.691)	0.072*** (0.002)	0.081*** (0.000)	0.077*** (0.001)	0.004 (0.920)	-0.014 (0.719)	-0.009 (0.816)
<i>Muslim population</i>	2.343* (0.075)	0.566* (0.061)	0.375 (0.224)	0.108 (0.725)	0.522* (0.078)	0.537* (0.071)	0.557* (0.062)	2.251 (0.507)	0.800 (0.293)	0.194 (0.792)	0.109 (0.882)	0.390 (0.569)	0.482 (0.479)	0.584 (0.397)
<i>Non-performing loans</i>	-0.374*** (0.008)	-0.301** (0.017)	-0.223** (0.018)	-0.275*** (0.003)	-0.289*** (0.002)	-0.281*** (0.002)	-0.283*** (0.002)	-0.997 (0.623)	1.483*** (0.008)	1.128** (0.025)	1.165** (0.017)	1.016** (0.028)	1.012** (0.027)	1.031** (0.025)
<i>Return on assets</i>	-0.292 (0.502)	-0.319 (0.430)	-0.617 (0.114)	-0.456 (0.241)	-0.683* (0.079)	-0.681* (0.080)	-0.677* (0.082)	-1.349 (0.816)	2.269 (0.133)	1.317 (0.335)	1.516 (0.318)	1.298 (0.333)	1.245 (0.349)	1.356 (0.309)
<i>Intercept</i>	-1.494* (0.072)	-0.566* (0.093)	-0.048 (0.955)	-0.207 (0.566)	-0.884*** (0.004)	-0.927*** (0.003)	-0.933*** (0.002)	0.141 (0.969)	0.548 (0.634)	-0.225 (0.944)	1.214 (0.316)	0.795 (0.436)	0.683 (0.500)	0.645 (0.525)
<i>R<sup>2</sup></i>	0.268	0.186	0.229	0.225	0.225	0.224	0.224	0.540	0.335	0.294	0.310	0.312	0.323	0.320
<i>Observations</i>	924	1249	1475	1357	1482	1482	1482	58	233	253	242	254	254	254

Note: the current study examines  $Liquidity\ creation_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  by using the fixed effect model and splitting samples into conventional and Islamic banks where bank liquidity creation is calculated by Berger and Bouwman (2009) and Berger et al. (2019)'s measurement. The key independent variable is institutional variables, which are political institution (*Polity 2*), economic institution (*Short-term interest rate* and *Overall economic freedom*), regulatory institution (*Activity restriction*) and Islamic institutions (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). Control variables include *GDP growth*, *Inflation*, *Bank concentration*, *Unemployment rate*, *Total asset*, *Equity to total asset*, the *Lerner index*, *Corruption rate*, *Muslim population*, *Non-performing loans*, *Return on assets* and *Bank credit to private sector*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.



The current study conducts a subsample analysis by splitting the sample into conventional and Islamic banks to empirically test the political economy and the new institutional economics (NIE) theories. Panel A presents the impact of institutions on conventional banks' liquidity creation. The *political institution* positively impacts conventional banks' liquidity creation (coefficient 0.081, p-value 0.007). This finding is consistent with that from the full-sample analysis that democratic institutions play a significant role in bank liquidity creation. The result suggests that more democratic countries have higher levels of conventional banks' liquidity creation.

Regarding economic institutions, *short-term interest rate* shows a negative impact on conventional banks' liquidity creation (coefficient 0.689, p-value 0.093), which is also consistent with the baseline result and previous findings in the literature. However, unlike the baseline result, conventional banks' liquidity is not affected by *economic freedom* (coefficient -0.186, p-value 0.308), probably due to the smaller sample relative to the full sample.

The regulatory institutional variable (*activity restriction*) negatively impacts conventional banks' liquidity creation (coefficient 0.150, p-value 0.001), which is consistent with the result from the baseline model.

Interestingly, all Islamic institutions (*Islamic political institution*, *Islamic economic institution*, and *Islamic legal institution*) have nonsignificant impacts on conventional banks' liquidity creation. However, panel B shows that Islamic institutions significantly impact Islamic banks' liquidity creation. This result suggests that while Islamic institutional environments do not affect conventional banks' liquidity creation, they significantly affect Islamic banks' liquidity creation.

This study finds that political institutions significantly impact conventional banks' liquidity creation. This suggests that more democratic institutions are necessary to increase conventional banks' liquidity creation. This conclusion confirms the full sample analysis result as well as the political economy and the new institutional economics (NIE) theories by reinforcing the importance of political institutions for conventional banking performance. The political economy and the new institutional economics (NIE) theories argue that economic and financial matters should be considered within the more extensive formation of society. Thus, proper institutional environments derived from their philosophy and purpose are necessary for the performance of each banking system. Furthermore, this result supports

the hierarchy of institutions hypothesis (HIH) by confirming the vital and ultimate role of political institutions.

The interest rate, as an economic institutional variable, negatively affects conventional banks' liquidity creation. However, unlike in the baseline model, *overall economic freedom* does not significantly impact conventional banks' liquidity creation, which is probably due to the smaller sample. Instead, financial freedom, as an alternative institutional variable for economic freedom in the additional test to confirm the initial result, still positively impacts conventional banks' liquidity creation. The impact of regulatory institutions on conventional banks' liquidity creation is negative, as in the baseline model.

Interestingly, all Islamic institutions have nonsignificant impacts on conventional banks' liquidity creation. However, Islamic institutions do impact Islamic banks' liquidity creation. The result is consistent with findings in previous studies. Bitar et al. (2017) find that Islamic banks perform better under a hybrid and *shariah*-based legal system than under a conventional, democratic, political system. Additionally, Asutay and Sidek (2020) find that Islamic banks' performance is negatively affected under a conventional regulatory system, due to unfavourable conditions under the conventional system. In addition to the current study, the latter two empirically support the political economy and the new institutional economics (NIE) theories: Proper institutional environments derived from the appropriate philosophy and purpose (for Islamic or conventional banks) are necessary for the performance of each banking system. However, the current study differs from those by Bitar et al. (2017) and Asutay and Sidek (2020) in that the latter studies both compare a political system (democratic system) with a legal system, or use only the conventional political system. Moreover, there is a lack of Islamic research on Islamic banks' liquidity creation. The current study aims to fill the research gap by investigating liquidity creation in both conventional and Islamic institutions. The study provides strong evidence of the importance of Islamic environments for Islamic banking performance. The result of the current study implies that Islamic values or environments are a necessary condition for Islamic banking performance.

As robustness test, table 22 and 23 are re-run without the UK bank sample, which can cause biased results due to its large number of banks. The results support the initial results. Appendix 7 and 8 show the results.

– **Banks with low and high levels of liquidity creation**

**Table 24: Effect of institutions on bank liquidity creation – comparing banks with low and high liquidity creation**

Variable	Panel A: Low Liquidity Creation Banks							Panel B: High Liquidity Creation Banks						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Political institution</i>	-0.016 (0.652)							0.095*** (0.009)						
<i>Short-term interest rate</i>		-0.383 (0.354)							-1.114*** (0.009)					
<i>Overall economic freedom</i>			0.692*** (0.000)							-0.156* (0.094)				
<i>Activity restriction</i>				-0.118*** (0.002)							-0.139** (0.020)			
<i>Islamic political institution</i>					0.317*** (0.000)							-0.163** (0.014)		
<i>Islamic economic institution</i>						0.305*** (0.000)							-0.165*** (0.007)	
<i>Islamic legal institution</i>							0.325*** (0.000)							-0.138** (0.017)
<i>GDP growth</i>	-0.341 (0.248)	-0.272 (0.244)	0.038 (0.803)	-0.226 (0.199)	-0.287* (0.073)	-0.253 (0.113)	-0.234 (0.141)	0.293 (0.482)	0.046 (0.769)	-0.058 (0.642)	0.223 (0.129)	0.287* (0.056)	0.293* (0.050)	0.270* (0.070)
<i>Inflation</i>	0.379* (0.099)	0.024 (0.908)	0.250** (0.026)	0.022 (0.900)	0.118 (0.441)	0.098 (0.524)	0.103 (0.501)	-0.459 (0.257)	0.348* (0.078)	-0.021 (0.872)	0.084 (0.446)	0.113 (0.308)	0.125 (0.258)	0.128 (0.250)
<i>Bank concentration</i>	-0.377** (0.011)	-0.290* (0.062)	-0.114* (0.091)	-0.325*** (0.009)	-0.344*** (0.002)	-0.356*** (0.002)	-0.319*** (0.005)	0.212 (0.421)	0.077 (0.597)	0.055 (0.239)	0.109 (0.360)	0.146 (0.230)	0.138 (0.254)	0.138 (0.256)
<i>Unemployment rate</i>	-1.690*** (0.003)	-1.415** (0.017)		-0.762 (0.139)	-1.151*** (0.009)	-1.319*** (0.003)	-1.226*** (0.006)	-0.539 (0.656)	-0.701 (0.298)		-0.418 (0.541)	0.094 (0.884)	0.160 (0.805)	0.111 (0.863)
<i>Total asset</i>	0.120*** (0.000)	0.117*** (0.004)	0.113*** (0.000)	0.136*** (0.000)	0.107*** (0.000)	0.116*** (0.000)	0.107*** (0.000)	-0.112 (0.236)	-0.054 (0.305)	-0.086*** (0.001)	-0.065 (0.219)	0.029 (0.569)	0.028 (0.578)	0.027 (0.599)
<i>Equity to total asset</i>	0.182 (0.143)	0.130 (0.334)	-0.523*** (0.000)	0.048 (0.678)	0.079 (0.456)	0.093 (0.380)	0.091 (0.391)	-0.456 (0.403)	-0.810*** (0.003)	-0.194* (0.090)	-0.832*** (0.002)	-0.782*** (0.004)	-0.785*** (0.004)	-0.791*** (0.003)
<i>Lerner index</i>	0.235** (0.012)	0.256*** (0.007)		0.228*** (0.009)	0.345*** (0.000)	0.337*** (0.000)	0.324*** (0.000)	-0.297 (0.131)	-0.071 (0.442)		-0.088 (0.297)	-0.069 (0.425)	-0.052 (0.548)	-0.041 (0.637)
<i>Corruption</i>	0.029*** (0.000)	0.023*** (0.000)	0.035*** (0.000)	0.025*** (0.000)	-0.022** (0.037)	-0.024** (0.029)	-0.028** (0.013)	-0.004 (0.740)	-0.012** (0.041)	-0.006 (0.115)	-0.010* (0.078)	0.011 (0.313)	0.013 (0.225)	0.009 (0.363)
<i>Non-performing loans</i>	-0.042 (0.685)	-0.114 (0.279)		-0.046 (0.533)	-0.008 (0.911)	0.007 (0.920)	0.003 (0.960)	-0.283 (0.502)	0.162 (0.361)		0.107 (0.486)	0.128 (0.417)	0.140 (0.376)	0.133 (0.401)
<i>Return on assets</i>	0.505 (0.255)	0.384 (0.464)	0.467*** (0.000)	0.129 (0.758)	0.271 (0.468)	0.318 (0.396)	0.331 (0.375)	0.420 (0.412)	0.451 (0.185)	0.042 (0.850)	0.282 (0.409)	0.220 (0.530)	0.232 (0.508)	0.209 (0.551)
<i>Bank credit to private sector</i>			0.065** (0.043)								0.011 (0.737)			
<i>Intercept</i>	0.166 (0.361)	0.165 (0.402)	-2.816*** (0.000)	0.332* (0.074)	0.159 (0.265)	0.141 (0.321)	0.152 (0.286)	1.271*** (0.004)	1.299*** (0.000)	1.915*** (0.000)	1.586*** (0.000)	0.863*** (0.000)	0.862*** (0.000)	0.865*** (0.000)
<i>R<sup>2</sup></i>	0.344	0.252	0.304	0.301	0.320	0.320	0.323	0.066	0.048	0.029	0.054	0.054	0.056	0.053
<i>Observations</i>	574	709	1915	806	909	909	909	408	773	1960	793	827	827	827

Note: the current study examines  $Liquidity\ creation_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  by using the fixed effect model and splitting samples into low and high liquidity creation banks where bank liquidity creation is calculated by Berger and Bouwman (2009) and Berger et al. (2019)'s measurement. The key independent variable is institutional variables, which are political institution (*Polity 2*), economic institution (*Short-term interest rate* and *Overall economic freedom*), regulatory institution (*Activity restriction*) and Islamic institutions (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). Control variables include *GDP growth*, *Inflation*, *Bank concentration*, *Unemployment rate*, *Total asset*, *Equity to total asset*, the *Lerner index*, *Corruption rate*, *Non-performing loans*, *Return on assets* and *Bank credit to private sector*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

The current study divides the sample into low- and high- liquidity creation banks, and investigate whether the impact of institutions varies with each bank's degree of liquidity creation. In panel A, the *political institution* has a nonsignificant impact on low-liquidity creation banks' liquidity creation (coefficient 0.016, p-value 0.652). This suggests that political institutions do not affect low-liquidity creation banks. Regarding the interest rate as an economic institutional variable, it does not significantly impact low-liquidity creation banks (coefficient 0.383, p-value 0.354). While *Overall economic freedom* has a positive impact (coefficient 0.692, p-value 0.000), the regulatory institutional variable (*activity restriction*) negatively impacts low-liquidity creation banks (coefficient 0.118, p-value 0.002). For Islamic institutions, all institutional variables have positive impacts.

Panel B presents the results for high-liquidity creation banks. Unlike low-liquidity creation banks, the political institutional variable (*polity 2*) positively impacts high-liquidity creation banks' liquidity creation (coefficient 0.095, p-value 0.009), which suggests that high-liquidity creation banks' liquidity creation tends to be affected by the political institutions of a country. The *short-term interest rate* negatively impacts high-liquidity creation banks' liquidity creation (coefficient 1.114, p-value 0.009). Unlike the baseline model's result, *overall economic freedom* negatively impacts high-liquidity creation banks' liquidity creation (coefficient 0.156, p-value 0.094). However, *activity restriction* negatively impacts high-liquidity creation banks' liquidity creation (coefficient 0.139, p-value 0.020), which is consistent with the result from the initial model. Interestingly, all Islamic institutional variables negatively impact high-liquidity creation banks' liquidity creation.

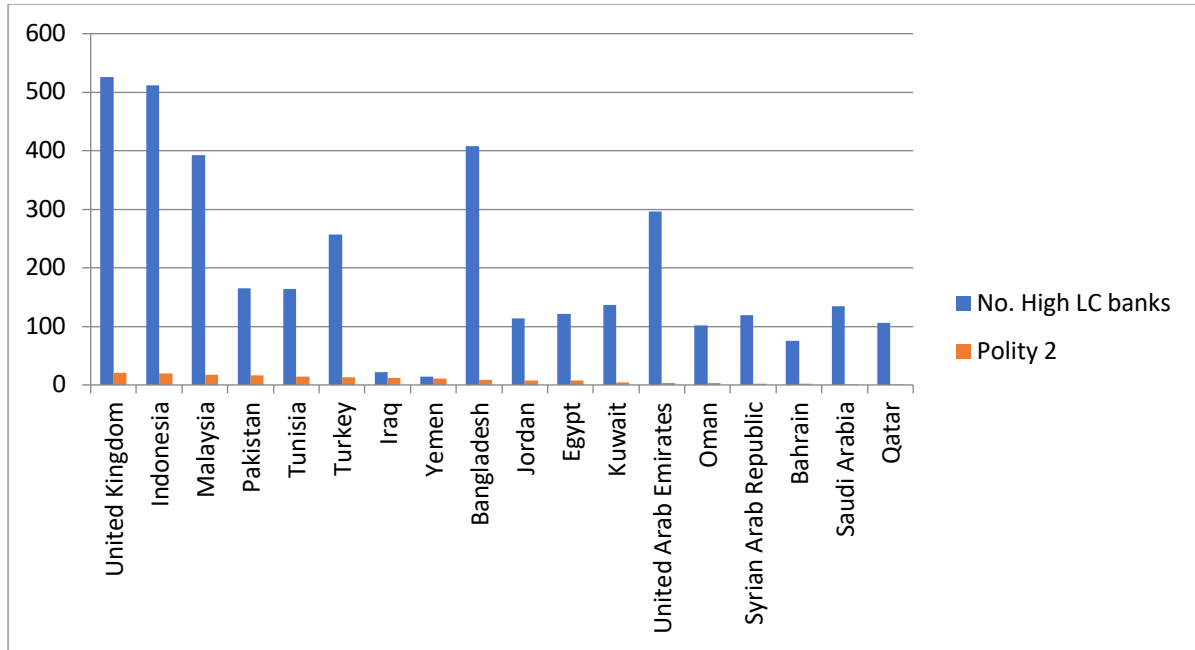
Interestingly, political institutions differentially affect banks' liquidity creation according to their levels of liquidity creation. While political institutions have nonsignificant impacts on low-liquidity creation banks' liquidity creation, they have significant positive impacts on high-liquidity creation banks' liquidity creation. Given the various components and activities of liquidity creation mechanisms, and based on our dataset, which shows that high-liquidity creation banks have higher mean values of total assets than low-liquidity creation banks, high-liquidity creation banks are mostly large banks that are engaged in various banking businesses. Most activities are closely related to a country's institutions, including its political institutions. Furthermore, another probable explanation is that there are more high-liquidity creation than low-liquidity creation banks in more democratic countries. Graph 1 shows that countries with high-liquidity creation banks tend to have higher *polity 2* scores (they are more likely to be democratic). The more democratic countries are, the more affected their banks'

liquidity creation is likely to be by democratic institutions. Meanwhile, banks in countries without a democratic system are not affected by those institutions.

Regarding the impact of economic freedom, unlike the full-sample and low-liquidity creation bank analyses, high-liquidity creation banks are negatively affected by economic freedom. This is probably due to the negative impact of banking competition. As mentioned earlier, high-liquidity creation banks tend to engage in many banking businesses and activities, which can be negatively affected by a high level of banking competition in a market. According to the ‘fragility channel’ hypothesis, an increase in bank competition may increase the fragility of banks, reducing bank profits (Petersen & Rajan, 1995), since larger banks are more exposed to market conditions due to their higher non-deposit funding, which is sensitive to market conditions (Berger, 2012, cited in Chatterjee, 2015). Thus, larger banks are more sensitive to market-dependent variables when they create liquidity; consequently, high-liquidity creation banks are also sensitive to market-dependent variables.

In terms of Islamic institutions, all positively impact low-liquidity creation banks, whereas they negatively impact high-liquidity creation banks. As our dataset shows, this is probably because most high-liquidity creation banks are conventional banks. The summary statistics in Table 21 show that conventional banks’ mean total assets (3.419) is higher than that of Islamic banks (3.321), which suggests that conventional banks are larger than Islamic banks, on average. Thus, the impact of Islamic institutions is relatively minor, which is consistent with the political economy and the new institutional economics (NIE) theories.

This result implies that to increase high-liquidity creation banks’ liquidity creation, a country requires good-quality democratic institutions and a low level of economic freedom. This subsample analysis again confirms the importance of political institutions and reinforces the political economy and the new institutional economics (NIE) theories.



