STRUCTURAL ANALYSIS OF BANKING COMPETITION AND PERFORMANCE: EVIDENCE FROM THE PHILIPPINE UNIVERSAL AND COMMERCIAL BANK GROUP, 2011-2021
(An Undergraduate Thesis)

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ABSTRACT

The structure of the banking industry plays a crucial role in banking performance, a well-functioning banking system, and economic development. This study aims to understand the relationship between competition, efficiency, and profitability of universal and commercial banks (UKBs) in the Philippines from the first quarter of 2011 to the last quarter of 2021 in order to test the applicability of the structure-conduct-performance (SCP) hypothesis, the efficient structure hypothesis (ESH), and the quiet life hypothesis. The descriptive results show that although the majority of the UKBs are commercial banks, universal banks – most of which are domestic - dominate the Philippine banking industry in terms of assets and market share. While the country's banking industry increasingly became more concentrated, its performance based on profitability has declined over time. The amendment of the bank liberalization law in 2014 aimed at promoting banking competition attracted the entry of private foreign banks into the industry but it was not effective in ensuring competition. Regression results show that return on equity is significantly related to the concentration indicators HHI and CR5 as well as to efficiency. HHI and CR5 were found to Granger-cause ROE but not market share. Research findings were found to be more in line with the QLH and rejected both the SCP and ES hypotheses. Hence, in the case of the Philippine banking industry, banking competition has a positive impact on banking profitability. The study suggests the need for the Philippines to promote banking competition, especially among domestic banks, to improve banking performance.

Keywords: Competition, Concentration, Profitability, Efficiency, Quiet Life Hypothesis

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CHAPTER I

Introduction

Competition is indispensable for efficient market outcomes as well as the production of a wide array of goods and services at lower prices (Aldaba, 2000). In a competitive market, industry price and profit are most likely determined by economic forces without distortions, hence, firms ought to redistribute their resources to higher-valued uses promoting economic dynamism and efficiency leading to increased consumer welfare, innovation, and technological advancement (World Bank & OECD, 1998). Market competition, however, is influenced by regulatory factors imposed by the government like tariffs and export subsidies, behavioral factors such as anti-competitive engagements like cartel formation and predatory pricing, and structural factors which are external or outside the control of market participants like economies of scale and large capital requirements (Aldaba, 2008).

Like all other sectors, ensuring competition in the financial sector results in economic efficiency through allocation, productivity, and dynamism. Claessens (2009) explained that the level of competition in the financial market determines productive efficiency in the delivery of financial services, the quality of financial services as well as the products offered, and the extent of financial innovation. More particularly, Beck, Levine, and Loayza (2000) pointed out that the development of financial intermediaries favorably influences the increase in total factor productivity and boosts the growth of a country's gross domestic product (GDP). They added that an increase in physical capital, as well as private savings, are associated with financial intermediary development.

Empirical studies suggest that competition plays a principal role in the banking industry's performance and the overall stability of the financial system. Anginer, Demirguc-Kunt, & Zhu (2012) explained that increased competition in the banking system allows for risk diversification of banks which cushions the impact of shocks. Additionally, banking competition preconditions economic growth by stimulating credit provision although it may also risk the stability of the financial system as banks engage in risk-taking behavior (Carlson, Correia, & Luck, 2022). Pruteanu-Podpiera, Weill, and Schobert (2016) pointed out that increased competition in the banking industry improves the performance of banks in terms of increasing welfare gains and lowering the cost of financial services which encourages investments and economic growth. In particular, increased banking competition decreases the monopoly power of banking firms which reduces banking prices.

Beck, Demirguc-Kunt, and Maksimovic (2003) pointed out that the banking industry is highly concentrated, and the financing constraints increase for small and medium firms. Moreover, they argued that the effect of bank concentration intensifies if a.) numerous policies that restrict banking activities are in place, b.) banking activities are disrupted by the government, or c.) a large proportion of banks in the country are government-owned.