**[The number of high-liquidity creation banks and polity 2 scores by country]**

**- Low- and high-corruption countries**

**Table 25: Effect of institutions on bank liquidity creation by country-level corruption**

Variable	Panel A: Low-corrupted countries							Panel B: High-corrupted countries						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Political institution</i>	0.105*** (0.000)							0.024 (0.182)						
<i>Short-term interest rate</i>		-4.061*** (0.002)							-0.147 (0.742)					
<i>Overall economic freedom</i>			-0.105 (0.494)							0.765*** (0.000)				
<i>Activity restriction</i>				-0.142 (0.333)							-0.176*** (0.000)			
<i>Islamic political institution</i>					0.084 (0.453)							0.300*** (0.000)		
<i>Islamic economic institution</i>						0.086 (0.400)							0.282*** (0.000)	
<i>Islamic legal institution</i>							0.125 (0.224)							0.279*** (0.000)
<i>GDP growth</i>	0.130 (0.818)	0.496 (0.479)	0.244 (0.440)	0.926 (0.132)	0.961 (0.117)	0.946 (0.123)	0.905 (0.141)	-0.050 (0.854)	-0.521** (0.012)	0.177 (0.267)	0.014 (0.933)	0.075 (0.627)	0.083 (0.592)	0.086 (0.578)
<i>Inflation</i>	0.861 (0.117)	5.821*** (0.001)	1.512*** (0.000)	4.617*** (0.001)	4.090*** (0.002)	4.016*** (0.003)	3.957*** (0.003)	0.782*** (0.001)	0.718*** (0.000)	0.487*** (0.000)	0.275** (0.014)	0.371*** (0.000)	0.343*** (0.001)	0.332*** (0.002)
<i>Bank concentration</i>	0.201 (0.361)	-0.920 (0.358)	-0.339** (0.028)	1.138 (0.124)	1.526*** (0.009)	1.535*** (0.009)	1.514*** (0.010)	-0.333*** (0.001)	-0.348** (0.014)	0.006 (0.932)	-0.248** (0.038)	-0.168 (0.148)	-0.160 (0.170)	-0.137 (0.243)
<i>Unemployment rate</i>	-4.002*** (0.001)	-5.232*** (0.009)		-3.539* (0.052)	-2.750 (0.106)	-2.728 (0.108)	-2.699 (0.111)	-3.415*** (0.000)	-1.070 (0.122)		-0.124 (0.849)	-0.462 (0.437)	-0.641 (0.277)	-0.563 (0.341)
<i>Total asset</i>	-0.367*** (0.000)	-0.032 (0.769)	0.260*** (0.000)	0.241*** (0.001)	0.207** (0.010)	0.203** (0.012)	0.180** (0.032)	0.195*** (0.000)	0.315*** (0.000)	0.229*** (0.000)	0.333*** (0.000)	0.257*** (0.000)	0.269*** (0.000)	0.260*** (0.000)
<i>Equity to total asset</i>	0.404*** (0.000)	0.180 (0.411)	0.158** (0.039)	0.496** (0.020)	0.505** (0.018)	0.504** (0.018)	0.502** (0.018)	0.300 (0.105)	0.256 (0.308)	-0.683*** (0.000)	0.196 (0.339)	0.164 (0.084)	0.189 (0.325)	0.174 (0.366)
<i>Lerner index</i>		0.156 (0.724)		0.919*** (0.003)	1.054*** (0.000)	1.060*** (0.000)	1.044*** (0.000)		0.201** (0.039)		0.085 (0.338)	0.141* (0.084)	0.131 (0.109)	0.113 (0.164)
<i>Non-performing loans</i>	0.174 (0.152)	0.090 (0.716)		-0.079 (0.709)	-0.049 (0.819)	-0.045 (0.833)	-0.028 (0.895)	-0.442*** (0.002)	-0.235 (0.164)		-0.229** (0.034)	-0.339*** (0.001)	-0.344*** (0.001)	-0.352*** (0.001)
<i>Return on assets</i>	0.476 (0.281)	0.499 (0.425)	0.885*** (0.000)	0.132 (0.837)	0.071 (0.912)	0.064 (0.921)	0.043 (0.947)	-0.834 (0.101)	-1.083** (0.046)	0.054 (0.795)	-1.124** (0.022)	-1.397*** (0.003)	-1.403*** (0.003)	-1.381*** (0.003)
<i>Bank credit to private sector</i>	0.249* (0.087)		0.071 (0.174)					0.410*** (0.000)		0.211*** (0.000)				
<i>Intercept</i>	1.699*** (0.000)	1.503* (0.089)	0.273 (0.660)	-0.978 (0.238)	-1.516*** (0.004)	-1.513*** (0.004)	-1.433*** (0.006)	0.025 (0.880)	-0.300 (0.196)	-3.371*** (0.000)	-0.046 (0.832)	-0.283* (0.098)	-0.321* (0.060)	-0.297* (0.081)
<i>R<sup>2</sup></i>	0.187	0.231	0.112	0.380	0.379	0.379	0.381	0.261	0.199	0.166	0.235	0.239	0.238	0.239
<i>Observations</i>	833	471	1750	512	513	513	513	985	1021	2180	1138	1275	1275	1275

Note: the current study examines  $Liquidity\ creation_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  by using the fixed effect model and splitting samples by country corruption level where bank liquidity creation is calculated by Berger and Bouwman (2009) and Berger et al. (2019)'s measurement. The key independent variable is institutional variables, which are political institution (*Polity 2*), economic institution (*Short-term interest rate* and *Overall economic freedom*), regulatory institution (*Activity restriction*) and Islamic institutions (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). Control variables include *GDP growth*, *Inflation*, *Bank concentration*, *Unemployment rate*, *Total asset*, *Equity to total asset*, *the Lerner index*, *Corruption rate*, *Non-performing loans*, *Return on assets* and *Bank credit to private sector*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

To examine the effect of institutions on bank liquidity creation concerning corruption, this study splits the sample into low- and high-corruption countries. As seen from panel A, less corrupted countries' bank liquidity creation is significantly affected by the *political institution* (coefficient 0.105, p-value 0.000). For economic institutions, while *short-term interest rate* negatively impacts low-corruption countries' bank liquidity creation (coefficient 4.061, p-value 0.002), *Overall economic freedom* has a nonsignificant impact on low-corruption countries' bank liquidity creation (coefficient 0.105, p-value 0.494). Interestingly, Islamic institutions show nonsignificant impacts on low-corruption countries' bank liquidity creation.

Panel B presents institutional impact on high-corruption countries' bank liquidity creation. High-corruption countries' bank liquidity creation is not affected by the *political institutions* of a country (coefficient 0.024, p-value 0.182). While *short-term interest rate* negatively impacts high-corruption countries' bank liquidity creation (coefficient 0.147, p-value 0.742), *Overall economic freedom* positively impacts their liquidity creation (coefficient 0.765, p-value 0.000). Regarding regulatory institutions, *activity restriction* negatively impacts high-corruption countries' bank liquidity creation (coefficient 0.176, p-value 0.000). Islamic institutions significantly impact high-corruption countries' bank liquidity creation.

This study finds that generally, low-corruption countries' bank liquidity creation is affected more by political institutions than that of high-corruption countries. A possible reason for this is that low-corruption countries are more likely to be democratic countries than high-corruption ones, as Nur-tegin (2012) revealed, and democratic countries are more affected by democratic institutions. Meanwhile, high-corruption countries without a democratic system are not significantly affected by political institutions, while the impact of democracy is relatively minor. Interestingly, the impact of Islamic institutions on bank liquidity creation is nonsignificant in low-corruption countries. This is because low-corruption countries are more likely to be democratic countries than high-corruption countries. Last, and interestingly, regardless of a country's corruption level, regulatory intervention negatively affects its bank liquidity creation, which suggests that the more regulation there is on banks, the less liquidity is created. This result implies that each country requires a different level of political institutions commensurate with its corruption level. For instance, for low-corruption countries, more developed democratic institutions might be helpful in increasing their bank liquidity creation, whereas for high-corruption countries, those democratic institutions might not be effective in increasing their bank liquidity creation. This result provides strong



evidence of the close relationship between democracy and corruption. Reducing regulatory intervention in banks' activities may affect bank liquidity creation regardless of a country's corruption level.

– **Low- and high-income countries**

**Table 26: Effect of institutions on bank liquidity creation by country-level income**

Variable	Panel A: Low income countries							Panel B: High income countries						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Political institution</i>	0.025*							0.075**						
	(0.075)							(0.030)						
<i>Short-term interest rate</i>		-2.013***							-1.063					
		(0.005)							(0.124)					
<i>Overall economic freedom</i>			0.586***							0.027				
			(0.000)							(0.863)				
<i>Activity restriction</i>				-0.200***							-0.228**			
				(0.000)							(0.013)			
<i>Islamic political institution</i>					0.286***							0.170*		
					(0.003)							(0.099)		
<i>Islamic economic institution</i>						0.251***							0.195**	
						(0.008)							(0.043)	
<i>Islamic legal institution</i>							0.198**							0.190**
							(0.040)							(0.045)
<i>GDP growth</i>	1.425***	-2.128***	-0.932***	-1.837***	-0.781	-0.715	-0.640	0.505*	-0.263	-0.311*	-0.175	-0.181	-0.204	-0.193
	(0.004)	(0.000)	(0.003)	(0.001)	(0.135)	(0.195)	(0.238)	(0.095)	(0.268)	(0.090)	(0.446)	(0.429)	(0.373)	(0.395)
<i>Inflation</i>	0.225	0.779***	0.417***	0.423*	0.499**	0.501**	0.499**	0.693	1.184***	0.763***	0.877***	1.215***	1.221***	1.221***
	(0.243)	(0.007)	(0.001)	(0.086)	(0.026)	(0.026)	(0.027)	(0.183)	(0.000)	(0.003)	(0.006)	(0.000)	(0.000)	(0.000)
<i>Bank concentration</i>	-0.063	-0.051	-0.009	-0.581***	-0.450***	-0.452***	-0.413**	0.169*	-0.543**	0.151**	-0.475**	-0.423*	-0.416*	-0.426**
	(0.493)	(0.798)	(0.908)	(0.001)	(0.007)	(0.006)	(0.013)	(0.052)	(0.017)	(0.050)	(0.027)	(0.051)	(0.055)	(0.050)
<i>Unemployment rate</i>		-1.972***		-0.884	-1.301**	-1.649***	-1.461***		-1.404		-0.777	-1.061	-1.047	-1.053
		(0.001)		(0.140)	(0.023)	(0.003)	(0.009)		(0.316)		(0.490)	(0.338)	(0.342)	(0.339)
<i>Total asset</i>	-0.003	0.053	0.128***	0.109***	0.129***	0.146***	0.135***	-0.047	0.320***	0.141***	0.438***	0.331***	0.324***	0.317***
	(0.899)	(0.300)	(0.000)	(0.008)	(0.001)	(0.000)	(0.000)	(0.304)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
<i>Equity to total asset</i>	-0.553***	0.245	-0.285***	0.201	0.314*	0.342*	0.320*	-0.520***	0.180	-0.460***	0.318	0.188	0.189	0.190
	(0.000)	(0.339)	(0.003)	(0.317)	(0.094)	(0.069)	(0.089)	(0.000)	(0.445)	(0.000)	(0.168)	(0.417)	(0.413)	(0.410)
<i>Lerner index</i>		0.200		0.376***	0.439***	0.423***	0.425***		0.344*		0.221	0.343**	0.323*	0.313*
		(0.121)		(0.000)	(0.000)	(0.000)	(0.000)		(0.059)		(0.210)	(0.041)	(0.052)	(0.060)
<i>Corruption</i>	0.002	0.039***	0.032***	0.027***	-0.001	0.009	0.002	0.039***	0.004	0.028***	0.008	-0.018	-0.024	-0.024
	(0.843)	(0.000)	(0.000)	(0.000)	(0.960)	(0.532)	(0.901)	(0.000)	(0.664)	(0.000)	(0.388)	(0.347)	(0.203)	(0.210)
<i>Non-performing loans</i>		-0.436**		-0.125	-0.059	-0.046	-0.049		0.111		-0.000	-0.086	-0.093	-0.092
		(0.020)		(0.250)	(0.567)	(0.658)	(0.630)		(0.561)		(1.000)	(0.642)	(0.618)	(0.620)
<i>Return on assets</i>	-0.571*	-0.982	-0.047	-0.609	-0.902	-0.898	-0.896	1.424***	0.593	0.538***	0.651	0.354	0.359	0.379
	(0.055)	(0.173)	(0.868)	(0.308)	(0.110)	(0.113)	(0.113)	(0.000)	(0.286)	(0.010)	(0.242)	(0.522)	(0.515)	(0.492)
<i>Bank credit to private sector</i>	2.307***		0.664***					0.048		-0.003				
	(0.000)		(0.000)					(0.336)		(0.944)				
<i>Intercept</i>	-0.097	0.693***	-2.399***	0.978***	0.253	0.226	0.226	0.494**	-0.325	-0.026	-0.400	-0.486	-0.455	-0.419
	(0.322)	(0.006)	(0.000)	(0.000)	(0.192)	(0.244)	(0.244)	(0.014)	(0.369)	(0.968)	(0.248)	(0.113)	(0.139)	(0.179)
<i>R<sup>2</sup></i>	0.390	0.371	0.296	0.416	0.430	0.426	0.429	0.073	0.092	0.079	0.130	0.112	0.113	0.113
<i>Observations</i>	1320	634	1748	691	777	777	777	1203	832	2087	863	914	914	914

Note: the current study examines  $Liquidity\ creation_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  by using the fixed effect model and splitting samples by country income level where bank liquidity creation is calculated by Berger and Bouwman (2009) and Berger et al. (2019)'s measurement. The key independent variable is institutional variables, which are political institution (*Polity 2*), economic institution (*Short-term interest rate* and *Overall economic freedom*), regulatory institution (*Activity restriction*) and Islamic institutions (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). Control variables include *GDP growth*, *Inflation*, *Bank concentration*, *Unemployment rate*, *Total asset*, *Equity to total asset*, *the Lerner index*, *Corruption rate*, *Non-performing loans*, *Return on assets* and *Bank credit to private sector*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

Lastly, this study divides the sample based on country income level to investigate how institutions differentially affect bank liquidity creation in different income-level countries. As shown in panels A and B, both low- and high-income countries' bank liquidity creation are significantly affected by the political institutions of a country (coefficients 0.025, 0.075, p-values 0.075, 0.030, respectively). This result suggests that regardless of a country's income status, political institutions can significantly affect its banks' liquidity creation.

The impact of economic institutions varies between samples: while *short-term interest rate* has a negative and significant impact on low-income countries' bank liquidity creation (coefficient 2.013, p-value 0.005), it does not significantly impact high-income countries' bank liquidity creation (coefficient -1.063, p-value 0.124). Concerning the impact of economic freedom, whereas it positively impacts low-income countries' bank liquidity creation (coefficient 0.586, p-value 0.000), it does not show any significant effect on high-income countries' bank liquidity creation (coefficient 0.027, p-value 0.863).

However, this analysis found a negative impact of regulatory institutions (*activity restriction*) on liquidity creation, regardless of a country's income status (coefficients 0.200, 0.228, p-values 0.000, 0.013, respectively for low- and high-income countries). This result suggests that regulatory intervention in bank activity negatively affects the bank liquidity creation of countries of any income status.

Additionally, both groups' liquidity creation are significantly affected by Islamic institutions. This result is probably due to the fact that Islamic institutions share their nature with the conventional perspective of democratic values.

The significant impact of political institutions on bank liquidity creation regardless of a country's income status or economic development is consistent with Acemoglu et al. (2019)'s findings. Unlike the finding in many previous studies that a positive impact of democracy depends on a country's status or degree of economic development (which has been a popular claim), Acemoglu et al. (2019) empirically found that a country's economic development played no role in the impact of democracy. This finding contradicts Posner (2010, cited in Acemoglu et al., 2019), who argues that a dictatorship can be more suitable or optimal for very poor countries since those countries lack cultural and institutional settings for democracy. However, the current study also finds that the impact of political institutions does not vary according to a country's income level. In other words, irrespective of whether a country is rich, democracy can help to increase banks' liquidity creation. The implication of

this finding for policymakers is that they might have to be concerned about each bank's liquidity creation and country's corruption levels in establishing appropriate political institutions; however, a country's income level should not matter. Instead, based on the results of all the subsample analyses, reducing regulatory intervention would help increase banks' liquidity creation. Lastly, this study finds a positive impact of Islamic institutions on banks' liquidity creation, probably due to the fact that Islamic institutions share their nature with the conventional perspective of democratic values.

#### **4.4.2.3. Interaction term**

**Table 27: Effect of interaction between political institution, economic freedom, activity restriction and bank equity on bank liquidity creation**

<i>Variable</i>	(1)	(2)	(3)
<i>Political institution</i>	-4.806*** (0.001)	0.849* (0.059)	-0.067 (0.254)
<i>Overall economic freedom</i>	-2.721*** (0.000)		
<i>Activity restriction</i>		0.383 (0.306)	
<i>Equity to total asset</i>			-2.578** (0.012)
<i>Polity2* Overall economic freedom</i>	1.200*** (0.000)		
<i>Polity2*Activity restriction</i>		-0.308* (0.090)	
<i>Polity2*Equity to total asset</i>			1.465*** (0.003)
<i>GDP growth</i>	-0.105 (0.750)	0.030 (0.929)	-0.148 (0.652)
<i>Inflation</i>	0.548* (0.058)	0.572* (0.055)	0.538* (0.054)
<i>Bank concentration</i>	-0.709*** (0.000)	-0.656*** (0.000)	-0.697*** (0.000)
<i>Unemployment rate</i>	-2.185*** (0.008)	-0.562 (0.525)	-2.606*** (0.000)
<i>Total asset</i>	0.132*** (0.002)	0.091* (0.062)	0.109** (0.014)
<i>Equity to total asset</i>	0.342** (0.049)	0.312* (0.080)	
<i>Lerner index</i>	0.247** (0.047)	0.080 (0.542)	0.174 (0.147)
<i>Corruption</i>	0.027*** (0.001)	0.025*** (0.005)	0.021** (0.011)
<i>Non-performing loans</i>	-0.283** (0.049)	-0.272* (0.064)	-0.337** (0.019)
<i>Return on assets</i>	-0.111 (0.805)	0.149 (0.746)	-0.144 (0.751)
<i>Bank credit to private sector</i>	0.138* (0.055)	0.132** (0.050)	0.105 (0.100)
<i>Intercept</i>	11.259*** (0.000)	-0.795 (0.421)	0.679*** (0.008)
<i>R<sup>2</sup></i>	0.279	0.275	0.275
<i>Observations</i>	982	878	982

Note: the model (1) examines  $Liquidity\ creation_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Political\ Institution_{it} + \beta_3 Economic\ Institution_{it} + \beta_4 Controls_{it} + \varepsilon_{it}$  by interacting political institution (*Polity 2*) and economic institution (*Overall economic freedom*), and the model (2) examines  $Liquidity\ creation_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Political\ Institution_{it} + \beta_3 Regulatory\ Institution_{it} + \beta_4 Controls_{it} + \varepsilon_{it}$  by interacting political institution (*Polity 2*) and regulatory institution (*Activity restriction*). The model (3) examines  $Liquidity\ creation_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Political\ Institution_{it} + \beta_3 Bank\ Equity_{it} + \beta_4 Controls_{it} + \varepsilon_{it}$  by interacting political institution (*Polity 2*) and Bank equity (*Equity to total asset*). Bank liquidity creation is calculated by Berger and Bouwman (2009) and Berger et al. (2019)'s measurement. Control variables include *GDP growth*, *Inflation*, *Bank concentration*, *Unemployment rate*, *Total asset*, *Equity to total asset*, *the Lerner index*, *Corruption rate*, *Non-performing loans*, *Return on assets* and *Bank credit to private sector*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

Table 27 shows the impacts of the interactions between political, economic, regulatory institutions and bank equity on bank liquidity creation. To empirically confirm the political institutions theory and the hierarchy of institutions hypothesis (HIH), which emphasise the role of political institutions as the ultimate institutions that determine and affect other subordinate institutions, and their crucial effect on banking and economic performance, this study considers the interaction effects. This test identifies how various institutions affect bank liquidity creation when integrated with political institutions. Many studies have confirmed the importance of political institutions in the effects of other institutions. For instance, Baum and Lack (2003) find that democracy is an effective tool in ensuring economic freedom, while Agoraki et al. (2019) argue that democracy is a prerequisite for financial liberalisation and an adequate financial regulatory framework. Conversely, the detrimental impact of financial openness can be eased by a solid institutional environment with efficient public and private monitoring of financial institutions (Anginer & Demircu-Kunt, 2014).

Model (1) shows that *overall economic freedom* has a significant and positive impact on banks' liquidity creation in the presence of *political institution*. This means that in the presence of good-quality political institutions (better democratic atmosphere), the positive impact of economic freedom on banks' liquidity creation is significant. Compared with the direct relationship between economic institutions and liquidity creation (coefficient 0.290, p-value), the impact of the interaction between political and economic institutions on banks' liquidity creation (coefficient 1.200, p-value 0.000) is more significant. Model (2) shows the effect of the interaction between the political and regulatory (*activity restriction*) institutional variables. The result shows that in the presence of good-quality political institutions, the negative impact of regulatory institutions on liquidity creation is enhanced. The coefficient of the interaction between political and regulatory institutions on bank liquidity creation (0.308) is higher than that of the direct relationship between regulatory institutions and bank liquidity creation (0.159). This means that the more democratic the environments, the less regulatory intervention can significantly impact banks' liquidity creation. In other words, in the presence of more democratic environments, economic and regulatory institutions function better. Lastly, model (3) shows the effect of the interaction between the *political institution* and *equity to total asset* ratio: in the presence of good-quality political institutions, bank equity fulfils its positive role of creating banks' liquidity. This means that in the institutional environment in which highly democratic institutions develop, bank capital fulfils its positive role of improving banks' ability to create liquidity by absorbing their risks. In other words, a

highly democratic environment can facilitate the positive role of bank capital in improving banks' ability to create liquidity by absorbing their risks. This finding contradicts previous empirical studies on the impact of capital on liquidity creation; these previous studies find a negative impact of capital on bank liquidity creation. For instance, Casu et al. (2019) confirm trade-off relationships between capital and bank liquidity creation, while Bouwbakri et al., (2021) argue that bank liquidity creation may decrease because capital may crowd out deposits. Their finding supports the 'financial fragility-crowding out' effect (Berger & Bouwman, 2009).

This finding is consistent with those of previous studies that examine the positive and ultimate role of political institutions in relation to other institutions and consequent banking performance. For example, Flachaire et al. (2014) find different roles of political and economic institutions in the growth rate; while political institutions have an indirect impact of providing the stage on which economic institutions can operate, economic institutions have a more direct impact. Quintyn and Verdier (2010) obtained a similar finding, noting the short-term effect of economic institutions and long-term effects of political institutions on financial development. Slesman et al. (2019) obtained a similar finding in their empirical study, and argued that political institutions were core components of financial growth among all institutions. Primarily, Slesman et al.'s study argued that good-quality political institutions played a crucial role in providing a conducive environment for financial markets in developing and emerging countries. Meanwhile, weak political institutions result in an inefficient financial system. Because the sample countries in the current study are mostly developing countries, the impact of political institutions may appear to be bigger. Additionally, Chortareas et al. (2013) find that the positive impact of financial freedom on bank efficiency tends to manifest in freer political environments. This is because, in freer political environments, governments can formulate and implement better-quality policies and engage in high-quality government.

The current study differs from previous others in that it examines the effect of the interaction between political and other institutions on bank liquidity creation. The result provides strong evidence that political institutions play the ultimate role that determines and affects other subordinate institutions, and eventually affects banking performance, including bank liquidity creation. Thus, to increase bank liquidity creation, more comprehensive political institutions are required; this implies that policymakers must implement proper political institutional environments.

#### **4.4.3. Robustness test**

This section presents the results of various robustness tests. First, the current study conducts a regression analysis using alternative institutional variables (political, economic, regulatory, and Islamic institutional variables). The second test uses propensity score matched samples. This is to address the imbalance between the samples (conventional versus Islamic banks). Last, an endogeneity test is performed using two-stage least square (2SLS) to address the endogeneity problems.

##### **4.4.3.1. Alternative variables**



**Table 28: Effect of institutions on bank liquidity creation using alternative institutional factors**

Variable	Full sample					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Democracy</i>	0.133*** (0.000)					
<i>Lending interest rate</i>		-1.375*** (0.006)				
<i>Financial freedom</i>			0.091*** (0.002)			
<i>Supervisory power</i>				-0.232*** (0.000)		
<i>Market discipline</i>					-0.084*** (0.000)	
<i>Islamicity overall</i>						0.161** (0.013)
<i>GDP growth</i>	-0.093 (0.747)	-0.518** (0.014)	-0.216 (0.129)	0.004 (0.980)	0.063 (0.699)	0.022 (0.887)
<i>Inflation</i>	0.616** (0.012)	1.091*** (0.000)	0.345*** (0.005)	0.182 (0.126)	0.153 (0.194)	0.315*** (0.006)
<i>Bank concentration</i>	-0.680*** (0.000)	-0.336** (0.017)	0.134** (0.013)	-0.250** (0.042)	-0.260** (0.032)	-0.244** (0.042)
<i>Unemployment rate</i>	-2.792*** (0.000)	-1.783*** (0.007)		-1.079* (0.061)	-1.850*** (0.002)	-1.291** (0.019)
<i>Total asset</i>	0.142*** (0.000)	0.210*** (0.000)	0.165*** (0.000)	0.255*** (0.000)	0.237*** (0.000)	0.269*** (0.000)
<i>Equity to total asset</i>	0.295* (0.073)	0.099 (0.602)	-0.369*** (0.000)	0.193 (0.227)	0.151 (0.338)	0.297* (0.053)
<i>Lerner index</i>	0.217** (0.031)	0.227** (0.012)		0.191** (0.028)	0.306*** (0.001)	0.179** (0.033)
<i>Corruption</i>	0.020*** (0.010)	0.029*** (0.000)	0.032*** (0.000)	0.015** (0.016)	0.013** (0.032)	-0.007 (0.573)
<i>Non-performing loans</i>	-0.138 (0.191)	-0.080 (0.433)		-0.111 (0.255)	-0.164* (0.090)	-0.222** (0.021)
<i>Return on assets</i>	-0.148 (0.728)	-0.417 (0.314)	0.405** (0.011)	-0.020 (0.962)	-0.033 (0.934)	-0.376 (0.340)
<i>Bank credit to private sector</i>			0.053 0.110			
<i>Intercept</i>	0.254 (0.215)	0.115 (0.592)	-0.406*** (0.000)	0.343 (0.184)	0.450** (0.039)	-0.235 (0.167)
<i>R<sup>2</sup></i>	0.266	0.272	0.126	0.194	0.210	0.193
<i>Observations</i>	1132	1306	3875	1599	1599	1736

Note: the current study examines  $Liquidity\ creation_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  by using the fixed effect model and employing alternative institutional factors where bank liquidity creation is calculated by Berger and Bouwman (2009) and Berger et al. (2019)'s measurement. The alternative institutional variables used in this regression is political institution (*Democracy*), economic institution (*Lending interest rate* and *Financial freedom*), regulatory institution (*Supervisory power* and *Market discipline*) and Islamic institution (*Islamicity overall*). Control variables include *GDP growth*, *Inflation*, *Bank concentration*, *Unemployment rate*, *Total asset*, *Equity to total asset*, *the Lerner index*, *Corruption rate*, *Non-performing loans*, *Return on assets* and *Bank credit to private sector*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

**Table 29: Effect of institutions on bank liquidity creation using alternative institutional factors – comparing conventional and Islamic banks**

Variable	Panel A: Conventional Banks						Panel B: Islamic Banks					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
<i>Democracy</i>	0.131*** (0.000)						0.140 (0.542)					
<i>Lending interest rate</i>		-1.411*** (0.003)						-5.339 (0.119)				
<i>Financial freedom</i>			0.107** (0.013)						-0.094 (0.628)			
<i>Supervisory power</i>				-0.236*** (0.000)						-0.488 (0.187)		
<i>Market discipline</i>					-0.089*** (0.000)						-0.107 (0.134)	
<i>Islamicity overall</i>						0.056 (0.380)						0.643*** (0.004)
<i>GDP growth</i>	0.213 (0.475)	-0.464** (0.040)	0.172 (0.292)	0.050 (0.767)	0.118 (0.479)	0.127 (0.437)	-3.553** (0.010)	-0.401 (0.526)	-0.279 (0.515)	-0.452 (0.342)	-0.329 (0.495)	-0.494 (0.247)
<i>Inflation</i>	0.588** (0.017)	1.246*** (0.000)	0.467*** (0.000)	0.340*** (0.003)	0.300*** (0.008)	0.445*** (0.000)	0.722 (0.628)	-0.501 (0.546)	-0.739* (0.092)	-0.999** (0.034)	-1.042** (0.028)	-0.780* (0.069)
<i>Bank concentration</i>	-0.351** (0.037)	-0.129 (0.376)	-0.021 (0.865)	-0.093 (0.464)	-0.068 (0.588)	-0.058 (0.643)	-1.015* (0.071)	-1.148** (0.014)	-1.333*** (0.002)	-1.523*** (0.001)	-1.505*** (0.001)	-1.147*** (0.006)
<i>Unemployment rate</i>	-3.090*** (0.000)	-2.415*** (0.000)	-1.349** (0.014)	-1.767*** (0.001)	-2.544*** (0.000)	-1.772*** (0.001)	0.300 (0.951)	-0.057 (0.989)	1.038 (0.735)	1.789 (0.571)	1.461 (0.644)	1.651 (0.573)
<i>Total asset</i>	0.139*** (0.001)	0.257*** (0.000)	0.308*** (0.000)	0.288*** (0.000)	0.280*** (0.000)	0.326*** (0.000)	-0.022 (0.935)	-0.103 (0.514)	0.041 (0.751)	-0.056 (0.719)	-0.106 (0.532)	-0.036 (0.758)
<i>Equity to total asset</i>	0.380** (0.026)	0.569*** (0.003)	0.730*** (0.000)	0.635*** (0.000)	0.583*** (0.000)	0.747*** (0.000)	-0.682 (0.517)	-0.582 (0.431)	-0.875* (0.097)	-1.082* (0.060)	-1.268** (0.036)	-0.807 (0.118)
<i>Lerner index</i>	0.248** (0.017)	0.090 (0.302)	0.028 (0.742)	0.025 (0.775)	0.173** (0.048)	0.041 (0.631)	0.058 (0.934)	0.686 (0.103)	0.878*** (0.006)	1.017*** (0.002)	1.033*** (0.002)	0.790** (0.011)
<i>Corruption</i>	0.016* (0.054)	0.016** (0.013)	0.006 (0.274)	0.002 (0.703)	0.000 (0.990)	-0.001 (0.920)	0.078 (0.121)	0.112*** (0.000)	0.082*** (0.000)	0.080*** (0.000)	0.083*** (0.000)	-0.011 (0.770)
<i>Muslim population</i>	2.046* (0.056)	0.243 (0.493)	0.533* (0.071)	0.111 (0.714)	0.361 (0.223)	0.546* (0.066)	4.073* (0.063)	0.946 (0.311)	0.239 (0.734)	0.132 (0.856)	0.259 (0.719)	0.526 (0.442)
<i>Non-performing loans</i>	-0.165 (0.114)	-0.089 (0.339)	-0.298*** (0.001)	-0.198** (0.031)	-0.247*** (0.006)	-0.283*** (0.002)	0.052 (0.951)	0.417 (0.537)	1.059** (0.026)	1.205** (0.013)	1.214** (0.013)	1.026** (0.025)
<i>Return on assets</i>	-0.202 (0.628)	-0.217 (0.566)	-0.671* (0.084)	-0.298 (0.444)	-0.348 (0.362)	-0.680* (0.081)	0.698 (0.878)	-2.224 (0.400)	1.248 (0.358)	2.097 (0.191)	1.950 (0.210)	1.291 (0.332)
<i>Intercept</i>	-1.371* (0.065)	-0.303 (0.390)	-1.306*** (0.000)	0.124 (0.743)	0.003 (0.992)	-0.924*** (0.003)	-2.326 (0.357)	1.086 (0.423)	1.130 (0.319)	2.376 (0.164)	2.067 (0.154)	0.666 (0.511)
<i>R<sup>2</sup></i>	0.268	0.308	0.227	0.230	0.254	0.224	0.536	0.379	0.293	0.312	0.314	0.321
<i>Observations</i>	1052	1143	1482	1357	1357	1482	80	163	254	242	242	254

Note: samples are dividing into conventional and Islamic banks. The current study examines  $Liquidity\ creation_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \epsilon_{it}$  by using the fixed effect model and employing alternative institutional factors where bank liquidity creation is calculated by Berger and Bouwman (2009) and Berger et al. (2019)'s measurement. The alternative institutional variables used in this regression is political institution (*Democracy*), economic institution (*Lending interest rate* and *Financial freedom*), regulatory institution (*Supervisory power* and *Market discipline*) and Islamic institution (*Islamicity overall*). Control variables include *GDP growth*, *Inflation*, *Bank concentration*, *Unemployment rate*, *Total asset*, *Equity to total asset*, *Lerner index*, *Corruption rate*, *Muslim population*, *Non-performing loans*, *Return on assets* and *Bank credit to private sector*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

Table 28 shows the full-sample analysis using the alternative institutional variables. As can be seen from the table, the results for most institutions are consistent with those from the baseline model. The score for *democracy*, an alternative political institutional variable for *polity 2*, positively affects bank liquidity creation. This result suggests that more democratic countries have higher bank liquidity creation than less democratic countries. The result supports the hierarchy of institutions hypothesis (HIH) by confirming the vital role of political institutions in banking performance. It is also consistent with Haber's (2007) finding. He used a pooled cross-sectional regression to examine the impact of democracy and the ratio of bank credit to GDP, and found that an increase in executive constraints led to a five-percentage point increase in bank credit. This is because democratic political institutions may create a competitive banking industry, thus increasing bank credit.

As with the original variable, *lending interest rate* has a negative impact. This finding is consistent with that of Dang and Dang (2021), who employed short-term lending rates as a monetary policy variable and found a negative impact of lending rate on Vietnamese commercial banks' liquidity creation. In a low-interest rate situation, banks tend to issue more loans to their customers at decreased interest rates and on relaxed lending terms (Berger & Bouwman, 2017; Dang & Dang, 2021). This may increase bank deposits and loan volumes, increasing bank liquidity creation (Berger & Bouwman, 2017; Dang & Dang, 2021; Yeddou & Pourroy, 2020). Moreover, on the off-balance-sheet side, banks can provide more commitments to customers with more loanable funds at cheaper costs (Dang & Dang, 2021).

Alternative regulatory institutional variables (*Supervisory power* and *Market discipline*) have a negative impact, consistent with the results for the original regulatory institutional variables. Countries with less supervisory power and market discipline tend to have more bank liquidity creation. This result is consistent with those of Berger et al. (2016) and Bouwman (2018). Because regulatory intervention can reduce portfolio risk, banks may reduce risky lending activities and bank liquidity creation to adjust their portfolios (Berger et al., 2016).

Islamic institutions (*Islamicity overall*) positively impact bank liquidity creation. This reinforces the baseline result. The *Islamicity overall* index assesses a country's overall Islamicity level, including the extent to which the country reflects Islamic economic, political, legal, social, human, and governance values. The political, economic, and regulatory institutions encompassed by this comprehensive index, which embraces many aspects of society's institutions, share their nature with the conventional perspective of democratic

values, as pointed out in the theory section. Hence, the institutions positively affect bank liquidity creation regardless of banking type. Additionally, considering that the sample in the current study comprises primarily Muslim-majority countries, this might affect the result.

Table 29 shows a sub-sample analysis (conventional vs Islamic banks) based on alternative institutional variables. The sub-sample results are also consistent with those from the baseline model. This result reinforces the significant influence of *democracy* on conventional bank liquidity creation and supports the new institutional economics (NIE) theory and the hierarchy of institutions hypothesis (HIH). Thus, proper institutional environments derived from their philosophy and purpose are necessary for the performance of each banking system. Moreover, as the ultimate institutions, political institutions are essential. While *lending interest rate* shows a negative impact, *financial freedom* positively impacts conventional bank's liquidity creation. Regulatory institutions (*Supervisory power* and *Market discipline*) negatively affect conventional banks liquidity creation.

As in the baseline model, Islamic institutions (*Islamicity overall*) do not affect conventional banks' liquidity creation. However, they significantly affect Islamic banks' liquidity creation. This result confirms the political economy and the new institutional economics (NIE) theories, as in the conventional sample, requiring proper institutional environments for the performance of each banking system. This finding is consistent with those of Bitar et al., (2017) and Asutay and Sidek (2020), who examine the impact of the Islamic environment on Islamic banking performance, although they do not include bank liquidity creation.

#### **4.4.3.2. Propensity Score Matching (PSM)**

**Table 30: Effect of institutions on bank liquidity creation using propensity score matched sample**

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<i>Democracy</i>	0.133*** (0.000)												
<i>Political institution</i>		0.080*** (0.006)											
<i>Lending interest rate</i>			-1.305** (0.011)										
<i>Short-term interest rate</i>				-0.801* (0.070)									
<i>Overall Economic freedom</i>					0.038 (0.828)								
<i>Financial freedom</i>						0.110** (0.017)							
<i>Supervisory power</i>							-0.243*** (0.000)						
<i>Activity restriction</i>								-0.158*** (0.001)					
<i>Market discipline</i>									-0.086*** (0.000)				
<i>Islamicity overall</i>										0.158** (0.016)			
<i>Islamic economic institution</i>											0.142** (0.024)		
<i>Islamic legal institution</i>												0.149** (0.016)	
<i>Islamic political institution</i>													0.169** (0.014)
<i>GDP growth</i>	-0.098 (0.736)	-0.210 (0.515)	-0.513** (0.016)	-0.457** (0.020)	-0.065 (0.713)	-0.099 (0.576)	-0.002 (0.992)	-0.059 (0.719)	0.058 (0.887)	0.021 (0.894)	0.022 (0.887)	0.029 (0.854)	0.004 (0.981)
<i>Inflation</i>	0.564** (0.039)	0.487 (0.126)	1.092*** (0.000)	0.930*** (0.000)	0.857*** (0.000)	0.898*** (0.000)	0.147 (0.231)	0.217* (0.077)	0.118 (0.330)	0.301** (0.010)	0.299** (0.011)	0.295** (0.012)	0.314*** (0.007)
<i>Bank concentration</i>	-0.683*** (0.000)	-0.641*** (0.000)	-0.333** (0.019)	-0.344** (0.020)	-0.368*** (0.006)	-0.341** (0.011)	-0.264** (0.034)	-0.252** (0.044)	-0.272** (0.027)	-0.248** (0.041)	-0.250** (0.039)	-0.243** (0.045)	-0.250** (0.040)
<i>Unemployment rate</i>	-2.776*** (0.000)	-2.658*** (0.000)	-1.672** (0.014)	-1.552** (0.017)	-1.552** (0.017)	-1.552** (0.017)	-0.991* (0.090)	-0.519 (0.390)	-1.766*** (0.003)	-1.247** (0.026)	-1.282** (0.022)	-1.250** (0.026)	-1.207** (0.031)
<i>Total asset</i>	0.141*** (0.000)	0.160*** (0.000)	0.211*** (0.000)	0.217*** (0.000)	0.300*** (0.000)	0.281*** (0.000)	0.249*** (0.000)	0.290*** (0.000)	0.233*** (0.000)	0.268*** (0.000)	0.272*** (0.000)	0.267*** (0.000)	0.265*** (0.000)
<i>Equity to total asset</i>	0.294* (0.075)	0.422** (0.015)	0.104 (0.585)	0.219 (0.212)	0.319** (0.040)	0.293* (0.060)	0.184 (0.252)	0.285* (0.072)	0.154 (0.330)	0.296* (0.055)	0.300* (0.052)	0.297* (0.054)	0.290* (0.061)
<i>Lerner index</i>	0.221** (0.031)	0.117 (0.318)	0.240*** (0.009)	0.231** (0.021)	0.208** (0.020)	0.208** (0.020)	0.133 (0.147)	0.332*** (0.000)	0.187** (0.029)	0.186** (0.029)	0.176** (0.029)	0.197** (0.038)	0.197** (0.022)
<i>Corruption</i>	0.020** (0.010)	0.019** (0.022)	0.030*** (0.000)	0.020*** (0.001)	0.026*** (0.000)	0.024*** (0.000)	0.015** (0.013)	0.017** (0.004)	0.013** (0.027)	-0.006 (0.639)	-0.004 (0.756)	-0.005 (0.658)	-0.006 (0.617)
<i>Non-performing loans</i>	-0.141 (0.186)	-0.342** (0.017)	-0.078 (0.447)	-0.076 (0.575)	-0.076 (0.575)	-0.076 (0.575)	-0.106 (0.279)	-0.178* (0.070)	-0.159* (0.100)	-0.220** (0.023)	-0.218** (0.025)	-0.221** (0.023)	-0.222** (0.022)
<i>Return on assets</i>	-0.161 (0.706)	-0.234 (0.600)	-0.412 (0.323)	0.007 (0.987)	0.062 (0.872)	0.055 (0.887)	-0.027 (0.946)	-0.187 (0.646)	-0.050 (0.901)	-0.382 (0.335)	-0.387 (0.329)	-0.372 (0.348)	-0.390 (0.325)
<i>Bank credit to private sector</i>					0.087 (0.152)	0.053 (0.382)							
<i>Intercept</i>	0.261 (0.208)	0.251 (0.235)	0.087 (0.690)	0.037 (0.869)	-0.574 (0.414)	-0.762*** (0.000)	0.389 (0.137)	0.025 (0.906)	0.473** (0.032)	-0.234 (0.173)	-0.247 (0.149)	-0.229 (0.183)	-0.226 (0.190)
<i>R<sup>2</sup></i>	0.265	0.265	0.272	0.157	0.188	0.191	0.196	0.192	0.212	0.193	0.192	0.193	0.193
<i>Observations</i>	1127	981	1296	1474	1691	1691	1588	1588	1588	1725	1725	1725	1725

Note: the current study examines  $Liquidity\ creation_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \epsilon_{it}$  by using the propensity score matched sample where bank liquidity creation is calculated by Berger and Bouwman (2009) and Berger et al. (2019)'s measurement. The independent variable includes main and alternative institutional variables used in the previous regression models, which are political institution (*Polity 2* and *Democracy*), economic institution (*Short-term interest rate*, *Lending interest rate* and *Overall Economic freedom*, *Financial freedom*), regulatory institution (*Activity restriction*, *Supervisory power* and *Market discipline*) and Islamic institutions (*Islamicity overall*, *Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). Control variables include *GDP growth*, *Inflation*, *Bank concentration*, *Unemployment rate*, *Total asset*, *Equity to total asset*, *the Lerner index*, *Corruption rate*, *Non-performing loans*, *Return on assets* and *Bank credit to private sector*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

Table 30 shows the effect of institutions on bank liquidity creation based on a propensity score-matched sample. This method addresses the imbalance that arises between the two different banking types because Islamic banks are much fewer than conventional banks: It provides the quality of the match between the two groups. Many empirical studies that compare conventional and Islamic banks employ this method (*see*: Bitar et al., 2017; Berger et al., 2019).

Having matched the samples, this study examines the impact of institutions (including the main and alternative institutional variables) on bank liquidity creation. The result reinforces that obtained from the original regression model. For instance, both political institutional variables, *democracy* and *political institution*, positively impact bank liquidity creation, which suggests that democracy plays a vital role in increasing bank liquidity. This finding confirms the theory of political institutions and the hierarchy of institutions hypothesis (HIH) that emphasises the importance of a country's political institutions for banking performance.

Both interest rates, *lending interest rates* and *short-term interest rates*, negatively impact bank liquidity creation. This implies that countries' lower interest rates tend to create more bank liquidity. Monetary expansion in the form of a low-interest rate can increase a bank's net worth since banks tend to issue more loans to their customers at decreased interest rates and on relaxed lending terms (Berger & Bouwman, 2017; Dang & Dang, 2021). This may increase bank deposits and loan volumes, thus increasing bank liquidity creation.

While *overall economic freedom* has a nonsignificant impact, *financial freedom* positively impacts bank liquidity creation. These results may be because the samples become smaller than before matching; consequently, there are too few observations for the overall index (*Overall economic freedom*) to capture; instead, only one component of economic freedom (*financial freedom*) is captured from the samples. However, the analysis still finds a positive impact of financial freedom on bank liquidity creation. The result may be due to the positive impact of banking competition, thus supporting the theory of the 'price channel' view. Increased competition may affect pricing policies through reduced loan rates and increased deposits rates (Ahmed, 2013; Cubillas & ález, 2014; Horvath et al., 2016).

Concerning regulatory institutions, all institutional variables (*activity restriction*, *Supervisory power*, and *Market discipline*) negatively impact bank liquidity creation. This finding confirms that more regulatory interventions in banking do not enhance bank liquidity creation.

All Islamic institutional variables (*Islamicity overall, Islamic economic institution, Islamic legal institution, and Islamic political institution*) positively impact bank liquidity creation. Regarding control variables, while *inflation rate, total assets, equity to total assets, corruption rate* and *Lerner index* have a positive effect, *GDP growth, bank concentration ratio* and *unemployment rate* have a negative impact.

#### **4.4.3.3. Endogeneity test**

The current study first determines whether an endogeneity problem exists in the research model using the Ramsey RESET test. The results obtained were as follows:

*Ho: Model has no omitted variables*

$$F(3, 442) = 2.97$$

$$Prob > F = 0.0317$$

The p-value for the test is significant, rejecting the null hypothesis that the model has no omitted variables. This suggests an omitted-variable problem in the research model.