Of equal importance is the role of regulatory and supervisory frameworks in the banking system. Beck (2008) emphasized that promoting banking competition in itself does not result in banking system instability as long as improved institutional frameworks are in place to provide support for the competitive mechanisms of the industry. Policies that ensure banking system competition in this regard like reduced barriers to entry, fewer

restrictive policies, and bank liberalization could promote stability in the banking system (Beck, 2008; Schaeck, Cihak, & Wolfe, 2009).

In the Philippines, there is little existing research discussing the relationship between the structure and performance of the Philippine banking industry. Most of these studies were conducted in the early 2000s as an assessment and evaluation of the country's banking system after policies and reforms were implemented in the late 1980s to the 1990s (Gochoco-Bautista, 2000; Reyes, 2001). These financial policies and reforms were also pointed out to have cushioned the adverse impacts of the Asian financial crisis and the global financial crisis on the Philippine banking system (Guinigundo, 2009; Ofreneo, 2015; Reyes 2001).

Among the financial reforms which aimed to encourage competition include the easing of restrictions on the entry of new banks and bank branches and the liberalization of the banking system which allowed the entry and operation of foreign banks in the country (Reyes, 2001). Milo (2002) emphasized that the deregulation of bank entry and branching restrictions resulted in banking industry competition and contestability and improved the dynamic efficiency of financial intermediaries, especially commercial banks. In another study, Pasadilla & Milo (2005) found that liberalizing the entry and operation of foreign banks improved banking density making banking more accessible to Filipinos across the region. Milo (2000), however, asserted that carefully thought-out banking regulation and supervisory policies are equally important as it provides the financial system with both implicit and explicit guarantees.

Aside from the policies and reforms that promote banking competition, prudential reforms were strengthened in the late 1990s to ensure systemic banking stability. After the Asian financial crisis, the Bangko Sentral ng Pilipinas (BSP) improved the supervisory and regulatory frameworks to strengthen the banking industry (Milo, 2002; Reyes, 2001). Following the strategy of other Asian countries, the BSP also aimed to manage and limit the number of banking institutions in the country by encouraging mergers and acquisitions and by setting authorization criteria like higher minimum capital requirements (Pasadilla & Milo, 2005).

Like other developing and developed countries, the Philippine banking industry is subject to policy restraints that ensure the stability of the banking system but, at the same time, may impede competition and contestability in the banking sector (Milo, 2000 & 2002). However, in a more recent study, Bayangos (2021) found that competition in the banking sector mitigates the risk-taking activities of banking firms at the industry level, although its influence on individual banks' risk-taking activity varies. According to Milo (2000 & 2002), although prudential reforms ensure the soundness and security of the financial system, removing them would also promote the competitive process in the industry hence, the balance between the benefits of allowing market contestability and its possible costs must be determined.

The level of competition in the Philippine banking industry, therefore, can be linked to a well-functioning banking system in the country. The role of banking competition has an important implication for the overall performance of the country’s banking industry as well as the overall functioning and growth of the Philippine economy. Given the limited number of studies on the relationship between structure and performance in the Philippine

banking industry, the researchers aimed to address this gap in the banking literature in the context of the Philippines.

Statement of the Problem

This study aims to understand the relationship between competition, efficiency, and profitability of universal and commercial banks (UKBs) in the Philippines from the first quarter of 2011 to the last quarter of 2021 in order to test the applicability of the structure-conduct-performance (SCP) hypothesis, the efficient structure hypothesis (ESH), and the quiet life hypothesis. The structure of the Philippine banking industry is examined using the concentration indices, namely, the Herfindahl-Hirschman Index (HHI) and CR5 (concentration ratio of the five largest banks) - which indirectly measure the level of competition in the industry. Banking efficiency, on the other hand, is measured using the market share of each bank. The banking industry's performance will be assessed using return on equity (ROE) as a measure of profitability. Using these indicators, the researchers endeavor to analyze how the level of competition and efficiency in the Philippine banking industry influences overall banking performance or alternatively, how banking efficiency in a competitive industry influences overall banking performance and consequently, the level of concentration. How are concentration, efficiency, and profitability related to each other? Specifically, the researchers aim to understand the impact of banking industry concentration and efficiency on banking profitability. Given these factors, how important is industry competition and/or efficiency in the banking industry in improving its overall performance?