**Table 31: Effect of institutions on bank liquidity creation employing two-stage least square method**

Variable	Full sample						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Political institution</i>	0.212*						
	(0.098)						
<i>Short-term interest rate</i>		-2.515***					
		(0.000)					
<i>Overall economic freedom</i>			0.392***				
			(0.001)				
<i>Activity restriction</i>				-0.247**			
				(0.022)			
<i>Islamic political institution</i>					0.297***		
					(0.000)		
<i>Islamic economic institution</i>						0.332***	
						(0.000)	
<i>Islamic legal institution</i>							0.304***
							(0.000)
<i>GDP growth</i>	1.541***	-0.558**	0.095	0.881**	0.295*	0.347*	0.344*
	(0.001)	(0.025)	(0.581)	(0.027)	(0.099)	(0.051)	(0.052)
<i>Inflation</i>	1.264***	1.658***	0.012	1.774***	0.411***	0.369***	0.363***
	(0.002)	(0.000)	(0.937)	(0.000)	(0.001)	(0.003)	(0.004)
<i>Bank concentration</i>	-0.378**	-0.050	-0.047	-0.222***	-0.118**	-0.167***	-0.163***
	(0.015)	(0.459)	(0.249)	(0.006)	(0.028)	(0.001)	(0.001)
<i>Unemployment rate</i>	0.970	-1.247***		-1.159***	-0.342	-0.462**	-0.488**
	(0.258)	(0.000)		(0.000)	(0.104)	(0.026)	(0.018)
<i>Total asset</i>	0.021*	0.057***	0.068***	0.012	0.039***	0.038***	0.037***
	(0.090)	(0.000)	(0.000)	(0.395)	(0.000)	(0.000)	(0.000)
<i>Equity to total asset</i>	-0.981***	-0.979***	-0.817***	-0.921***	-0.752***	-0.762***	-0.772***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
<i>Lerner index</i>	-0.108	0.131		0.778***	0.600***	0.567***	0.537***
	(0.634)	(0.160)		(0.000)	(0.000)	(0.000)	(0.000)
<i>Corruption</i>	0.076***	0.046***	0.057***	0.037***			
	(0.000)	(0.000)	(0.000)	(0.000)			
<i>Non-performing loans</i>	0.246*	0.071		0.478***	0.098	0.085	0.091
	(0.086)	(0.598)		(0.000)	(0.232)	(0.299)	(0.266)
<i>Return on assets</i>	1.222**	-0.121	1.303***	2.516***	1.344***	1.286***	1.327***
	(0.015)	(0.844)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
<i>Bank credit to private sector</i>			-0.107***				
			(0.000)				
<i>Intercept</i>	0.020	0.622***	-1.139**	0.953***	0.342***	0.372***	0.399***
	(0.913)	(0.000)	(0.015)	(0.001)	(0.000)	(0.000)	(0.000)
<i>R<sup>2</sup></i>	213.73	306.55	1133.55	297.57	343.90	372.53	366.79
<i>Observations</i>	903	896	3875	1413	1736	1736	1736

Note: the table reports result of the two-stage least square method of the full sample. Bank liquidity creation is calculated by Berger and Bouwman (2009) and Berger et al. (2019)'s measurement. The key independent variable is institutional variables, which are political institution (*Polity 2*), economic institution (*Short-term interest rate* and *Overall economic freedom*), regulatory institution (*Activity restriction*) and Islamic institutions (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). Instrumental variables include *Regime durability* for political institution; *different types of interest rates* for interest rates; *property right*, *government integrity* and *government spending* for economic freedom; *capital adequacy ratio* for regulatory institution; *Muslim population* and *Corruption* for Islamic institution. Control variables include *GDP growth*, *Inflation*, *Bank concentration*, *Unemployment rate*, *Total asset*, *Equity to total asset*, *the Lerner index*, *Corruption rate*, *Muslim population*, *Non-performing loans*, *Return on assets* and *Bank credit to private sector*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.



**Table 32: Effect of institutions on bank liquidity creation employing two-stage least square – conventional vs. Islamic banks**

Variable	Panel A: Conventional Banks							Panel B: Islamic Banks						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Political institution</i>	1.412*** (0.000)							0.241 (0.648)						
<i>Short-term interest rate</i>		-3.009*** (0.000)							-2.041 (0.510)					
<i>Overall economic freedom</i>			1.172*** (0.000)							0.165 (0.541)				
<i>Activity restriction</i>				-0.278** (0.013)							-3.120 (0.348)			
<i>Islamic political institution</i>					0.256*** (0.000)							0.678*** (0.000)		
<i>Islamic economic institution</i>						0.293*** (0.000)							0.576*** (0.000)	
<i>Islamic legal institution</i>							0.269*** (0.000)							0.551*** (0.000)
<i>GDP growth</i>	-1.153* (0.087)	-0.972*** (0.000)	-0.125 (0.544)	1.150** (0.014)	0.439** (0.023)	0.482** (0.012)	0.483** (0.012)	-1.980 (0.249)	0.484 (0.463)	0.491 (0.148)	3.144 (0.336)	-0.274 (0.521)	-0.141 (0.740)	-0.168 (0.690)
<i>Inflation</i>	1.155** (0.025)	2.059*** (0.000)	1.227*** (0.000)	2.088*** (0.000)	0.535*** (0.000)	0.490*** (0.000)	0.488*** (0.000)	-2.185 (0.456)	-0.813 (0.400)	-0.099 (0.818)	-3.447 (0.215)	-0.215 (0.570)	-0.234 (0.535)	-0.276 (0.459)
<i>Bank concentration</i>	-1.028*** (0.000)	0.082 (0.203)	-0.436*** (0.000)	-0.129 (0.137)	-0.041 (0.479)	-0.081 (0.135)	-0.076 (0.167)	-1.152** (0.018)	-0.775*** (0.010)	-0.706*** (0.000)	-3.039 (0.221)	-0.543*** (0.000)	-0.649*** (0.000)	-0.660*** (0.000)
<i>Unemployment rate</i>	-3.667*** (0.001)	-1.598*** (0.000)	-1.036*** (0.000)	-1.198*** (0.000)	-0.414* (0.060)	-0.531** (0.015)	-0.554** (0.011)	-0.876 (0.891)	0.331 (0.744)		4.179 (0.360)	0.905 (0.137)	0.576 (0.340)	0.563 (0.346)
<i>Total asset</i>	0.032** (0.026)	0.045*** (0.003)	0.022** (0.035)	0.009 (0.500)	0.041*** (0.000)	0.039*** (0.000)	0.038*** (0.000)	0.563*** (0.000)	0.153** (0.028)	0.219*** (0.000)	0.150 (0.183)	0.170*** (0.000)	0.163*** (0.001)	0.157*** (0.001)
<i>Equity to total asset</i>	-1.242*** (0.000)	-1.106*** (0.000)	-0.783*** (0.000)	-0.812*** (0.000)	-0.548*** (0.000)	-0.573*** (0.000)	-0.581*** (0.000)	1.221 (0.205)	-0.680*** (0.001)	-0.869*** (0.000)	-0.211 (0.765)	-0.559*** (0.001)	-0.571*** (0.001)	-0.584*** (0.000)
<i>Lerner index</i>	-1.422*** (0.000)	0.007 (0.946)	0.352*** (0.000)	0.759*** (0.000)	0.559*** (0.000)	0.535*** (0.000)	0.505*** (0.000)	-0.153 (0.887)	0.395* (0.082)		0.398 (0.408)	0.218 (0.202)	0.203 (0.238)	0.164 (0.337)
<i>Corruption</i>	0.037** (0.012)	0.035*** (0.000)	0.040*** (0.000)	0.030*** (0.005)				0.028 (0.694)	0.112*** (0.000)	0.093*** (0.000)	0.061 (0.144)			
<i>Muslim population</i>	0.455*** (0.000)		0.459*** (0.000)					-0.586 (0.658)						
<i>Non-performing loans</i>	0.464*** (0.004)	-0.072 (0.630)	0.029 (0.731)	0.446*** (0.000)	0.032 (0.709)	0.026 (0.765)	0.030 (0.731)	-0.031 (0.990)	0.185 (0.550)		0.733 (0.384)	0.265 (0.290)	0.182 (0.466)	0.215 (0.386)
<i>Return on assets</i>	1.173** (0.037)	0.216 (0.725)	0.576 (0.147)	2.378*** (0.000)	1.036** (0.011)	0.978** (0.015)	1.014** (0.012)	6.021 (0.277)	-1.728 (0.456)	0.399 (0.296)	9.461 (0.308)	2.148* (0.099)	1.921 (0.138)	2.094 (0.104)
<i>Bank credit to private sector</i>										0.104* (0.073)				
<i>Intercept</i>	-1.608*** (0.000)	0.728*** (0.000)	-4.487*** (0.000)	0.956*** (0.001)	0.284*** (0.000)	0.311*** (0.000)	0.334*** (0.000)	-0.328 (0.802)	0.441 (0.224)	-0.455 (0.662)	8.573 (0.328)	0.193 (0.352)	0.306 (0.131)	0.360* (0.069)
<i>R<sup>2</sup></i>	207.68	290.04	416.88	232.13	237.61	257.43	252.90	71.62	96.10	934.31	38.42	174.02	173.42	178.13
<i>Observations</i>	853	744	1475	1201	1482	1482	1482	50	152	709	212	254	254	254

Note: the table reports result of the two-stage least square method of the conventional and Islamic banks sample. Bank liquidity creation is calculated by Berger and Bouwman (2009) and Berger et al. (2019)'s measurement. The key independent variable is institutional variables, which are political institution (*Polity 2*), economic institution (*Short-term interest rate* and *Overall economic freedom*), regulatory institution (*Activity restriction*) and Islamic institutions (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). Instrumental variables include *Regime durability* for political institution; *different types of interest rates* for interest rates; *property right*, *government integrity* and *government spending* for economic freedom; *capital adequacy ratio* for regulatory institution; *Muslim population* and *Corruption* for Islamic institution. Control variables include *GDP growth*, *Inflation*, *Bank concentration*, *Unemployment rate*, *Total asset*, *Equity to total asset*, *the Lerner index*, *Corruption rate*, *Muslim population*, *Non-performing loans*, *Return on assets* and *Bank credit to private sector*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

This study employs two-stage least square (2SLS) to address the endogeneity problem. As shown in Table 31, the initial regression result is confirmed. *Political institution* still positively impacts banks' liquidity creation, while *short-term interest rates* have a negative impact, which also supports the initial result. *Overall economic freedom* also reinforces the initial result by showing a positive impact on liquidity creation. Regarding regulatory institutions, *activity restriction* has a negative effect. Consistent with the initial result, Islamic institutions have a positive impact. For control variables, *GDP growth*, *inflation rate*, *Lerner index*, *corruption rate*, *Return on assets*, and *total assets* have a positive impact, while *bank concentration rate*, *unemployment rate* and *equity to total assets* have a negative impact.

Table 32 shows the results of the two-stage least square (2SLS) tests for conventional and Islamic banks, which are mostly consistent with the initial result. In panel A, while *political institution* positively impacts bank liquidity creation, *short-term interest rate* negatively impacts it. *Overall economic freedom* positively affects conventional banks' liquidity creation, whereas *activity restriction* has a negative impact. Unlike the initial result, Islamic institutions have a positive impact. For control variables, while *unemployment rate* and *equity to total assets* have negative impacts, *Lerner index*, *corruption rate*, *Muslim population*, *total assets*, and *Return on assets* have positive impacts. Panel B also reinforces the initial result by confirming the impact of Islamic institutions on Islamic banks' liquidity creation. For control variables, while *bank concentration ratio* and *equity to total assets* have a negative impact, *total assets* and *corruption rate* have positive impacts.

Following the two-stage least square (2SLS) test using instrumental variables (Ullah et al., 2021), the current study conduct the Stock-Yogo test / F-statistic to determine the strength of the instrumental variables used. This test examines the correlation level between additional instrumental and endogenous variables (Ullah et al., 2021). As a result, the F-statistic is significant; thus, this study can reject the null hypothesis that the instrumental variables are weak. Therefore, this test confirms that the instrumental variables employed in this study are strong. Additionally, this study performs each regression between the independent and instrumental variables, controlling for firm and country-level effects. The instrumental variable's coefficient is found to be significant, while the F-statistic of the regression is confirmed.

#### 4.5. Conclusion

Banks' liquidity creation is a crucial function in an economy: it contributes to capital allocation and consequently economic growth (Berger et al., 2019; Bouwman, 2018; Casu et al., 2019; Diaz & Huang, 2017; Jiang et al., 2019). However, an excessive level of liquidity creation by banks may expose banks to various risks, including liquidity risks (Bouwman, 2018; Diaz & Huang, 2017) and can cause an asset bubble, which can also lead to a financial crisis (Berger et al., 2019). Therefore, managing bank liquidity creation at a proper level is essential; to do this, it is necessary to identify and examine the crucial determinants of bank liquidity creation. According to the political economy, new institutional economics (NIE) theories and the hierarchy of institutions hypothesis (HIH), appropriate political and institutional environments are essential for a country's financial deepening and development (Quintyn & Verdier, 2010). Consequently, the current study aimed to examine the impact of political and institutional variables on bank liquidity creation.

This study conducted an empirical investigation that employed both conventional and Islamic institutions to examine the impact of those institutions on banks' liquidity creation performance. The study produced essential findings. First, political institutions have a significant and positive role in banks' liquidity creation regardless of a country's banking type and income status. This study also shows that the impact of a political institution varies according to banks' liquidity creation statuses and countries' corruption rates. Second, this study confirms that economic and regulatory institutions significantly impact banks' liquidity creation. Moreover, the study finds that economic and regulatory institutions have a stronger impact on banks' liquidity creation in the presence of political institutions. This result confirms the vital and ultimate role of political institutions. Third, the study confirms the negative impact of regulatory interventions on bank activities regardless of banking type and whether a bank is integrated with good-quality political institutions. Last, the study found that Islamic institutions also influenced bank liquidity creation and that this effect was more significant in the Islamic banks' sample.

The study offers major contributions to the existing political economy and banking literature. First, it is an empirical study of bank liquidity creation from the political economy perspective, employing political, economic, and regulatory institutions as the main variables, which has not been sufficiently performed before. Second, this study empirically confirms the vital role of political institutions in bank liquidity creation, supporting the hierarchy of

institutions hypothesis (HIH). Last, the study empirically demonstrates the importance of Islamic institutional environments for Islamic banking liquidity creation.

Important policy implications follow from the findings of this study. First, policymakers need to introduce and establish high-quality democratic institutions within their countries to increase bank liquidity creation. Since changing a society's political structure or regime type is not trivial, one possible example is the promotion of democratic values within a country's political system, such as solid check-and-balance or electoral systems, enhancing the competitiveness and openness of the executive recruiting system, or opening a new channel for a public voice for political participation. Second, one recommendation for regulators is that fewer regulatory interventions in bank activities be imposed to increase bank liquidity creation. Also, reducing excessive liquidity creation using regulatory interventions in bank activity might be an effective tool to control liquidity creation. Third, this finding may impact bank management's capital level plan. It is recommended that bank management set a high level of capital to increase their bank liquidity creation. Last, as the study finds a positive impact of Islamic environments on Islamic bank liquidity creation, Islamic institutions in the market should be improved to increase Islamic bank liquidity creation. Therefore, it is recommended that policymakers in Islamic bank-operating countries introduce and establish proper Islamic institutions within their countries to raise their banks' liquidity creation.

This study has its limitations. First, the compatibility and consistency issues between the components of the Islamic and conventional indices are a concern. This problem arises from the limited number of available proxies for the Islamic system. Moreover, even the conventional institutional measures were insufficient and controversial (Acemoglu et al., 2019; Asutay & Sidek, 2020). A future study could use more specific Islamic and conventional variables. Second, the sample countries in this study were limited mainly to Muslim-majority countries. This issue was unavoidable, as the countries selected each had to have at least two Islamic banks operating for an accurate comparison. As Islamic banks continue to increase in number worldwide, future studies will have better data from which to draw.

## **CHAPTER 5: CONCLUSION**

## 5.1. Summary and research findings

The banking sector's performance and development are critical to the overall economy's outcomes and growth (Braun & Raddatz, 2010; Imam & Kpodar, 2010; Sufian & Habibullah, 2010). Despite this knowledge, only some countries have developed financial systems, markets, and economic development (Braun & Raddatz, 2010; Quintyn & Verdier, 2010). Instead, each country and market shows various forms, sizes, and degrees of development in the banking sector. Many views in the political economy discipline argue that appropriate political and institutional environments are essential for a country's financial deepening and development, which leads to diverse forms of financial markets (Quintyn & Verdier, 2010). In particular, the theory of political institutions raised by Acemoglu et al. (2005) and the hierarchy of institutions hypothesis (HIH) refers to the importance of political institutions as ultimate institutions that form other institutions, such as economic and regulatory institutions, and their critical impact on economic performance and outcome. Many empirical studies confirm the role of political institutions and their impact on economic growth in general (Acemoglu et al., 2019; Przeworski & Limongi, 1993; Rivera-Batiz, 2002), and banking performance in particular (Agoraki et al., 2019; Ashraf, 2017; Hasanov & Bhattacharya, 2019; Jackowicz et al., 2013; Liu & Ngo, 2014).

Besides, the banking sector and politics are inseparable because banks provide the source of government income and influence the government's regulation and supervision using political connections (Jackowicz et al., 2013). To prevent strong ties with politics and address the conflicts among various parties involved in the banking sector, such as the government, regulators, and borrowers, appropriate institutions that can limit authority and discretion are needed (Haber et al., 2008). Therefore, identifying the political and institutional determinants of banking performance is vital.

As another dimension of this study, the Islamic banking and finance industry has a distinctive feature due to Islamic law's economic and financial principles (*shariah*). It has been growing rapidly in recent years and has attracted much interest from the Muslim and non-Muslim worlds (Ahmed, 2009; Asutay & Sidek, 2020; Asutay & Turkistani, 2015; Belal et al., 2014). Remarkably, after the 2008 financial crisis, the industry's relative resilience compared to its conventional counterparts attracted academic research interest. As a result, many comparative studies of Islamic and conventional banking performance have been conducted. Considering the potential of Islamic banks, the rapid growth of the industry and the importance of political economy research, theoretical and empirical research on this issue is required.

This study conducted a comprehensive conceptual analysis based on the existing theories to differentiate the theoretical differences between conventional and Islamic institutions. This study also conducted a systematic literature review to summarise the current theoretical and empirical research examining the impact of various institutions on economic and banking performance. Furthermore, it conducted empirical tests to fill the research gap in the political economy of banking performance. The empirical chapters examine the impact of political, economic, and regulatory institutions on bank efficiency and bank liquidity creation using a cross-country panel dataset.

By conducting a systematic literature review, this study has three findings. First, although Islamic institutions share commonalities with conventional institutions, they have distinct and additional institutional features. For instance, while from a conventional perspective, Western democracy is primarily rooted in the philosophy of Europe and America (Yusof et al., 2014), the Islamic perspective on democracy is derived from the ultimate religious sources of Islam. Thus, institutions' meanings, features, elements, and requirements vary.

Second, although there have been clear theoretical relationships between political, economic, and regulatory institutions and banking performance, empirical research on this issue has not been conducted well in both conventional and Islamic banking literature. Moreover, empirical research on the effect of institutions on banking performance tends to focus heavily on economic and regulatory institutions. The impact of more comprehensive institutions, such as political institutions, is insufficient despite their ultimate role that determines and affects other institutions.

Third, many theoretical and empirical studies have compared the performance of conventional and Islamic banks. Nevertheless, studies on the impact of different institutional environments using Islamic institutions for each banking type have not been conducted. Given the political economy and new institutional economics (NIE) perspective, a proper institutional environment for each banking type is required. A more comprehensive institutional environment's (political) impact and the interaction among various institutions on specific banking performance remain unexplored. Remarkably, the importance of banking efficiency and liquidity creation has been growing since it affects the country's economic performance and development. Therefore, in-depth investigations of the institutional environments that affect banking efficiency and liquidity creation are needed. The research gaps in the literature motivate the following empirical chapters of this research.

The empirical chapters (Chapter 3 and 4) contain interesting findings. First, political institutions, which are referred to as the degree of democracy of a country, positively affect both bank efficiency and bank liquidity creation, both in conventional and Islamic banks. This result means that when more democratic institutions are present within a country, the country tends to have a higher bank efficiency and liquidity creation.

Second, although the single institutional impact of economic and regulatory institutions varies between bank efficiency and bank liquidity creation when integrated with political institutions, the positive effect of economic institutions and the negative influence of regulatory institutions become stronger. Financial freedom negatively affects bank efficiency, whereas when it is integrated with good quality political institutions (more democratic institutions), its impact becomes positive. Consequently, the positive impact of regulatory interventions on banking activity turns negative when integrated with good-quality political institutions. Regarding bank liquidity creation, this study confirms that economic and regulatory institutions significantly affect bank liquidity creation. Moreover, in finding that the impacts of economic and regulatory institutions become stronger in the presence of good-quality political institutions, the study confirms the ultimate role of political institutions. It indicates that, in the presence of high-quality political institutions, more economic freedom and fewer regulatory interventions help increase bank efficiency, and its impact becomes stronger to increase bank liquidity creation. This result empirically reinforces the hierarchy of institutions hypothesis (HIH) theory by confirming political institutions' vital and ultimate role and their critical impact on bank performance.

Finally, this study finds that Islamic institutions play a critical role in Islamic banking performance and positively influence Islamic bank efficiency and the creation of liquidity. This result empirically supports the theories of political economy and new institutional economics (NIE). Additionally, this study found that more regulations on bank activity with a more democratic institution are required to increase bank efficiency, particularly during a crisis. Moreover, it demonstrates that the impact of political institutions on bank liquidity creation varies according to each bank's liquidity creation status and the country's corruption rate.

The current study contributes to the existing research on the political economy of banking, finance, and Islamic finance by filling certain research gaps. First, it provides comprehensive conceptual knowledge of conventional and Islamic institutions. To the best of the author's knowledge, hardly any study attempts to examine the theoretical differences between



conventional and Islamic institutions. This study splits institutions into political and economic institutions and identifies the commonality and differences between those institutions from both conventional and Islamic perspectives. Despite having some common aspects of conventional institutions, such as the nature of democracy, Islamic institutions have several distinct and additional features. This study also analyses the underlying theories (political economy and new institutional economics) from the Islamic perspective.

Second, by exploring and summarising current theoretical and empirical research on the impact of institutions on banking performance, this study identifies the current research gaps in this area. Despite the growing importance of bank efficiency and liquidity creation as a banking performance measurement, empirical research on this issue concerning institutional environments is insufficient. Moreover, there has been no research that employs both conventional and Islamic institutions and investigates their impact on both conventional and Islamic banking performance.

Third, this study contributes to the literature on the political economy of banking efficiency from both conventional and Islamic banking perspective. This study provides empirical research on banking efficiency from a political economy perspective by investigating political, economic, and regulatory institutions' impact on bank efficiency. Moreover, this study empirically supports the hierarchy of institutions hypothesis (HIH) theory by finding the importance of political institutions on bank efficiency.

Fourthly, this study contributes to the literature on the political economy of bank liquidity creation, including conventional and Islamic banks. This study empirically demonstrates political institutions' importance and critical role in bank liquidity creation, directly or through their impacts on other institutions, which supports the hierarchy of institutions hypothesis (HIH). Moreover, the subsample analyses of the study find different impacts of political institutions on bank liquidity creation depending on the levels (low to high) of liquidity creation and country-level corruption.

Lastly, this study contributes to the literature on the political economy of Islamic banking. Existing literature on Islamic banking performance from a political economy perspective either examines the effect of conventional political institutions (*see*: Asutay & Sidek, 2020) or compares conventional political systems to *shariah*-based legal systems (*see*: Bitar et al., 2017). By employing both conventional and Islamic institutions, this study extends the extant literature confirming the importance of Islamic institutional environments for Islamic bank

efficiency and liquidity creation. The findings further suggest that Islamic banks are more efficient and create higher liquidity in a stronger Islamic institutional environment. This finding empirically supports the political economy and new institutional economics (NIE). According to these theories, every organisation and firm requires a correct institutional environment, including a political system, laws and regulations, and enforcement institutions.

## **5.2. Policy implications**

The findings of this study have significant policy implications for policymakers, regulators, and other stakeholders. First, the results of this study may inspire policy changes, as it found the significant importance of political institutions (democratic institutions) in the market in increasing bank efficiency and liquidity creation. Therefore, policymakers should introduce and implement high-quality democratic institutions within a market to improve bank efficiency and increase bank liquidity creation. However, changing a society's political structure or regime is not trivial. Instead, this study suggests a change in the institutions of society. For instance, promoting democratic institutions, such as enhancing sound checks and balance systems, electoral rules, the openness of the executive recruiting system, and opening various channels for a public voice for political participation within a country's political system, will be effective. Moreover, encouraging political competition by implementing proper political institutions will constrain political power in banking, which prevents the harmful interference of politicians. Furthermore, robust political environments are more important for emerging and developing countries without a proper political system, which can lead to poor economic policies, weak government, and turbulent transitions of power (Faccio, 2006; Li et al., 2008, cited in Bitar et al., 2017). In the sample countries of this study, most of which are developing nations, sound political environments with proper institutions are vital.

Second, as the impact of economic and regulatory institutions varies according to the presence of high-quality political institutions on bank efficiency and liquidity creation, appropriate economic and regulatory policies are needed considering a country's political environment. Thus, the finding may require regulators' appropriate levels of regulatory interventions on bank activities, considering each country's different political and institutional environments. For example, countries with high-quality democratic institutions require less regulatory intervention in banking activities to achieve high bank efficiency. Moreover, as this finding shows the negative influence of regulatory interventions on bank liquidity creation, it is suggested that regulators should impose fewer regulatory interventions

on bank activities if they want to increase bank liquidity creation. However, regulators should also be careful about excessive bank liquidity creation, which can create bank risks and increase the probability of a crisis (Nguyen et al., 2020). Regulators may effectively control the level of liquidity creation of banks by using regulatory interventions on bank activities.

Finally, this study provides important policy implications for policymakers in Islamic bank-operating countries. Islamic institutions should improve the market to increase both Islamic bank efficiency and bank liquidity creation. Implementing and improving Islamic institutions does not require dramatic change within a country because Islamic and conventional political and economic systems already have elements in common. For instance, Islamic political institutions ensure a democratic system, such as civil liberties and political rights, and Islamic economic institutions ensure economic and financial freedom by guaranteeing private property and contract rights. However, distinct Islamic economic institutions that ensure social and economic justice are additionally required. Thus, implementing institutions for income distribution, donating money systems, and volunteering systems to aid basic human needs may be good examples. Additionally, Islamic economic institutions that adhere to Islamic finance principles, such as the prohibition of interest on loan contracts, should be embodied. To implement these policies and institutions, the role of the government and its active will are essential.

### **5.3. Limitations and suggestions for future studies**

This study has several limitations. The first is the compatibility and consistency issues between Islamic and conventional indices in their components. This limitation is one of the critical challenges facing political-economic research. Even conventional institutional indices are insufficient and controversial in research owing to their strengths and weaknesses. For example, classifying countries according to different government types remains challenging (Acemoglu et al., 2019; Asutay & Sidek, 2020). Thus, more sophisticated and specific measures of institutional variables are required (Scully, 1988). Future research could use more specific and sophisticated variables for both Islamic and conventional institutions. Moreover, future research could employ diverse variables for their robustness tests. Second, regarding the measurements of Islamic banks' data, this study follows the international formats and terminologies of databases. Islamic banks do not deal with interest within a banking operation, and Islamic banks do not offer loans in the same way as conventional banks (Johnes et al., 2014). Gross loans in Islamic banks encompass equity- and debt-based Islamic products as a generic term. However, most international bank databases, including

Bankfocus and Fitchconnect, follow the international formats and generic terms of the balance sheet, off-balance sheet, and income statement. Consequently, the current study follows international formats and terminologies. Third, the sample countries in this study are limited to Muslim-majority countries, which led to most developing countries' samples. This study could not avoid this limitation as only countries with at least two Islamic banks were selected for an accurate comparison. Nevertheless, as the number of Islamic banks continues to increase worldwide, future studies could use diverse data by including developed countries and Muslim-minority countries

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## APPENDIX

### [Appendix 1: Chapter 3 sample banks by country]

No	Country	Conventional banks	Islamic banks
1	Bahrain	AHLI UNITED BANK BSC ALUBAF ARAB INTERNATIONAL BANK ARAB BANKING CORPORATION BSC BAHRAIN COMMERCIAL FACILITIES COMPANY BSC BBK B.S.C. FUTURE BANK B.S.C. NATIONAL BANK OF BAHRAIN STATE BANK OF INDIA MANAMA	ABC ISLAMIC BANK (E.C.) ALBARAKA BANKING GROUP B.S.C. ALBARAKA ISLAMIC BANK BSC ALSALAM BANKBAHRAIN B.S.C. BAHRAIN ISLAMIC BANK B.S.C. BMI BANK BSC GFH FINANCIAL GROUP B.S.C. IBDAR CAPITAL B.S.C CLOSED ITHMAAR BANK B.S.C. ITHMAAR HOLDING B.S.C. KHALEEJI COMMERCIAL BANK KUWAIT FINANCE HOUSE (Bahrain) LIQUIDITY MANAGEMENT CENTER BSC SHAMIL BANK OF BAHRAIN B.S.C. VENTURE CAPITAL BANK BSC (C) ALARAFAH ISLAMIC BANK LTD. EXPORT IMPORT BANK OF BANGLADESH LIMITED FIRST SECURITY ISLAMIC BANK LIMITED ICB ISLAMIC BANK LIMITED ISLAMIC BANK BANGLADESH LIMITED ISLAMIC FINANCE AND INVESTMENT LIMITED SHAHJALAL ISLAMIC BANK LTD SOCIAL ISLAMIC BANK LTD UNION BANK LIMITED
2	Bangladesh	AB BANK LTD AGRANI BANK LIMITED BANGLADESH COMMERCE BANK LTD BANK ASIA LIMITED BASIC BANK LTD BRAC BANK LIMITED CITIBANK NA BANGLADESH BRANCHES CITY BANK LTD COMMERCIAL BANK OF CEYLON PLC COMMUNITY BANK BANGLADESH LIMITED DHAKA BANK LIMITED DUTCHBANGLA BANK LIMITED EASTERN BANK LIMITED GLOBAL ISLAMIC BANK HABIB BANK LIMITED BANGLADESH BRANCHES HONGKONG AND SHANGHAI BANKING CORPORATION LTD BANGLADESH BRANCHES IFIC BANK LIMITED JAMUNA BANK LTD JANATA BANK LIMITED LANKABANGLA FINANCE LIMITED MEGHNA BANK LIMITED MERCANTILE BANK LIMITED MIDLAND BANK LIMITED MODHUMOTI BANK LIMITED MUTUAL TRUST BANK NATIONAL BANK LIMITED NATIONAL BANK OF PAKISTAN BANGLADESH BRANCHES NATIONAL CREDIT AND COMMERCE BANK LIMITED NRB BANK LIMITED NRB COMMERCIAL BANK LIMITED ONE BANK LIMITED PADMA BANK LIMITED PREMIER BANK LTD (THE) PRIME BANK LIMITED PROBASHI KALLYAN BANK PUBALI BANK LIMITED RUPALI BANK LIMITED SHIMANTO BANK LIMITED SONALI BANK LIMITED SOUTH BANGLA AGRICULTURE & COMMERCE BANK LIMITED SOUTHEAST BANK LIMITED STANDARD BANK LIMITED STATE BANK OF INDIA BANGLADESH TRUST BANK LTD (THE) UNITED COMMERCIAL BANK LTD UTTARA BANK LIMITED	
3	Egypt	ABU DHABI COMMERCIAL BANK EGYPT AHLI UNITED BANK (EGYPT) SAE AL AHLI BANK OF KUWAITEGYPT ARAB AFRICAN INTERNATIONAL BANK ARAB BANKING CORPORATION EGYPT (SAE) ARAB INTERNATIONAL BANK ATTIJARIWABA BANK EGYPT S.A.E. BANK AUDI SAE BANK OF ALEXANDRIA BANQUE DU CAIRE SAE BANQUE MISR SAE BLOM BANK EGYPT SAE COMMERCIAL INTERNATIONAL BANK (EGYPT)	ABU DHABI ISLAMIC BANK AL BARAKA BANK EGYPT SAE FAISAL ISLAMIC BANK OF EGYPT

S.A.E.  
 CREDIT AGRICOLE EGYPT SAE  
 EGYPTIAN GULF BANK SAE  
 EGYPTIAN NATIONAL POST OFFICE  
 EMIRATES NATIONAL BANK OF DUBAI SAE  
 HSBC BANK EGYPT S AE  
 NATIONAL BANK OF EGYPT  
 QNB ALAHLI BANK (S.A.E.)  
 SOCIETE ARABE INTERNATIONALE DE BANQUE  
 SUEZ CANAL BANK  
 THE NATIONAL BANK OF KUWAIT EGYPT SAE  
 UNITED BANK (THE)  
 BANGKOK BANK PCL JAKARTA BRANCH  
 BANGKOK BANK PUBLIC COMPANY LIMITED  
 BANK AMAR INDONESIA, PT  
 BANK ARTHA GRAHA INTERNASIONAL TBK  
 BANK ARTOS INDONESIA, PT  
 BANK BNP PARIBAS INDONESIA PT  
 BANK BPD JATENG  
 BANK BUMI ARTA  
 BANK CHINA CONSTRUCTION BANK INDONESIA  
 TBK., PT  
 BANK COMMONWEALTH  
 BANK DANAMON INDONESIA TBK  
 BANK DBS INDONESIA  
 BANK GANESHA  
 BANK HARDA INTERNASIONAL  
 BANK JASA JAKARTA, PT  
 BANK KESEJAHTERAAN EKONOMI  
 BANK MANDIRI (PERSERO) TBK  
 BANK MANDIRI TASPEN POS, PT  
 BANK MASPION INDONESIA  
 BANK MEGA TBK  
 BANK MESTIKA DHARMA  
 BANK MNC INTERNASIONAL TBK., PT  
 BANK NEGARA INDONESIA (PERSERO) TBK, PT  
 BANK OCBC NISP TBK  
 BANK OF AMERICA, JAKARTA BRANCH  
 BANK OF CHINA LIMITED (JAKARTA BRANCH)  
 BANK PEMBANGUNAN DAERAH KALIMANTAN  
 SELATAN PAGATAN  
 BANK PEMBANGUNAN DAERAH KALIMANTAN  
 TIMUR  
 BANK PEMBANGUNAN DAERAH MALUKU DAN  
 MALUKU UTARA, PT  
 BANK PEMBANGUNAN DAERAH NUSA TENGGARA  
 BARAT, PT (BANK NTB)  
 BANK PEMBANGUNAN DAERAH NUSA TENGGARA  
 TIMUR, PT (BANK NTT)  
 BANK PEMBANGUNAN DAERAH PAPUA, PT (BANK  
 PAPUA)  
 BANK PERMATA TBK  
 BANK QNB INDONESIA TBK., PT  
 BANK RAKYAT INDONESIA (PERSERO) TBK  
 BANK ROYAL INDONESIA  
 BANK SBI INDONESIA PT  
 BANK SINARMAS TBK., PT  
 BANK SULSELBAR, PT  
 BANK SULTENG, PT  
 BANK SULTRA  
 BANK TABUNGAN NEGARA (PERSERO)  
 BANK VICTORIA INTERNATIONAL TBK (PT)  
 CITIBANK NA  
 CITIBANK, KC INDONESIA BRANCH  
 DEUTSCHE BANK AG INDONESIAN BRANCHES  
 JPMORGAN CHASE BANK JAKARTA BRANCH  
 MUFG BANK, LTD., JAKARTA BRANCH  
 PT BANK ACEH  
 PT BANK ANZ INDONESIA  
 PT BANK BTPN TBK  
 PT BANK BUKOPIN  
 PT BANK CAPITAL INDONESIA  
 PT BANK CENTRAL ASIA TBK  
 PT BANK CIMB NIAGA TBK  
 PT BANK CTBC INDONESIA  
 PT BANK DKI  
 PT BANK FAMA INTERNATIONAL  
 PT BANK HSBC INDONESIA  
 PT BANK IBK INDONESIA TBK  
 PT BANK ICBC INDONESIA  
 PT BANK INA PERDANA TBK  
 PT BANK INDEX SELINDO  
 PT BANK JTRUST INDONESIA TBK  
 PT BANK KEB HANA  
 PT BANK MAYAPADA INTERNASIONAL TBK  
 PT BANK MAYBANK INDONESIA TBK  
 BANK SYARIAH MANDIRI  
 PT BANK ALADIN SYARIAH TBK  
 PT BANK BCA SYARIAH  
 PT BANK BNI SYARIAH  
 PT BANK JAWA BARAT BANTEN SYARIAH  
 PT BANK MEGA SYARIAH  
 PT BANK MUAMALAT INDONESIA TBK  
 PT BANK PANIN DUBAI SYARIAH TBK  
 PT BANK SYARIAH BUKOPIN  
 PT BANK SYARIAH INDONESIA  
 PT BANK VICTORIA SYARIAH

		PT BANK MAYORA PT BANK MIZUHO INDONESIA PT BANK MULTIARTA SENTOSA PT BANK NATIONALNOBU TBK PT BANK OF INDIA INDONESIA TBK PT BANK OKE INDONESIA TBK PT BANK PEMBANGUNAN DAERAH BALI PT BANK PEMBANGUNAN DAERAH BANTEN TBK PT BANK PEMBANGUNAN DAERAH BENGKULU PT BANK PEMBANGUNAN DAERAH ISTIMEWA YOGYAKARTA PT BANK PEMBANGUNAN DAERAH JAMBI PT BANK PEMBANGUNAN DAERAH KALIMANTAN BARAT PT BANK PEMBANGUNAN DAERAH KALIMANTAN TENGAH PT BANK PEMBANGUNAN DAERAH LAMPUNG PT BANK PEMBANGUNAN DAERAH RIAU KEPRI PT BANK PEMBANGUNAN DAERAH SULAWESI UTARA PT BANK PEMBANGUNAN DAERAH SUMATERA BARAT PT BANK RAKYAT INDONESIA AGRONIAGA TBK PT BANK RESONA PERDANIA PT BANK SAHABAT SAMPOERNA PT BANK TABUNGAN PENSIUNAN NASIONAL SYARIAH PT BANK UOB INDONESIA PT BANK WOORI SAUDARA INDONESIA 1906 TBK PT BANK YUDHA BHAKTI PT BPD JAWA BARAT DAN BANTEN TBK PT INTERNATIONAL BUSINESS BANK PT PRIMA MASTER BANK PT. BANK PANIN, TBK PT. BANK SUMUT PT. BPD JAWA TIMUR SHINHAN BANK INDONESIA STANDARD CHARTERED BANK INDONESIA ALTAIF ISLAMIC BANK FOR INVESTMENT & FINANCE	
5	Iraq	BABYLON BANK BANK OF BAGHDAD COMMERCIAL BANK OF IRAQ SA GULF COMMERCIAL BANK INTERNATIONAL ISLAMIC BANK IRAQI MIDDLE EAST INVESTMENT BANK NATIONAL BANK OF IRAQ NORTH BANK RT BANK SUMER COMMERICAL BANK PSC TRADE BANK OF IRAQ UNION BANK OF IRAQ	ALBILAD ISLAMIC BANK FOR INVESTMENTS & FINANCING CIHAN BANK FOR ISLAMIC INVESTMENT AND FINANCE P.S.C ELAF ISLAMIC BANK INTERNATIONAL DEVELOPMENT BANK FOR INVESTMENT & FINANCE IRAQI ISLAMIC BANK FOR INVESTMENT & DEVELOPMENT PJSC KURDISTAN INTERNATIONAL BANK FOR INVESTMENT AND DEVELOPMENT NATIONAL ISLAMIC BANK TRUST INTERNATIONAL ISLAMIC BANK PRIVATE SHAREHOLDING COMPANY
6	Jordan	ARAB BANK PLC ARAB BANKING CORPORATION (JORDAN) ARAB JORDAN INVESTMENT BANK BANK AL ETIHAD BANK OF JORDAN PLC CAIRO AMMAN BANK CAPITAL BANK OF JORDAN HOUSING BANK FOR TRADE & FINANCE (THE) INVEST BANK JORDAN AHLI BANK PLC JORDAN COMMERCIAL BANK JORDAN KUWAIT BANK SOCIETE GENERALE DE BANQUEJORDANIE	AL ISRAA FOR ISLAMIC FINANCE & INVESTMENT PLC ISLAMIC INTERNATIONAL ARAB BANK JORDAN ISLAMIC BANK SAFWA ISLAMIC BANK
7	Kuwait	AL AHLI BANK OF KUWAIT (KSC) BURGAN BANK KPSC COMMERCIAL BANK OF KUWAIT K.P.S.C. (THE) GULF BANK KSC (THE) NATIONAL BANK OF KUWAIT S.A.K.	AHLI UNITED BANK KSC BOUBYAN BANK KSCP KUWAIT FINANCE HOUSE (Kuwait) KUWAIT INTERNATIONAL BANK WARBA BANK
8	Malaysia	AFFIN BANK BERHAD ALLIANCE BANK MALAYSIA BERHAD AMBANK (M) BERHAD BANGKOK BANK BERHAD BANK OF AMERICA MALAYSIA BERHAD BANK OF CHINA (MALAYSIA) BERHAD BANK OF NOVA SCOTIA BERHAD BANK PERSATUAN MALAYSIA BERHAD	AFFIN ISLAMIC BANK BERHAD AL RAJHI BANKING & INVESTMENT CORPORATION (MALAYSIA) BERHAD ALKHAIR INTERNATIONAL ISLAMIC BANK BERHAD ALLIANCE ISLAMIC BANK BERHAD AMBANK ISLAMIC BERHAD BANK ISLAM MALAYSIA BERHAD BANK KERJASAMA RAKYAT MALAYSIA BERHAD BANK MUAMALAT MALAYSIA BERHAD