Specific Objectives

1. To describe the composition of the Philippine banking industry from 2011 to 2021 in terms of the number of banks by type (universal or commercial), classification (private or government), and ownership (foreign or domestic);
2. To describe the level of concentration in the Philippine banking industry from 2011 to 2021 using the Herfindahl–Hirschman Index (HHI) and the concentration ratio for the five largest banks in the country (CR5);
3. To describe the efficiency of the country's banking industry for the same period using market share;
4. To describe the profitability of the banking industry for the same period using the bank's return on equity (ROE) banking profitability indicator;
5. To determine the relationship between the banking industry concentration indicators (HHI and CR5), banking efficiency indicator (market shares), and the banking profitability indicator (ROE) and examine its relationship using panel data regression analysis from 2011 to 2021; and
6. To determine the direction of the causality between the indicators of concentration, efficiency, and profitability using the Granger causality test.

Scope and Delimitations

This paper used the individual banks as its unit of analysis but mainly focused on commercial and universal banks publicly listed on the website of the Bangko Sentral ng Pilipinas. The lack of quarterly data from 2011 to 2021 was the reason for excluding thrift, rural, and cooperative banks from the analysis. Data on total assets were sourced from

the banks' balance sheets and were used to compute the market concentration indices (HHI and CR5) of the banking industry and the measure of efficiency (market share of individual banks). To measure each bank's profitability, only the data on the return on equity (ROE) was used as most banks do not publicly release their return on assets (ROA). These data were sourced from the public balance sheets on the BSP website, although their availability to the public affected the amount of data compiled in this study. The period of observation for this study was limited to 2011 until 2021. The analysis mainly focused on the structure and performance of the banking industry as there is no direct way of measuring the conduct or behavior of firms (Michel & Weiergraeber, 2018).

Significance of the Study

Through this study, the researchers will be able to determine the level of competition, performance, and the overall condition of the Philippine banking system that can be beneficial to the following:

For policymakers, this study can contribute to the existing knowledge regarding the Philippine banking system. The results can be a starting point for policy reforms that maintain a competitive market structure while ensuring the optimum performance of banks necessary for a well-functioning economy.

For banks, the results can give them an overview of their performance and introduce significant changes that can help improve their efficiency and performance.

For students and researchers, this study can help them formulate future research studies. The results, conclusions, and recommendations can serve as motivations for their future works.

Definition of Terms

Banking Industry is the network of banking institutions licensed by the state or the Central Bank to supply services. Republic Act 8791 or *An Act Providing For The Regulation of the Organization and Operations of Banks, Quasi-banks, Trust Entities, and For Other Purposes* divides banks into commercial, universal (which are expanded commercial banks), thrift, rural, cooperative, and Islamic banks (Milo, 2002). In this study, only commercial and universal banks were included.

- **Commercial banks** are banks that provide basic services like accepting deposits, lending out loans, issuing drafts and credit cards, and serving as remittance facilities (BSP, 2014).
- **Universal banks** are banks that have the same services offered by commercial banks but also serve as investment houses, invest in other businesses other than their subsidiaries, and own up to 100% of the equity of thrift banks (BSP, 2014).

Bank Efficiency is defined as the ability of banks to produce the best output with limited input and costs. Efficient banks are said to support “the fruitfulness of implemented macroeconomic policies, which generate the durable development, economic growth, and welfare for society” (Isrova, 2010, as cited in Alber, Elmofty, Kishk, & Sami, 2019, p.2). Although bank efficiency indicated by a bank’s market share can be measured using

total assets, total loans, and total deposits, only market shares in terms of total assets will be used in this study.

Efficient structure hypothesis is a structural hypothesis that examines the relationship between bank efficiency and profit. It states that efficient banking, as in better banking management, increases profit. This increase in profit will later cause an increase in market shares which in turn, increases market concentration (Jeon & Miller, 2005).