		BNP PARIBAS MALAYSIA BERHAD CHINA CONSTRUCTION BANK (MALAYSIA) BERHAD CIMB BANK (L) LIMITED CIMB BANK BERHAD CITIBANK BERHAD HONG LEONG BANK BERHAD HSBC BANK MALAYSIA BERHAD INDIA INTERNATIONAL BANK (MALAYSIA) BHD INDUSTRIAL AND COMMERCIAL BANK OF CHINA (MALAYSIA) BERHAD JP MORGAN CHASE BANK BERHAD MALAYAN BANKING BERHAD MALAYAN BANKING BERHAD MAYBANK MIZUHO BANK (MALAYSIA) BERHAD MUFG BANK (MALAYSIA) OCBC BANK (MALAYSIA) BERHAD PUBLIC BANK (L) LTD PUBLIC BANK BERHAD RHB BANK BERHAD STANDARD CHARTERED BANK MALAYSIA BERHAD UNITED OVERSEAS BANK (MALAYSIA) BHD.	BIMB HOLDINGS BERHAD CIMB ISLAMIC BANK BERHAD EONCAP ISLAMIC BANK BERHAD HONG LEONG ISLAMIC BANK BERHAD HSBC AMANAH MALAYSIA BERHAD MAYBANK ISLAMIC BERHAD MBSB BANK BERHAD OCBC ALAMIN BANK BERHAD PUBLIC ISLAMIC BANK BERHAD RHB ISLAMIC BANK BERHAD STANDARD CHARTERED SAADIQ BERHAD
9	Oman	AL OMANIYA FINANCIAL SERVICES BANK DHOFAR SAOG BANK MUSCAT SAOG HSBC BANK OMAN SAOG NATIONAL BANK OF OMAN (SAOG) OMAN ARAB BANK SAOC SOHAR INTERNATIONAL BANK SAOG	ALIZZ ISLAMIC BANK S.A.O.G BANK NIZWA SAOG MAISARAH ISLAMIC BANKING
10	Pakistan	ADVANS PAKISTAN MICROFINANCE BANK LTD ALLIED BANK LIMITED ASKARI BANK LIMITED BANK AL HABIB BANK OF KHYBER BANK OF PUNJAB CITIBANK NA PAKISTAN FAYSAL BANK LTD FIRST WOMEN BANK LIMITED HABIB BANK LIMITED HABIB METROPOLITAN BANK LIMITED JS BANK LIMITED KHUSHHALI MICROFINANCE BANK MCB BANK LIMITED NATIONAL BANK OF PAKISTAN SAMBA BANK LIMITED SILKBANK LIMITED SME BANK LTD SONERI BANK LIMITED STANDARD CHARTERED BANK (PAKISTAN) SUMMIT BANK LIMITED UNITED BANK LIMITED	ALBARAKA BANK (PAKISTAN) LIMITED ALBARAKA ISLAMIC BANK BSC (EC) PAKISTAN BRANCHES BANKISLAMI PAKISTAN LIMITED BURJ BANK LIMITED DUBAI ISLAMIC BANK PAKISTAN LIMITED FIRST NATIONAL BANK MODARABA MCB ISLAMIC BANK LIMITED MEEZAN BANK LIMITED
11	Qatar	AHLI BANK QSC AL KHALIJ COMMERCIAL BANK P.Q.S.C. BANK AUDI LLC DOHA BANK QATAR NATIONAL BANK (Q.P.S.C.) QATAR NATIONAL BANK (QNB) THE COMMERCIAL BANK (PQSC)	DUKHAN BANK MASRAF AL RAYAN (Q.S.C.) QATAR FIRST BANK LLC QATAR INTERNATIONAL ISLAMIC BANK QATAR ISLAMIC BANK SAQ
12	Saudi Arabia	ARAB NATIONAL BANK PUBLIC JOINT STOCK COMPANY BANQUE SAUDI FRANSI JSC GULF INTERNATIONAL BANK SAUDI ARABIA RIYAD BANK SAUDI BRITISH BANK JSC (THE) SAUDI INVESTMENT BANK (THE) SAUDI NATIONAL BANK (SNB), THE DBA ALAHLI BANK	AL RAJHI BANK PUBLIC JOINT STOCK COMPANY ALINMA BANK PUBLIC JOINT STOCK COMPANY BANK ALBILAD BANK ALJAZIRA JSC
13	Syria	ARAB BANK SYRIA SA BANK ALSHARQ BANK AUDI SYRIA (CLOSED SHAREHOLDING COMPANY) BANK OF JORDANSYRIA BANK OF SYRIA AND OVERSEAS SA BANQUE BEMO SAUDI FRANSI SA BYBLOS BANK SYRIA S.A. COMMERCIAL BANK OF SYRIA FRANSABANKSYRIA S.A. INTERNATIONAL BANK FOR TRADE AND FINANCE SA QATAR NATIONAL BANK SYRIA SA SYRIA GULF BANK SA	AL BARAKA BANK SYRIA SA CHAM ISLAMIC BANK SA SYRIA INTERNATIONAL ISLAMIC BANK
14	Tunisia	ALUBAF INTERNATIONAL BANK AMEN BANK ARAB BANKING CORPORATION TUNISIE	ALBARAKA BANK TUNISIA BANQUE ZITOUNA

		<p>ARAB TUNISIAN BANK  ATTIJARI BANK  BANQUE INTERNATIONALE ARABE DE TUNISIE  BIAT  BANQUE NATIONALE AGRICOLE  BANQUE TUNISIENNE DE SOLIDARITE  BH BANK  QATAR NATIONAL BANK TUNISIA  SOCIETE TUNISIENNE DE BANQUE  UNION BANCAIRE POUR LE COMMERCE ET  L'INDUSTRIE SA UBCI  UNION INTERNATIONALE DE BANQUES</p>	
15	Turkey	<p>ADABANK AS  AKBANK T.A.S.  ALTERNATIFBANK A.S.  ANADOLUBANK A.S.  ARAB TURKISH BANK  BANK OF CHINA TURKEY A.S.  BANK OF TOKYOMITSUBISHI UFJ TURKEY A.S.  BANKPOZITIF KREDI VE KALKINMA BANKASI AS  BIRLESIK FON BANKASI AS  BURGAN BANK AS  CITIBANK A.S.  DENIZBANK A.S.  DEUTSCHE BANK AG  DEUTSCHE BANK AS  FIBABANKA AS  GARANTI BBVA  HSBC BANK A.S.  ICBC TURKEY BANK A.S.  ING BANK A.S.  MARTI GAYRIMENKUL YAIRIM ORTAKLIGI A.S.  ODEA BANK AS  PASHA YATIRIM BANKASI A.S.  QNB FINANSBANK A.S.  SEKERBANK T.A.S.  STANDARD CHARTERED YATIRIM BANKASI TURK  AS  T.C. ZIRAAT BANKASI A.S.  TURK EKONOMI BANKASI A.S.  TURKISH BANK A.S.  TURKIYE EMLAK KATILIM BANKASI A.S.  TURKIYE HALK BANKASI A.S.  TURKIYE IS BANKASI A.S. ISBANK  TURKIYE IS BANKASI AS  TURKIYE VAKIFLAR BANKASI TAO  TURKLAND BANK AS  YAPI VE KREDI BANKASI A.S.</p>	<p>ALBARAKA TURK PARTICIPATION BANK  ASYA KATILIM BANKASI AS  KUYEYI TURK KATILIM BANKASI A.S.  TURKIYE FINANS KATILIM BANKASI AS  VAKIF KATILIM BANKASI ANONIM SIRKETI  ZIRAAT KATILIM BANKASI A.S.</p>
16	United Arab Emirates	<p>ABU DHABI COMMERCIAL BANK  AL KHALIJI FRANCE SA  AL SAFWA MUBASHER FINANCIAL SERVICES  ARAB BANK FOR INVESTMENT &amp; FOREIGNTRADE  ARAB BANK PLC UNITED ARAB EMIRATES  BRANCHES  BANK OF BARODA UAE BRANCH  BANK OF CHINA MIDDLE EAST (DUBAI) LIMITED  BANK OF SHARJAH  CITIBANK, UNITED ARAB EMIRATES  COMMERCIAL BANK INTERNATIONAL P.S.C.  COMMERCIAL BANK OF DUBAI P.S.C.  CREDIT EUROPE BANK (DUBAI) LTD  DUBAI FIRST PRIVATE JOINT STOCK COMPANY  EMIRATES NBD BANK PJSC  FIRST ABU DHABI BANK  HSBC BANK MIDDLE EAST LIMITED  INVEST BANK P.S.C.  MASHREQBANK PSC  NATIONAL BANK OF FUJAIRAH PJSC  NATIONAL BANK OF RAS ALKHAIMAH (P.S.C.)  (THE)  NATIONAL BANK OF UMM ALQAIWAIN PSC  STANDARD CHARTERED BANK UAE BRANCHES  UNITED ARAB BANK PJSC</p>	<p>ABU DHABI ISLAMIC BANK PUBLIC JOINT STOCK  CO.  AJMAN BANK  AL HILAL BANK PJSC  AMLAQ FINANCE PJSC  DUBAI BANK  DUBAI ISLAMIC BANK PJSC  EMIRATES ISLAMIC BANK PJSC  MAWARID FINANCE PJSC  NOOR BANK  SHARJAH ISLAMIC BANK</p>
17	United Kingdom	<p>ABC INTERNATIONAL BANK PLC  ADIB (UK) LTD  AHLI UNITED BANK (UK) PLC  AIB GROUP (UK) PLC  ALPHA BANK LONDON LIMITED  ATOM BANK PLC  AXIS BANK UK LTD  BANK LEUMI (UK) PLC  BANK MANDIRI (EUROPE) LIMITED  BANK OF BARODA (UK) LIMITED  BANK OF BEIRUT (UK) LIMITED  BANK OF CEYLON (UK) LTD</p>	<p>AL RAYAN BANK PLC  BANK OF LONDON AND THE MIDDLE EAST PLC  BLME HOLDINGS LIMITED  GATEHOUSE BANK PLC  QIB (UK) PLC  RASMALA UK LIMITED</p>



BANK OF CHINA (UK) LTD  
 BANK OF IRELAND (UK) PLC  
 BANK OF MONTserrat LTD  
 BANK OF SCOTLAND PLC  
 BANK OF ST. HELENA  
 BANK OF THE PHILIPPINE ISLANDS (EUROPE) PLC  
 BANK SADERAT PLC  
 BANK SEPAH INTERNATIONAL PLC  
 BARCLAYS BANK PLC  
 BARCLAYS BANK UK PLC  
 BIRMINGHAM BANK LIMITED  
 BMCE BANK INTERNATIONAL PLC  
 BRADFORD & BINGLEY PLC  
 BRITISH ARAB COMMERCIAL BANK PLC  
 BRITISH CARIBBEAN BANK LIMITED  
 BUTTERFIELD BANK (GUERNSEY) LIMITED  
 C. HOARE & CO  
 CAMBRIDGE & COUNTIES BANK LIMITED  
 CANADA SQUARE OPERATIONS LIMITED  
 CAPITAL ONE (EUROPE) PLC  
 CHARITY BANK LIMITED (THE)  
 CHINA CONSTRUCTION BANK (LONDON) LIMITED  
 CLYDESDALE BANK PLC  
 COOPERATIVE BANK PLC (THE)  
 CYNERGY BANK LIMITED  
 EUROPE ARAB BANK PLC  
 FBN BANK (UK) LIMITED  
 GHANA INTERNATIONAL BANK PLC  
 GULF INTERNATIONAL BANK BSC  
 HABIB ALLIED HOLDING LIMITED  
 HABIB EUROPEAN BANK LIMITED  
 HAMPDEN & CO PLC  
 HAMPSHIRE TRUST BANK PLC  
 HBL BANK UK LIMITED  
 HSBC BANK PLC  
 HSBC UK BANK PLC  
 ICBC (LONDON) PLC  
 ICBC STANDARD BANK PLC  
 ICICI BANK UK PLC  
 INVESTEC BANK (CHANNEL ISLANDS) LTD  
 INVESTEC BANK PLC  
 JORDAN INTERNATIONAL BANK PLC  
 JULIAN HODGE BANK LIMITED  
 KINGDOM BANK LIMITED  
 LLOYDS BANK PLC  
 MACQUARIE BANK INTERNATIONAL LIMITED  
 MELLI BANK PLC  
 METHODIST CHAPEL AID LIMITED  
 METRO BANK PLC  
 N M ROTHSCHILD & SONS LIMITED  
 NATIONAL BANK OF EGYPT (UK) LIMITED  
 NATIONAL BANK OF KUWAIT (INTERNATIONAL)  
 PLC  
 NATIONAL WESTMINSTER BANK PLC NATWEST  
 NORTHERN BANK LIMITED  
 OAKNORTH BANK PLC  
 PERSIA INTERNATIONAL BANK PLC  
 PHILIPPINE NATIONAL BANK (EUROPE) PLC  
 PUNJAB NATIONAL BANK (INTERNATIONAL)  
 LIMITED  
 RBC EUROPE LIMITED  
 RELIANCE BANK LIMITED  
 ROYAL BANK OF CANADA (CHANNEL ISLANDS)  
 LIMITED  
 SAINSBURY'S BANK PLC  
 SANTANDER FINANCIAL SERVICES PLC  
 SANTANDER UK PLC  
 SCOTIABANK (TURKS & CAICOS) LTD  
 SCOTIABANK EUROPE PLC  
 SECURE TRUST BANK PLC  
 SHAWBROOK BANK LIMITED  
 SMBC BANK INTERNATIONAL PLC  
 SONALI BANK (UK) LIMITED  
 STANDARD CHARTERED BANK  
 STATE BANK OF INDIA (UK) LIMITED  
 TD BANK EUROPE LTD  
 THE ACCESS BANK UK LIMITED  
 TILBA LIMITED  
 TSB BANK PLC  
 TURKISH BANK (UK) LIMITED  
 TURKS & CAICOS BANKING COMPANY LIMITED  
 ULSTER BANK LIMITED  
 UNION BANK OF INDIA (UK) LIMITED  
 UNION BANK UK PLC  
 UNITED NATIONAL BANK LIMITED  
 UNITED TRUST BANK LIMITED

18	Yemen	UNITY TRUST BANK PLC	
		VIRGIN MONEY PLC	
		VTB CAPITAL PLC	
		WEATHERBYS BANK LIMITED	
		WESLEYAN BANK LTD	
		WYELANDS BANK PLC	
		ZENITH BANK (UK) LIMITED	
		INTERNATIONAL BANK OF YEMEN YSC	ALKURAIMI ISLAMIC MICROFINANCE BANK
		NATIONAL BANK OF YEMEN	ISLAMIC BANK OF YEMEN FOR FINANCE & INVESTMENT
		YEMEN COMMERCIAL BANK	SABA ISLAMIC BANK
		YEMEN KUWAIT BANK FOR TRADE AND INVESTMENT	SHAMIL BANK OF YEMEN & BAHRAIN
			TADHAMON INTERNATIONAL ISLAMIC BANK

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**[Appendix 2: Chapter 3 variable description and data sources]**

<b>Variable</b>	<b>Definition and description</b>	<b>Source</b>	<b>Empirical studies</b>
<i>Political institution</i>	Revised combined polity score subtracting the degree of democracy and autocracy	Polity IV	Giavazzi & Tabellini, 2005; Glaeser et al., 2004
<i>Economic institution</i>	Financial freedom index	Heritage Foundation's Index of Economic Freedom	Chortareas et al., 2013; Cubillas & ález, 2014
<i>Regulatory institution</i>	Restriction on banking activities, The level of the restrictions on bank's activities in securities, insurance, real estate and ownership of non-financial firms.	World Bank's Bank Regulation and Supervisory Survey	Ashraf, 2017; Barth et al., 2013; Djalilov & Piesse, 2019
<i>Islamic political institution</i>	Islamic human and political rights	Islamicity Indices	
<i>Islamic economic institution</i>	Islamic economic value	Islamicity Indices	
<i>Islamic legal institution</i>	Islamic legal and governance	Islamicity Indices	
<i>Total asset</i>	Log of total assets, size of banks	Bankfocus & Fitchconnect	Ashraf, 2017; Asutay & Sidek, 2020; Bitar et al., 2017
<i>Equity to total asset</i>	Equity / total assets (%), capital of banks	Bankfocus & Fitchconnect	Tanna et al., 2017; Tanna et al., 2011
<i>Return on assets</i>	Return on assets	Bankfocus & Fitchconnect	Otero et al., 2020; Saeed et al., 2020
<i>Corruption rate</i>	Corruption perceptions index: how corrupt a country's public sector is perceived to be by experts and business executives.	Transparency International	Ashraf, 2017; Asutay & Sidek, 2020
<i>GDP growth</i>	Annual GDP growth (%)	World Bank database & Global Market Information Database (GMID)	Bitar et al., 2017; Pasiouras et al., 2009
<i>Inflation rate</i>	Inflation, annual consumer prices (%)	World Bank database & Global Market Information Database (GMID)	Bitar et al., 2017; Tanna et al., 2017
<i>Unemployment rate</i>	Unemployment rate (%) of a country	IMF database	Teclès & Tabak, 2010
<i>Muslim population</i>	Muslim population (%) of a country	Pew Research Centre & Muslim Population	Abedifar et al., 2016

**[Appendix 3: Effect of institutions on bank efficiency, excluding the UK sample]**

Variable	Full sample					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Political institution</i>	0.058*** (0.000)					
<i>Financial freedom</i>		-0.129*** (0.000)				
<i>Activity restriction</i>			0.041*** (0.004)			
<i>Islamic political institution</i>				-0.197*** (0.000)		
<i>Islamic economic institution</i>					-0.121*** (0.000)	
<i>Islamic legal institution</i>						-0.205*** (0.000)
<i>Total asset</i>	0.003 (0.121)	0.001 (0.685)	-0.000 (0.740)	0.000 (0.821)	0.000 (0.974)	0.000 (0.804)
<i>Equity to total asset</i>	0.017 (0.118)	0.008 (0.307)	0.014* (0.088)	0.011 (0.163)	0.011 (0.149)	0.011 (0.168)
<i>Return on assets</i>	-0.011 (0.268)	-0.006 (0.386)	-0.009 (0.244)	-0.006 (0.382)	-0.007 (0.325)	-0.006 (0.370)
<i>Corruption</i>	-0.073*** (0.000)	-0.061*** (0.000)	-0.070*** (0.000)	-0.032*** (0.000)	-0.045*** (0.000)	-0.030*** (0.000)
<i>GDP growth</i>	-0.217*** (0.009)	-0.324*** (0.000)	-0.273*** (0.000)	-0.275*** (0.000)	-0.258*** (0.000)	-0.297*** (0.000)
<i>Inflation</i>	-0.139 (0.235)	0.093** (0.039)	0.066* (0.100)	0.050 (0.196)	0.039 (0.313)	0.094** (0.014)
<i>Unemployment rate</i>	-0.380 (0.138)	-0.518*** (0.003)	-0.099 (0.561)	0.021 (0.896)	0.112 (0.487)	-0.061 (0.700)
<i>Muslim population</i>	-0.969*** (0.000)	-0.064 (0.466)	-0.176* (0.050)	-0.146* (0.089)	-0.134 (0.122)	-0.183** (0.032)
<i>Intercept</i>	1.292*** (0.000)	1.108*** (0.000)	0.625*** (0.000)	0.673*** (0.000)	0.662*** (0.000)	0.706*** (0.000)
<i>R<sup>2</sup></i>	0.304	0.287	0.266	0.278	0.270	0.283
<i>Observations</i>	2856	4953	4849	5177	5177	5177

Note: this study applies fixed-effect method to examine  $Bank\ Efficiency_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  where bank efficiency is calculated by the data envelopment analysis (DEA). Models 1 – 6 include major independent variables, which are *Political institution*, *Financial freedom* (economic institution), *Activity restriction* (regulatory institution) and Islamic institution (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). The models further include control variables, which include *Total asset*, *Equity to total asset*, *Return on assets*, *Corruption rate*, *GDP growth*, *Inflation*, *Unemployment rate*, and *Muslim population*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

[Appendix 4: Effect of institutions on bank efficiency, excluding the UK sample – conventional vs. Islamic banks]

Variable	Panel A: Conventional Banks						Panel B: Islamic Banks					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
<i>Political institution</i>	0.035*** (0.000)						0.141*** (0.000)					
<i>Financial freedom</i>		-0.146*** (0.000)						0.049 (0.465)				
<i>Activity restriction</i>			0.016 (0.281)						0.217*** (0.000)			
<i>Islamic political institution</i>				-0.396*** (0.000)						0.170** (0.013)		
<i>Islamic economic institution</i>					-0.342*** (0.000)						0.207*** (0.001)	
<i>Islamic legal institution</i>						-0.368*** (0.000)						-0.055 (0.420)
<i>Total asset</i>	0.002 (0.410)	-0.001 (0.447)	-0.002 (0.116)	-0.001 (0.427)	-0.001 (0.323)	-0.001 (0.420)	0.013 (0.141)	0.012** (0.023)	0.014*** (0.008)	0.010* (0.052)	0.010* (0.064)	0.012** (0.021)
<i>Equity to total asset</i>	0.017 (0.119)	0.010 (0.264)	0.013 (0.143)	0.005 (0.504)	0.007 (0.379)	0.007 (0.361)	0.030 (0.573)	-0.044 (0.157)	-0.042 (0.177)	-0.026 (0.388)	-0.025 (0.420)	-0.021 (0.488)
<i>Return on assets</i>	-0.020* (0.051)	-0.008 (0.340)	-0.010 (0.238)	-0.005 (0.473)	-0.008 (0.271)	-0.009 (0.263)	0.037 (0.394)	0.024 (0.346)	0.014 (0.584)	0.020 (0.433)	0.017 (0.502)	0.025 (0.323)
<i>Corruption</i>	-0.072*** (0.000)	-0.069*** (0.000)	-0.078*** (0.000)	-0.007* (0.085)	-0.010** (0.017)	-0.008* (0.066)	-0.062*** (0.000)	-0.072*** (0.000)	-0.068*** (0.000)	-0.100*** (0.000)	-0.112*** (0.000)	-0.058*** (0.000)
<i>GDP growth</i>	-0.018 (0.839)	0.002 (0.973)	0.088 (0.205)	-0.002 (0.980)	-0.098 (0.112)	-0.119* (0.053)	-0.631* (0.065)	-0.994*** (0.000)	-1.069*** (0.000)	-0.752*** (0.000)	-0.714*** (0.000)	-0.776*** (0.000)
<i>Inflation</i>	0.397*** (0.001)	0.135*** (0.005)	0.156*** (0.000)	0.100** (0.013)	0.075* (0.065)	0.196*** (0.000)	-1.912*** (0.003)	-0.445** (0.033)	-0.890*** (0.000)	-0.781*** (0.000)	-0.768*** (0.000)	-0.797*** (0.000)
<i>Unemployment rate</i>	-0.896*** (0.000)	-1.156*** (0.000)	-0.458*** (0.010)	-0.582*** (0.000)	-0.413** (0.011)	-0.783*** (0.000)	6.295*** (0.000)	5.355*** (0.000)	4.941*** (0.000)	5.378*** (0.000)	5.250*** (0.000)	5.494*** (0.000)
<i>Muslim population</i>	-1.369*** (0.000)	-0.232** (0.018)	-0.442*** (0.000)	-0.313*** (0.001)	-0.283*** (0.002)	-0.359*** (0.000)	-0.248 (0.737)	0.419 (0.160)	0.394 (0.199)	0.554* (0.063)	0.549* (0.065)	0.454 (0.132)
<i>Intercept</i>	1.718*** (0.000)	1.405*** (0.000)	0.980*** (0.000)	0.902*** (0.000)	0.880*** (0.000)	0.956*** (0.000)	0.275 (0.626)	-0.062 (0.864)	-0.305 (0.299)	0.003 (0.992)	0.014 (0.958)	0.056 (0.836)
<i>R<sup>2</sup></i>	0.377	0.387	0.355	0.416	0.407	0.417	0.220	0.189	0.216	0.186	0.189	0.181
<i>Observations</i>	2423	4002	3917	4162	4162	4162	440	963	944	1027	1027	1027

Note: this study applies fixed-effect method to examine  $Bank\ Efficiency_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  where bank efficiency is calculated by data envelopment analysis (DEA). Models 1 – 6 include major independent variables, which are *Political institution*, *Financial freedom* (economic institution), *Activity restriction* (regulatory institution) and Islamic institution (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). The models further include control variables, which include *Total asset*, *Equity to total asset*, *Return on assets*, *Corruption rate*, *GDP growth*, *Inflation*, *Unemployment rate*, and *Muslim population*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level. p-values are in parentheses.

## [Appendix 5: Chapter 4 sample banks by country]

No	Country	Conventional banks	Islamic banks
1	Bahrain	AHLI UNITED BANK BSC ALUBAF ARAB INTERNATIONAL BANK ARAB BANKING CORPORATION BSC BAHRAIN COMMERCIAL FACILITIES COMPANY BSC BBK B.S.C. FUTURE BANK B.S.C. GULF INTERNATIONAL BANK BSC (Bahrain) NATIONAL BANK OF BAHRAIN STATE BANK OF INDIA - MANAMA	ABC ISLAMIC BANK (E.C.) ALBARAKA BANKING GROUP B.S.C. ALBARAKA ISLAMIC BANK BSC AL-SALAM BANK-BAHRAIN B.S.C. BAHRAIN ISLAMIC BANK B.S.C. BMI BANK BSC GLOBAL BANKING CORPORATION BSC KHALEEJI COMMERCIAL BANK KUWAIT FINANCE HOUSE (BAHRAIN) LIQUIDITY MANAGEMENT CENTER BSC VENTURE CAPITAL BANK BSC (C) AL-ARAFAH ISLAMIC BANK LTD. EXPORT IMPORT BANK OF BANGLADESH LIMITED FIRST SECURITY ISLAMIC BANK LIMITED ICB ISLAMIC BANK LIMITED ISLAMIC BANK BANGLADESH LIMITED ISLAMIC FINANCE AND INVESTMENT LIMITED SHAHJALAL ISLAMIC BANK LTD SOCIAL ISLAMIC BANK LTD UNION BANK LIMITED
2	Bangladesh	AB BANK LTD AGRANI BANK LIMITED BANGLADESH COMMERCE BANK LTD BANK ASIA LIMITED BASIC BANK LTD BRAC BANK LIMITED CITIBANK NA BANGLADESH BRANCHES CITY BANK LTD COMMERCIAL BANK OF CEYLON PLC DHAKA BANK LIMITED DUTCH-BANGLA BANK LIMITED EASTERN BANK LIMITED GLOBAL ISLAMIC BANK HABIB BANK LIMITED BANGLADESH BRANCHES HONGKONG AND SHANGHAI BANKING CORPORATION LTD - BANGLADESH BRANCHES HONGKONG AND SHANGHAI BANKING CORPORATION LTD - OFFSHORE BANKING UNIT IFIC BANK LIMITED JAMUNA BANK LTD JANATA BANK LIMITED LANKABANGLA FINANCE LIMITED MEGHNA BANK LIMITED MERCANTILE BANK LIMITED MIDLAND BANK LIMITED MODHUMOTI BANK LIMITED MUTUAL TRUST BANK NATIONAL BANK LIMITED NATIONAL BANK OF PAKISTAN- BANGLADESH BRANCHES NATIONAL CREDIT AND COMMERCE BANK LIMITED NRB BANK LIMITED NRB COMMERCIAL BANK LIMITED ONE BANK LIMITED PADMA BANK LIMITED PREMIER BANK LTD (THE) PRIME BANK LIMITED PROBASHI KALLYAN BANK PUBALI BANK LIMITED RUPALI BANK LIMITED SONALI BANK LIMITED SOUTH BANGLA AGRICULTURE & COMMERCE BANK LIMITED SOUTHEAST BANK LIMITED STANDARD BANK LIMITED STATE BANK OF INDIA BANGLADESH TRUST BANK LTD (THE) UNITED COMMERCIAL BANK LTD UTTARA BANK LIMITED	ABU DHABI ISLAMIC BANK AL BARAKA BANK EGYPT SAE FAISAL ISLAMIC BANK OF EGYPT
3	Egypt	ABU DHABI COMMERCIAL BANK - EGYPT AHLI UNITED BANK (EGYPT) SAE AL AHLI BANK OF KUWAIT-EGYPT ARAB AFRICAN INTERNATIONAL BANK ARAB BANKING CORPORATION - EGYPT (SAE) ARAB INTERNATIONAL BANK ATTIJARIWafa BANK EGYPT S.A.E. BANK AUDI SAE BANK OF ALEXANDRIA BANQUE DU CAIRE SAE BANQUE MISR SAE BLOM BANK EGYPT SAE COMMERCIAL INTERNATIONAL BANK (EGYPT) S.A.E. CREDIT AGRICOLE EGYPT SAE EGYPTIAN GULF BANK SAE EGYPTIAN NATIONAL POST OFFICE EMIRATES NATIONAL BANK OF DUBAI SAE HSBC BANK EGYPT S A E	

NATIONAL BANK OF EGYPT  
 QNB ALAHLI BANK (S.A.E.)  
 SOCIETE ARABE INTERNATIONALE DE BANQUE  
 SUEZ CANAL BANK  
 THE NATIONAL BANK OF KUWAIT - EGYPT SAE  
 UNITED BANK (THE)  
 BANGKOK BANK PCL - JAKARTA BRANCH  
 BANK AMAR INDONESIA, PT  
 BANK ARTHA GRAHA INTERNASIONAL TBK  
 BANK ARTOS INDONESIA, PT  
 BANK BNP PARIBAS INDONESIA PT  
 BANK BPD JATENG  
 BANK BUMI ARTA  
 BANK CHINA CONSTRUCTION BANK INDONESIA  
 TBK., PT  
 BANK COMMONWEALTH  
 BANK DANAMON INDONESIA TBK  
 BANK DBS INDONESIA  
 BANK GANESHA  
 BANK HARDA INTERNASIONAL  
 BANK JASA JAKARTA, PT  
 BANK KESEJAHTERAAN EKONOMI  
 BANK MANDIRI (PERSERO) TBK  
 BANK MANDIRI TASPEN POS, PT  
 BANK MASPION INDONESIA  
 BANK MEGA TBK  
 BANK MESTIKA DHARMA  
 BANK MNC INTERNASIONAL TBK., PT  
 BANK NEGARA INDONESIA (PERSERO) TBK, PT  
 BANK OCBC NISP TBK  
 BANK OF AMERICA, 0, JAKARTA BRANCH  
 BANK OF CHINA LIMITED (JAKARTA BRANCH)  
 BANK PEMBANGUNAN DAERAH KALIMANTAN  
 SELATAN PAGATAN  
 BANK PEMBANGUNAN DAERAH KALIMANTAN  
 TIMUR  
 BANK PEMBANGUNAN DAERAH MALUKU DAN  
 MALUKU UTARA, PT  
 BANK PEMBANGUNAN DAERAH NUSA  
 TENGGARA BARAT, PT (BANK NTB)  
 BANK PEMBANGUNAN DAERAH NUSA  
 TENGGARA TIMUR, PT (BANK NTT)  
 BANK PEMBANGUNAN DAERAH PAPUA, PT  
 (BANK PAPUA)  
 BANK PERMATA TBK  
 BANK QNB INDONESIA TBK., PT  
 BANK RAKYAT INDONESIA (PERSERO) TBK  
 BANK ROYAL INDONESIA  
 BANK SBI INDONESIA PT  
 BANK SINARMAS TBK., PT  
 BANK SULSELBAR, PT  
 BANK SULTENG, PT  
 BANK SULTRA  
 BANK TABUNGAN NEGARA (PERSERO)  
 BANK VICTORIA INTERNATIONAL TBK (PT)  
 CITIBANK NA (Indonesia)  
 DEUTSCHE BANK AG - INDONESIAN BRANCHES  
 JPMORGAN CHASE BANK 0 JAKARTA BRANCH  
 MUFG BANK, LTD., JAKARTA BRANCH  
 PT BANK ACEH  
 PT BANK ANZ INDONESIA  
 PT BANK BTPN TBK  
 PT BANK BUKOPIN  
 PT BANK CAPITAL INDONESIA  
 PT BANK CENTRAL ASIA TBK  
 PT BANK CIMB NIAGA TBK  
 PT BANK CTBC INDONESIA  
 PT BANK DKI  
 PT BANK FAMA INTERNATIONAL  
 PT BANK HSBC INDONESIA  
 PT BANK IBK INDONESIA TBK  
 PT BANK ICBK INDONESIA  
 PT BANK INA PERDANA TBK  
 PT BANK INDEX SELINDO  
 PT BANK JTRUST INDONESIA TBK  
 PT BANK KEB HANA  
 PT BANK MAYAPADA INTERNASIONAL TBK  
 PT BANK MAYBANK INDONESIA TBK  
 PT BANK MAYORA  
 PT BANK MIZUHO INDONESIA  
 PT BANK MULTIARTA SENTOSA  
 PT BANK NATIONALNOBU TBK  
 PT BANK OF INDIA INDONESIA TBK  
 PT BANK OKE INDONESIA TBK  
 PT BANK PEMBANGUNAN DAERAH BALI  
 PT BANK PEMBANGUNAN DAERAH BANTEN TBK  
 BANK SYARIAH MANDIRI  
 PT BANK BCA SYARIAH  
 PT BANK BNI SYARIAH  
 PT BANK BRI SYARIAH  
 PT BANK JAWA BARAT BANTEN SYARIAH  
 PT BANK MEGA SYARIAH  
 PT BANK MUAMALAT INDONESIA TBK  
 PT BANK NET INDONESIA SYARIAH  
 PT BANK PANIN DUBAI SYARIAH TBK  
 PT BANK SYARIAH BUKOPIN  
 PT BANK VICTORIA SYARIAH

		<p>PT BANK PEMBANGUNAN DAERAH BENGKULU PT BANK PEMBANGUNAN DAERAH ISTIMEWA YOGYAKARTA PT BANK PEMBANGUNAN DAERAH JAMBI PT BANK PEMBANGUNAN DAERAH KALIMANTAN BARAT PT BANK PEMBANGUNAN DAERAH KALIMANTAN TENGAH PT BANK PEMBANGUNAN DAERAH LAMPUNG PT BANK PEMBANGUNAN DAERAH RIAU KEPRI PT BANK PEMBANGUNAN DAERAH SULAWESI UTARA PT BANK PEMBANGUNAN DAERAH SUMATERA BARAT PT BANK RAKYAT INDONESIA AGRONIAGA TBK PT BANK RESONA PERDANIA PT BANK SAHABAT SAMPOERNA PT BANK TABUNGAN PENSIUNAN NASIONAL SYARIAH PT BANK UOB INDONESIA PT BANK WOORI SAUDARA INDONESIA 1906 TBK PT BANK YUDHA BHAKTI PT BIMA MULTI FINANCE PT BPD JAWA BARAT DAN BANTEN TBK PT INTERNATIONAL BUSINESS BANK PT PRIMA MASTER BANK PT. BANK PANIN, TBK PT. BANK SUMUT PT. BPD JAWA TIMUR SHINHAN BANK INDONESIA STANDARD CHARTERED BANK INDONESIA</p>	
5	Iraq	<p>BABYLON BANK  COMMERCIAL BANK OF IRAQ SA  GULF COMMERCIAL BANK INTERNATIONAL ISLAMIC BANK IRAQI MIDDLE EAST INVESTMENT BANK NATIONAL BANK OF IRAQ NORTH BANK RT BANK SUMER COMMERICAL BANK PSC TRADE BANK OF IRAQ UNION BANK OF IRAQ</p>	<p>CIHAN BANK FOR ISLAMIC INVESTMENT AND FINANCE P.S.C IRAQI ISLAMIC BANK FOR INVESTMENT &amp; DEVELOPMENT PJSC KURDISTAN INTERNATIONAL BANK FOR INVESTMENT AND DEVELOPMENT NATIONAL ISLAMIC BANK</p>
6	Jordan	<p>ARAB BANK PLC (Jordan) ARAB BANKING CORPORATION (JORDAN) ARAB JORDAN INVESTMENT BANK BANK AL ETIHAD BANK OF JORDAN PLC CAIRO AMMAN BANK CAPITAL BANK OF JORDAN COMPREHENSIVE LEASING COMPANY PLC HOUSING BANK FOR TRADE &amp; FINANCE (THE) INVEST BANK JORDAN AHLI BANK PLC JORDAN COMMERCIAL BANK JORDAN KUWAIT BANK SOCIETE GENERALE DE BANQUE-JORDANIE</p>	<p>FIRST FINANCE P.L.C ISLAMIC INTERNATIONAL ARAB BANK JORDAN ISLAMIC BANK SAFWA ISLAMIC BANK</p>
7	Kuwait	<p>AL AHLI BANK OF KUWAIT (KSC) ARAB INVESTMENT AND EXPORT CREDIT GUARANTEE CORPORATION BURGAN BANK KPSC COMMERCIAL BANK OF KUWAIT K.P.S.C. (THE) GULF BANK KSC (THE) NATIONAL BANK OF KUWAIT S.A.K.</p>	<p>A'AYAN LEASING &amp; INVESTMENT COMPANY AHLI UNITED BANK KSC BOUBYAN BANK KSCP FIRST INVESTMENT COMPANY K.S.C.C. Gulf Investment House K.S.C.P. KUWAIT FINANCE HOUSE (KUWAIT) KUWAIT INTERNATIONAL BANK WARBA BANK AFFIN ISLAMIC BANK BERHAD AL RAJHI BANKING &amp; INVESTMENT CORPORATION (MALAYSIA) BERHAD ALLIANCE ISLAMIC BANK BERHAD AMBANK ISLAMIC BERHAD BANK ISLAM MALAYSIA BERHAD BANK KERJASAMA RAKYAT MALAYSIA BERHAD BANK MUAMALAT MALAYSIA BERHAD BIMB HOLDINGS BERHAD CIMB ISLAMIC BANK BERHAD HONG LEONG ISLAMIC BANK BERHAD HSBC AMANAH MALAYSIA BERHAD KUWAIT FINANCE HOUSE (MALAYSIA) BERHAD MAYBANK ISLAMIC BERHAD MBSB BANK BERHAD OCBC AL-AMIN BANK BERHAD PUBLIC ISLAMIC BANK BERHAD</p>
8	Malaysia	<p>AFFIN BANK BERHAD ALLIANCE BANK MALAYSIA BERHAD AMBANK (M) BERHAD BANGKOK BANK BERHAD BANK OF AMERICA MALAYSIA BERHAD BANK OF CHINA (MALAYSIA) BERHAD BANK OF NOVA SCOTIA BERHAD BANK PERSATUAN MALAYSIA BERHAD BNP PARIBAS MALAYSIA BERHAD CAGAMAS BERHAD CIMB BANK BERHAD CITIBANK BERHAD HONG LEONG BANK BERHAD HSBC BANK MALAYSIA BERHAD INDIA INTERNATIONAL BANK (MALAYSIA) BHD INDUSTRIAL AND COMMERCIAL BANK OF CHINA (MALAYSIA) BERHAD</p>	<p>AFFIN ISLAMIC BANK BERHAD AL RAJHI BANKING &amp; INVESTMENT CORPORATION (MALAYSIA) BERHAD ALLIANCE ISLAMIC BANK BERHAD AMBANK ISLAMIC BERHAD BANK ISLAM MALAYSIA BERHAD BANK KERJASAMA RAKYAT MALAYSIA BERHAD BANK MUAMALAT MALAYSIA BERHAD BIMB HOLDINGS BERHAD CIMB ISLAMIC BANK BERHAD HONG LEONG ISLAMIC BANK BERHAD HSBC AMANAH MALAYSIA BERHAD KUWAIT FINANCE HOUSE (MALAYSIA) BERHAD MAYBANK ISLAMIC BERHAD MBSB BANK BERHAD OCBC AL-AMIN BANK BERHAD PUBLIC ISLAMIC BANK BERHAD</p>



		JP MORGAN CHASE BANK BERHAD MALAYAN BANKING BERHAD - MAYBANK MIZUHO BANK (MALAYSIA) BERHAD MUFG BANK (MALAYSIA) OCBC BANK (MALAYSIA) BERHAD PUBLIC BANK (L) LTD PUBLIC BANK BERHAD RHB BANK BERHAD STANDARD CHARTERED BANK MALAYSIA BERHAD UNITED OVERSEAS BANK (MALAYSIA) BHD.	RHB ISLAMIC BANK BERHAD STANDARD CHARTERED SAADIQ BERHAD
9	Oman	AL OMANIYA FINANCIAL SERVICES BANK DHOFAR SAOG BANK MUSCAT SAOG HSBC BANK OMAN SAOG NATIONAL BANK OF OMAN (SAOG) OMAN ARAB BANK SAOC	ALIZZ ISLAMIC BANK S.A.O.G BANK NIZWA SAOG MAISARAH ISLAMIC BANKING
10	Pakistan	SOHAR INTERNATIONAL BANK SAOG ADVANS PAKISTAN MICROFINANCE BANK LTD ALLIED BANK LIMITED ASKARI BANK LIMITED BANK AL HABIB BANK OF KHYBER BANK OF PUNJAB CITIBANK NA PAKISTAN FAYSAL BANK LTD FIRST CREDIT AND INVESTMENT BANK LTD. FIRST DAWOOD INVESTMENT BANK LIMITED FIRST WOMEN BANK LIMITED HABIB BANK LIMITED (Pakistan) JS BANK LIMITED KHUSHHALI MICROFINANCE BANK MCB BANK LIMITED NATIONAL BANK OF PAKISTAN SAMBA BANK LIMITED SILKBANK LIMITED SME BANK LTD SONERI BANK LIMITED STANDARD CHARTERED BANK (PAKISTAN) SUMMIT BANK LIMITED UNITED BANK LIMITED	ALBARAKA BANK (PAKISTAN) LIMITED BANKISLAMI PAKISTAN LIMITED BURJ BANK LIMITED DUBAI ISLAMIC BANK PAKISTAN LIMITED FIRST HABIB MODARABA FIRST NATIONAL BANK MODARABA MCB ISLAMIC BANK LIMITED MEEZAN BANK LIMITED ORIX MODARABA
11	Qatar	AHLI BANK QSC AL KHALIJ COMMERCIAL BANK P.Q.S.C. BANK AUDI LLC DOHA BANK QATAR NATIONAL BANK (Q.P.S.C.) THE COMMERCIAL BANK (PQSC)	DUKHAN BANK MASRAF AL RAYAN (Q.S.C.) Qatar Development Bank Q.S.C.C QATAR INTERNATIONAL ISLAMIC BANK QATAR ISLAMIC BANK SAQ
12	Saudi Arabia	ARAB NATIONAL BANK PUBLIC JOINT STOCK COMPANY BANQUE SAUDI FRANSI JSC HSBC SAUDI ARABIA NCB CAPITAL COMPANY RIYAD BANK (Saudi Arabia) SAUDI BRITISH BANK JSC (THE) SAUDI INVESTMENT BANK (THE) SAUDI NATIONAL BANK	AL RAJHI BANK PUBLIC JOINT STOCK COMPANY AL RAJHI BANKING AND INVESTMENT CORPORATION ALINMA BANK PUBLIC JOINT STOCK COMPANY BANK ALBILAD BANK ALJAZIRA JSC
13	Syria	ARAB BANK SYRIA SA BANK AL-SHARQ BANK AUDI SYRIA (CLOSED SHAREHOLDING COMPANY) BANK OF JORDAN-SYRIA BANK OF SYRIA AND OVERSEAS SA BANQUE BEMO SAUDI FRANSI SA BYBLOS BANK SYRIA S.A. COMMERCIAL BANK OF SYRIA FRANSABANK-SYRIA S.A. INTERNATIONAL BANK FOR TRADE AND FINANCE SA QATAR NATIONAL BANK - SYRIA SA SYRIA GULF BANK SA	CHAM ISLAMIC BANK SA SYRIA INTERNATIONAL ISLAMIC BANK
14	Tunisia	ALUBAF INTERNATIONAL BANK AMEN BANK ARAB BANKING CORPORATION - TUNISIE ARAB TUNISIAN BANK ATTIJARI BANK BANQUE DE TUNISIE BANQUE INTERNATIONALE ARABE DE TUNISIE - BIAT BANQUE NATIONALE AGRICOLE BANQUE TUNISIENNE DE SOLIDARITE BH BANK LA POSTE TUNISIENNE QATAR NATIONAL BANK TUNISIA SOCIETE TUNISIENNE DE BANQUE UNION BANCAIRE POUR LE COMMERCE ET	ALBARAKA BANK TUNISIA BANQUE ZITOUNA