Market concentration is a measure of the size of the market that is mainly controlled by a small number of firms (OECD, 2018). The market share, in terms of total assets, of the individual banks is collated and used to calculate the HHI and concentration ratio of the industry as a whole:

- **Herfindahl-Hirschman Index (HHI)** is the most common market concentration indicator that measures overall market concentration. It is the summation of the square of the market shares of all banks in the industry (Bikker & Haaf, 2002).
- **Concentration Ratio** is another common indicator of market concentration. Unlike HHI, CR only measures relative market concentration as it focuses on the largest banks in the industry (Galetíc & Obradović, 2018). The concentration ratio CR5 is calculated by combining the market shares of the five (5) leading banks in the industry.

Market share is the portion of the market held by a bank within the industry. This study uses the ratio of a bank's total assets relative to the total assets of the entire banking industry.

Quiet Life Hypothesis is a structural hypothesis that explains the effect of market concentration on efficiency (Lelissa & Kuhil, 2018). It claims that banking industry concentration leads to lower banking profitability as bank managers have less incentive to maximize efficiency in bank operations when the industry is concentrated (Hicks, 1995).

Structure-Conduct-Performance (SCP) hypothesis is a structural hypothesis that argues that there is a relationship between the structure, behavior, and performance of the industry and its firms (Lelissa & Kuhil, 2018).

Market structure refers to the different market classifications and conditions – the number of firms in the industry, how similar the products these firms offer, and the ease of entry and exit from the market (Ezenekwe & Uzonwanne, 2018).

Banking Performance is generally defined as "the achievement of the objectives set forth by the firm (the bank) within the agreed time and with minimal costs while using the available resources (Hajer & Anis, 2016)." Return on Assets (ROA) and return on equity (ROE) are two of the most common measures of performance. For this paper, only ROE will be used due to the limited data available on the banks' ROA.

- **Return on Equity (ROE)** is a measure of a bank's profitability and efficiency relative to its shareholders' equity or the amount of money that was invested in the bank (Hajer & Anis, 2016). It is calculated by dividing net income by equity – both are available from the banks' balance sheets and/or annual reports.

CHAPTER II

Review of Related Literature

Banking plays a crucial role in promoting economic growth, especially since banking institutions channel funds to investors for investment opportunities, and the financial activities of banking firms ensure successful operations of the financial system and consequently the economy. Douglas (2008) and Levine (1997) asserted that a well-functioning banking system operates as a driving force for economic growth and development as it provides investment opportunities, generates employment, and assists individuals and businesses.

The role of the banking industry develops throughout the economic development process in two folds: the expansion of bank depth or the size of the banking industry relative to the economy and the weakening of the relationship between national income and bank development (Demirguc-Kunt, Feyen, & Levine, 2018). Similarly, Le, Le, Tran, Duong, Dao, and Do (2021) found that banking depth has a positive causal relationship with short-term economic growth however, in the long run, the causal direction reverses since long-run production conditions and efficient usage of capital would influence banking depth variables. In turn, the volatility of these variables would determine economic efficiency in the economy through money supply, bank credit, and credit requirements.

Moreover, Lin, Liu, and Wei (2018) claimed that the banking industry's ability to spur innovation depends on the state of the financial markets. More particularly, the banking industry's role in providing capital and encouraging innovative investments would

be more relevant in a less-developed stock market like in most developing economies. This suggests that the performance of the banking industry is partly linked to financial market conditions.

Additionally, Rushchyshyn, Mulska, Nikolchuk, Rushchyslyn, and Vasyltiv (2021) identified a strong causal relationship between banking sector development with foreign direct investment and the reduction of national poverty. They added that the banking sector's positive role in economic growth indicates its value in achieving sustainable development and economic turbulence. For instance, Bayraktar and Wang (2008) argued that financial liberalization, particularly of banking institutions, could positively influence economic growth as it improves financial servicing conditions, availability of funds, or banking efficiency. More specifically, liberalizing financial institutions would minimize financing costs and maximize the accumulation of capital which would, consequently, boost national income.

A well-performing banking system has an important implication in nation-building since it requires elements necessary for its functioning including an effective justice system that legitimizes contracts and agreements, and a government that ensures the operation of sound banks through supervision and statutory frameworks (Douglas, 2008). Additionally, the state of the banking system acts as an indicator for successful nation-building in that it helps in storing public funds safely for productive allocation to the nation's investments.