15	<b>Turkey</b>	L'INDUSTRIE SA UBCI UNION INTERNATIONALE DE BANQUES AK FAKTORING ANONIM SIRKETI AKBANK T.A.S. ALJ FINANSMAN A.S. ALTERNATIFBANK A.S. ANADOLUBANK A.S. ANALIZ FACTORING ANONIM SIRKETI ARAB TURKISH BANK ATILIM FAKTORING ANONIM SIRKETI BANK OF AMERICA YATIRIM BANK A.S BANK OF CHINA TURKEY A.S. BANK OF TOKYO-MITSUBISHI UFJ TURKEY A.S. BANKPOZITIF KREDI VE KALKINMA BANKASI AS BEREKET VARLIK KIRALAMA AS BIRLESIK FON BANKASI AS BURGAN BANK AS CITIBANK A.S. DENIZBANK A.S. DEUTSCHE BANK AS FIBABANKA AS GARANTI BBVA HABIB BANK LIMITED (Turkey) HSBC BANK A.S. ICBC TURKEY BANK A S. ING BANK A.S. MARTI GAYRIMENKUL YAIRIM ORTAKLIGI A.S. NUROL GAYRIMENKUL YATIRIM ORTAKLIGI A.S. ODEA BANK AS OZAK GAYRIMENKUL YATIRIM ORTAKLIGI A.S. PANORA GAYRIMENKUL YATIRIM ORTAKLIGI A.S. PASHA YATIRIM BANKASI A.S. QNB FINANSBANK A.S. SEKERBANK T.A.S. T.C. ZIRAAT BANKASI A.S. TURK EKONOMI BANKASI A.S. TURKISH BANK A.S. TURKIYE HALK BANKASI A.S. TURKIYE IS BANKASI A.S. - ISBANK TURKIYE VAKIFLAR BANKASI TAO TURKLAND BANK AS YAPI VE KREDI BANKASI A.S.	ASYA KATILIM BANKASI AS KUVEYT TURK KATILIM BANKASI A.S. TURKIYE FINANS KATILIM BANKASI AS VAKIF KATILIM BANKASI ANONIM SIRKETI ZIRAAT KATILIM BANKASI A.S.
16	<b>United Arab Emirates</b>	ABU DHABI COMMERCIAL BANK AL KHALJI FRANCE SA AL SAFWA MUBASHER FINANCIAL SERVICES ARAB BANK FOR INVESTMENT & FOREIGNTRADE BANK OF BARODA - UAE BRANCH BANK OF SHARJAH CITIBANK 0, UNITED ARAB EMIRATES COMMERCIAL BANK INTERNATIONAL P.S.C. COMMERCIAL BANK OF DUBAI P.S.C. CREDIT EUROPE BANK (DUBAI) LTD DUBAI FINANCIAL MARKET EMIRATES NBD BANK PJSC FIRST ABU DHABI BANK HSBC BANK MIDDLE EAST LIMITED (UAE) INVEST BANK P.S.C. MASHREQBANK PSC NATIONAL BANK OF FUJAIRAH PJSC NATIONAL BANK OF RAS AL-KHAIMAH (P.S.C.) (THE) NATIONAL BANK OF UMM AL-QAIWAIN PSC STANDARD CHARTERED BANK- UAE BRANCHES UNITED ARAB BANK PJSC	ABU DHABI ISLAMIC BANK - PUBLIC JOINT STOCK CO. AJMAN BANK AL HILAL BANK PJSC DUBAI ISLAMIC BANK PJSC EMIRATES ISLAMIC BANK PJSC MAWARID FINANCE PJSC NOOR BANK SHARJAH ISLAMIC BANK
17	<b>United Kingdom</b>	ABC INTERNATIONAL BANK PLC ADIB (UK) LTD AHLI UNITED BANK (UK) PLC AIB GROUP (UK) PLC ALPHA BANK LONDON LIMITED ATOM BANK PLC AXIS BANK UK LTD BANK LEUMI (UK) PLC BANK MANDIRI (EUROPE) LIMITED BANK OF BEIRUT (UK) LIMITED BANK OF CEYLON (UK) LTD BANK OF CHINA (UK) LTD BANK OF IRELAND (UK) PLC BANK OF MONTSERRAT LTD BANK OF SCOTLAND PLC BANK OF ST. HELENA BANK OF THE PHILIPPINE ISLANDS (EUROPE) PLC BANK SADERAT PLC	AL RAYAN BANK PLC BANK OF LONDON AND THE MIDDLE EAST PLC BLME HOLDINGS PLC GATEHOUSE BANK PLC QIB (UK) PLC RASMALA UK LIMITED

BANK SEPAH INTERNATIONAL PLC  
 BARCLAYS BANK PLC  
 BARCLAYS BANK UK PLC  
 BMCE BANK INTERNATIONAL PLC  
 BRADFORD & BINGLEY PLC  
 BRITISH ARAB COMMERCIAL BANK PLC  
 BRITISH BUSINESS BANK PLC  
 BRITISH CARIBBEAN BANK LIMITED  
 BUTTERFIELD BANK (GUERNSEY) LIMITED  
 C. HOARE & CO  
 CAF BANK LTD  
 CANADA SQUARE OPERATIONS LIMITED  
 CAPITAL ONE (EUROPE) PLC  
 CHARITY BANK LIMITED (THE)  
 CHINA CONSTRUCTION BANK (LONDON)  
 LIMITED  
 CLYDESDALE BANK PLC  
 CO-OPERATIVE BANK PLC (THE)  
 EURO EXIM BANK LIMITED  
 EUROPE ARAB BANK PLC  
 FBN BANK (UK) LIMITED  
 FINANCE IRELAND LIMITED  
 GHANA INTERNATIONAL BANK PLC  
 HABIB ALLIED HOLDING LIMITED  
 HABIB EUROPEAN BANK LIMITED  
 HAMPDEN & CO PLC  
 HAMPSHIRE TRUST BANK PLC  
 HBL BANK UK LIMITED  
 HEMISPHERE BANK, INC., LTD  
 HSBC BANK PLC  
 HSBC TRUST COMPANY (UK) LTD  
 HSBC UK BANK PLC  
 ICBC (LONDON) PLC  
 ICBC STANDARD BANK PLC  
 ICICI BANK UK PLC  
 INVESTEC BANK (CHANNEL ISLANDS) LTD  
 INVESTEC BANK PLC  
 JORDAN INTERNATIONAL BANK PLC  
 JULIAN HODGE BANK LIMITED  
 KINGDOM BANK LIMITED  
 LLOYDS BANK PLC  
 MACQUARIE BANK INTERNATIONAL LIMITED  
 MELLI BANK PLC  
 METHODIST CHAPEL AID LIMITED (THE)  
 METRO BANK PLC  
 N M ROTHSCHILD & SONS LIMITED  
 NATIONAL BANK OF EGYPT (UK) LIMITED  
 NATIONAL BANK OF KUWAIT (INTERNATIONAL)  
 PLC  
 NATIONAL WESTMINSTER BANK PLC - NATWEST  
 NORTHERN BANK LIMITED  
 OAKNORTH BANK PLC  
 PARAGON BANK PLC  
 PERSIA INTERNATIONAL BANK PLC  
 PNB (EUROPE) PLC  
 PUNJAB NATIONAL BANK (INTERNATIONAL)  
 LIMITED  
 RBC EUROPE LIMITED  
 RELIANCE BANK LIMITED  
 ROYAL BANK OF CANADA (CHANNEL ISLANDS)  
 LIMITED  
 SAINSBURY'S BANK PLC  
 SANTANDER FINANCIAL SERVICES PLC  
 SANTANDER UK PLC  
 SCOTIABANK (TURKS & CAICOS) LTD  
 SCOTIABANK EUROPE PLC  
 SECURE TRUST BANK PLC  
 SHAWBROOK BANK LIMITED  
 SMBC BANK INTERNATIONAL PLC  
 STANDARD CHARTERED BANK  
 TD BANK EUROPE LTD  
 THE ACCESS BANK UK LIMITED  
 TILBA LIMITED  
 TSB BANK PLC  
 TURKISH BANK (UK) LIMITED  
 ULSTER BANK LIMITED  
 UNITED NATIONAL BANK LIMITED  
 VIRGIN MONEY PLC  
 VTB CAPITAL PLC  
 WEATHERBYS BANK LIMITED  
 INTERNATIONAL BANK OF YEMEN YSC  
 NATIONAL BANK OF YEMEN  
 YEMEN COMMERCIAL BANK  
 YEMEN KUWAIT BANK FOR TRADE AND  
 INVESTMENT

18

Yemen

SABA ISLAMIC BANK  
 SHAMIL BANK OF YEMEN & BAHRAIN  
 TADHAMON INTERNATIONAL ISLAMIC BANK

**[Appendix 6: Chapter 4 variable description and data sources]**

<b>Variable</b>	<b>Definition and Description</b>	<b>Source</b>	<b>Empirical studies</b>
<i>Political institution</i>	Revised combined polity score subtracting the degree of democracy and autocracy	Polity IV database	Flachaire et al., 2014; Giavazzi & Tabellini, 2005; Glaeser et al., 2004
<i>Democracy</i>	The degree of democracy	Polity IV	Haber, 2007; Asutay & Sidek, 2020
<i>Short-term interest rate</i>	Short-term interest rate of a country	World Development Indicators, International Financial Statistics & Fitchconnect	Chen et al., 2007; Gloker & Towbin, 2015; Berger et al., 2019
<i>Lending interest rate</i>	Lending interest rate of a country	World Development Indicators, International Financial Statistics & Fitchconnect	Dang & Dang, 2021
<i>Overall economic freedom</i>	Overall economic freedom score	Heritage Foundation's Index of Economic Freedom	Bennett et al., 2017; Sufian & Habibullah, 2010
<i>Financial freedom</i>	Financial freedom score	Heritage Foundation's Index of Economic Freedom	Bennett et al., 2017; Sufian & Habibullah, 2010
<i>Activity restriction</i>	Restriction on banking activities, The level of the restrictions on bank's activities in securities, insurance, real estate and ownership of non-financial firms.	World Bank's Bank Regulation and Supervisory Survey	Chortareas et al., 2012; Kladakis et al., 2021; Pasiouras et al., 2009
<i>Supervisory power</i>	Supervisory power The level of supervisors or supervisory authorities' power	World Bank's Bank Regulation and Supervisory Survey	Chortareas et al., 2012; Kladakis et al., 2021; Pasiouras et al., 2009
<i>Market discipline</i>	Market discipline Indicator that measures how much banks are allowed to disclose their off-balance sheet items and risk management procedures to the public and whether the certified auditors and mandatory within a bank.	World Bank's Bank Regulation and Supervisory Survey	Chortareas et al., 2012; Kladakis et al., 2021; Pasiouras et al., 2009
<i>Islamic political institution</i>	Islamic human and political rights	Islamicity Indices	
<i>Islamic economic institution</i>	Islamic economic value	Islamicity Indices	
<i>Islamic legal institution</i>	Islamic legal and governance	Islamicity Indices	
<i>Islamicity overall</i>	Overall Islamicity index How much the country reflects the Islamic values according to	Islamicity Indices	

	the teachings of the Holy <i>Quran</i> .		
<i>GDP growth</i>	Annual GDP growth (%)	World Bank database & Global Market Information Database (GMID)	Casu et al., 2019; Diaz & Huang, 2017
<i>Inflation rate</i>	Inflation, annual consumer prices (%)	World Bank database & Global Market Information Database (GMID)	Berger et al., 2019
<i>Bank concentration</i>	Bank concentration ratio (%) Ratio of the three largest commercial banks' assets to the total assets of all commercial banks of a country	World Bank database	Luo et al., 2016; Pasiouras et al., 2009; Tanna et al., 2017
<i>Unemployment rate</i>	Unemployment rate (%) of a country	IMF database	Casu et al., 2019
<i>Total asset</i>	Log of total assets, size of banks	Bankfocus & Fitchconnect	Casu et al., 2019; Diaz & Huang, 2017; Jiang et al., 2019
<i>Equity to total asset</i>	Equity / total assets (%), capital of banks	Bankfocus & Fitchconnect	Diaz & Huang, 2017; Jiang et al., 2019
<i>Lerner index</i>	Measurement of market power in the banking market	Global Financial Development Database	Beck et al., 2013; Berger et al., 2019; Fiordelisi & Mare, 2014
<i>Corruption rate</i>	Corruption perceptions index: how corrupt a country's public sector is perceived to be by experts and business executives.	Transparency International	Ashraf, 2017; Asutay & Sidek, 2020
<i>Non-performing loans</i>	Non-performing loan ratio to measure the credit risk in banking areas	Bankfocus & Fitchconnect	Casu et al., 2019; Nguyen et al., 2020
<i>Return on assets</i>	Return on assets	Bankfocus & Fitchconnect	Diaz & Huang, 2017; Nguyen et al., 2020
<i>Bank credit to private sector</i>	Bank Credit to private sector (% of GDP) Ratio of banks' claims to the private sector to GDP	Fitchconnect	Luo et al., 2016; Pasiouras et al., 2009; Tanna et al., 2017

## [Appendix 7: Effect of institutions on bank liquidity creation, excluding the UK sample]

Variable	Full sample						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Political institution</i>	0.061* (0.083)						
<i>Short-term interest rate</i>		-0.530 (0.382)					
<i>Overall economic freedom</i>			0.029 (0.790)				
<i>Activity restriction</i>				-0.163*** (0.001)			
<i>Islamic political institution</i>					0.199** (0.019)		
<i>Islamic economic institution</i>						0.155** (0.035)	
<i>Islamic legal institution</i>							0.156** (0.029)
<i>GDP growth</i>	-0.367 (0.359)	-0.391* (0.067)	-0.123 (0.384)	-0.013 (0.943)	0.067 (0.689)	0.083 (0.619)	0.090 (0.591)
<i>Inflation</i>	0.617** (0.037)	0.914*** (0.000)	0.383*** (0.002)	0.259** (0.039)	0.361*** (0.002)	0.345*** (0.004)	0.341*** (0.004)
<i>Bank concentration</i>	-0.921*** (0.000)	-0.425** (0.016)	0.161*** (0.003)	-0.273* (0.056)	-0.272** (0.048)	-0.267* (0.053)	-0.259* (0.059)
<i>Unemployment rate</i>	-4.765*** (0.000)	-1.851** (0.012)		-0.942 (0.173)	-1.452** (0.024)	-1.624** (0.011)	-1.573** (0.014)
<i>Total asset</i>	0.105** (0.032)	0.226*** (0.000)	0.240*** (0.000)	0.287*** (0.000)	0.255*** (0.000)	0.264*** (0.000)	0.260*** (0.000)
<i>Equity to total asset</i>	0.299 (0.127)	0.172 (0.377)	-0.204*** (0.007)	0.212 (0.223)	0.250 (0.136)	0.256 (0.128)	0.253 (0.132)
<i>Lerner index</i>	0.172 (0.316)	0.241* (0.079)		0.154 (0.147)	0.195** (0.049)	0.192* (0.052)	0.179* (0.070)
<i>Corruption</i>	0.002 (0.846)	0.019*** (0.008)	0.028*** (0.000)	0.014** (0.041)	-0.009 (0.477)	-0.006 (0.649)	-0.007 (0.609)
<i>Non-performing loans</i>	-0.631*** (0.005)	-0.054 (0.763)		-0.225* (0.052)	-0.268** (0.017)	-0.267** (0.018)	-0.270** (0.017)
<i>Return on assets</i>	-1.706** (0.028)	-0.690 (0.264)	-0.033 (0.868)	-0.898 (0.104)	-1.086** (0.039)	-1.095** (0.037)	-1.080** (0.040)
<i>Bank credit to private sector</i>			0.114** (0.017)				
<i>Intercept</i>	0.836*** (0.001)	0.110 (0.670)	-0.454 (0.285)	0.168 (0.491)	-0.110 (0.563)	-0.136 (0.469)	-0.122 (0.521)
<i>R<sup>2</sup></i>	0.322	0.171	0.146	0.210	0.209	0.209	0.209
<i>Observations</i>	740	1240	3238	1357	1494	1494	1494

Note: the current study examines  $Liquidity\ creation_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  by using the fixed-effect model where bank liquidity creation is calculated by Berger and Bouwman (2009) and Berger et al. (2019)'s measurement. The key independent variable is institutional variables, which are political institution (*Polity 2*), economic institution (*Short-term interest rate* and *Overall economic freedom*), regulatory institution (*Activity restriction*) and Islamic institution (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). Control variables include *GDP growth*, *Inflation*, *Bank concentration*, *Unemployment rate*, *Total asset*, *Equity to total asset*, *the Lerner index*, *Corruption rate*, *Non-performing loans*, *Return on assets* and *Bank credit to private sector*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.

## [Appendix 8: Effect of institutions on bank liquidity creation, excluding the UK sample – conventional vs. Islamic banks]

Variable	Panel A: Conventional Banks							Panel B: Islamic Banks						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Political institution</i>	0.073* (0.062)							-0.072 (0.714)						
<i>Short-term interest rate</i>		-0.150 (0.796)							-3.726 (0.107)					
<i>Overall economic freedom</i>			-0.223 (0.250)							0.255 (0.707)				
<i>Activity restriction</i>				-0.159*** (0.001)							-0.202 (0.257)			
<i>Islamic political institution</i>					0.088 (0.302)							0.604** (0.017)		
<i>Islamic economic institution</i>						0.008 (0.920)							0.639*** (0.003)	
<i>Islamic legal institution</i>							0.032 (0.668)							0.587*** (0.005)
<i>GDP growth</i>	0.256 (0.549)	-0.487** (0.030)	0.103 (0.560)	-0.059 (0.748)	0.151 (0.390)	0.168 (0.338)	0.167 (0.342)	-3.831** (0.033)	-0.423 (0.405)	-0.284 (0.513)	-0.401 (0.402)	-0.481 (0.264)	-0.519 (0.225)	-0.483 (0.258)
<i>Inflation</i>	0.573* (0.050)	0.938*** (0.000)	0.753*** (0.000)	0.436*** (0.000)	0.507*** (0.000)	0.507*** (0.000)	0.503*** (0.000)	1.372 (0.572)	-0.093 (0.894)	-0.382 (0.516)	-0.880* (0.061)	-0.731* (0.090)	-0.772* (0.072)	-0.808* (0.060)
<i>Bank concentration</i>	-0.404 (0.130)	0.011 (0.955)	-0.076 (0.618)	-0.114 (0.473)	-0.042 (0.782)	-0.033 (0.825)	-0.031 (0.837)	-1.339* (0.085)	-1.482*** (0.001)	-1.328*** (0.002)	-1.430*** (0.001)	-1.213*** (0.004)	-1.141*** (0.006)	-1.147*** (0.006)
<i>Unemployment rate</i>	-3.722*** (0.003)	-2.594*** (0.000)	-2.529*** (0.000)	-1.784*** (0.006)	-2.036*** (0.001)	-2.132*** (0.000)	-2.107*** (0.001)	-4.172 (0.495)	1.543 (0.672)	1.771 (0.575)	1.865 (0.555)	1.836 (0.534)	1.475 (0.614)	1.536 (0.600)
<i>Total asset</i>	0.108** (0.037)	0.261*** (0.000)	0.331*** (0.000)	0.320*** (0.000)	0.319*** (0.000)	0.328*** (0.000)	0.325*** (0.000)	-0.034 (0.924)	0.043 (0.789)	0.011 (0.930)	0.070 (0.596)	-0.035 (0.772)	-0.029 (0.803)	-0.041 (0.732)
<i>Equity to total asset</i>	0.463** (0.024)	0.708*** (0.000)	0.746*** (0.000)	0.683*** (0.000)	0.744*** (0.000)	0.749*** (0.000)	0.747*** (0.000)	-0.712 (0.587)	-1.530** (0.033)	-0.902* (0.089)	-0.834 (0.146)	-0.790 (0.129)	-0.825 (0.109)	-0.808 (0.118)
<i>Lerner index</i>	0.138 (0.491)	0.135 (0.314)	0.112 (0.286)	-0.014 (0.899)	0.073 (0.472)	0.066 (0.518)	0.066 (0.513)	0.735 (0.540)	0.851** (0.033)	0.935*** (0.005)	0.972*** (0.004)	0.842*** (0.007)	0.784** (0.012)	0.771** (0.014)
<i>Corruption</i>	0.011 (0.345)	0.004 (0.533)	0.006 (0.385)	-0.001 (0.861)	-0.007 (0.591)	0.004 (0.785)	-0.000 (0.994)	0.025 (0.691)	0.072*** (0.002)	0.081*** (0.000)	0.077*** (0.001)	0.004 (0.920)	-0.014 (0.719)	-0.009 (0.816)
<i>Muslim population</i>	4.261 (0.399)	0.505 (0.126)	0.344 (0.295)	-0.038 (0.912)	0.542* (0.092)	0.508 (0.117)	0.536 (0.103)	2.251 (0.507)	0.800 (0.293)	0.194 (0.792)	0.109 (0.882)	0.390 (0.569)	0.482 (0.479)	0.584 (0.397)
<i>Non-performing loans</i>	-0.693*** (0.002)	-0.559*** (0.002)	-0.316*** (0.006)	-0.390*** (0.000)	-0.390*** (0.000)	-0.388*** (0.000)	-0.388*** (0.000)	-0.997 (0.623)	1.483*** (0.008)	1.128** (0.025)	1.165** (0.017)	1.016** (0.028)	1.012** (0.027)	1.031** (0.025)
<i>Return on assets</i>	-1.900** (0.014)	-2.127*** (0.001)	-1.896*** (0.001)	-1.770*** (0.002)	-2.008*** (0.000)	-2.036*** (0.000)	-2.024*** (0.000)	-1.349 (0.816)	2.269 (0.133)	1.317 (0.335)	1.516 (0.318)	1.298 (0.333)	1.245 (0.349)	1.356 (0.309)
<i>Intercept</i>	-3.416 (0.457)	-0.627 (0.152)	0.162 (0.864)	0.088 (0.853)	-0.900** (0.021)	-0.897** (0.022)	-0.916** (0.020)	0.141 (0.969)	0.548 (0.634)	-0.225 (0.944)	1.214 (0.316)	0.795 (0.436)	0.683 (0.500)	0.645 (0.525)
<i>R<sup>2</sup></i>	0.327	0.219	0.259	0.259	0.254	0.253	0.253	0.540	0.335	0.294	0.310	0.312	0.323	0.320
<i>Observations</i>	682	1007	1233	1115	1240	1240	1240	58	233	253	242	254	254	254

Note: the current study examines  $Liquidity\ creation_{it} = \alpha_{it} + \beta_1 Institutions_{it} + \beta_2 Controls_{it} + \varepsilon_{it}$  by using the fixed effect model and splitting samples into conventional and Islamic banks where bank liquidity creation is calculated by Berger and Bouwman (2009) and Berger et al. (2019)'s measurement. The key independent variable is institutional variables, which are political institution (*Polity 2*), economic institution (*Short-term interest rate* and *Overall economic freedom*), regulatory institution (*Activity restriction*) and Islamic institutions (*Islamic political institution*, *Islamic economic institution* and *Islamic legal institution*). Control variables include *GDP growth*, *Inflation*, *Bank concentration*, *Unemployment rate*, *Total asset*, *Equity to total asset*, *the Lerner index*, *Corruption rate*, *Muslim population*, *Non-performing loans*, *Return on assets* and *Bank credit to private sector*. All models include bank, country and year fixed effects. \*\*\*, \*\* and \* denote 1%, 5% and 10% significance level, respectively. p-values are in parentheses.