Structure-Performance Relationship

Two commonly used structural hypotheses can be used to draw inferences on the relationship between banking industry structure and banking profitability in the industrial organization literature (Berger, 1995; Edwards, Allen, & Shaik, 2006; Uzunidis, 2016). These are the traditional structure-conduct-performance (SCP) or simply structure-performance (SP) hypothesis and the efficient-structure hypothesis (ESH) (Berger, 1995; Uzunidis, 2016).

The SCP hypothesis states that the structure of the banking market determines the behavior of banking firms which, in turn, determines their performance in the market (Bain, 1951 & 1956). The SCP hypothesis places an emphasis on market power to describe the overall banking industry structure and performance (Berger, 1995). Generally, it posits that the level of concentration in an industry is negatively correlated to the degree of competition and is positively correlated to the firms' profits in that industry (Lelissa & Kuhil, 2018). This assumes that in a concentrated banking industry, banks, regardless of their efficiency, are able to earn higher profits (Edwards, Allen, and Shaik, 2006).

Additionally, banks in a concentrated banking market are said to generate more profits by engaging in noncompetitive behavior. The traditional SCP hypothesis, also known as the collusion hypothesis, posits that concentration in the banking market increases the tendency of banks to collude with each other to set higher prices and generate more profits (Sathye, 2005). In a concentrated market, a smaller number of banking firms means that negotiating and coordinating with other banks are easier and

that the level of interdependence among banks gets higher (Ornstein, 1972). Hence, banking firms in a concentrated banking industry have higher market power due to collusion which means that they can set the price above the marginal cost as opposed to a competitive banking market where the price is near the marginal cost (Carlton & Perloff, 2000). Because banks can set the price above marginal cost, they can generate higher profits as a result. This is one of the foundational arguments for the structuralist approach to antitrust policies (Carter, 1978).

As opposed to the SCP hypothesis, the efficient structure hypothesis puts emphasis on the efficiency of banking firms, rather than their market power. The ESH provides an alternative perspective in understanding the relationship between structure and performance stating that banking efficiency in a competitive banking industry increases the profitability of banks which leads to increased market concentration (Edwards, Allen, & Shaik, 2006). It posits that there is a spurious relationship between market concentration and profitability. In other words, efficiency and performance have a direct relationship (Edwards, Allen, and Shaik, 2006).

In a competitive banking market, more efficient banks are able to maximize their profits by either keeping the price at the same level while shrinking the size of the bank or by reducing the price while expanding the size of the bank (Demsetz, 1973; Lloyd-Williams, Molyneux, & Thornton, 1994). In addition, they can operate with smaller costs because of better management strategies and superior production capabilities (Lelissa & Kuhil, 2020). In turn, these efficient bank can compete in the market, expand and secure larger shares in the banking market, and earn higher profits resulting in increased concentration (Demsetz, 1973).

The traditional SCP hypothesis received criticisms regarding its explanation of the relationship among its components. Critics argued that there is a rather complex relationship between market structure, conduct, and performance that the hypothesis fails to address. Many argue that it is deterministic, linear, and descriptive rather than analytic (Perloff, Karp, and Golan, 2010). The SCP hypothesis takes structure as the independent variable that affects conduct and performance; however, there are exogenous factors like government regulations that can also affect structure, conduct, and performance (Medalla, et al., 2020).

Seelanatha (2010) proposed that, despite its criticisms and weaknesses, using the SCP paradigm as a tool for industrial organization analysis has two general benefits. First, it postulates how the industry operates by incorporating different variables such as barriers to entry, market concentration, and product differentiation to explain the restriction and expansion of firms' operations in the industry. More specifically, it can explain the productivity and efficiency of firms in the market based on such variables. Second, the SCP paradigm emphasizes the rationality of firms as economic actors in an industry. For instance, it notes that firms strategize and change their behavior with respect to the market environment to optimize their profits.

Other variant hypotheses emerged to address the limitations of the traditional SCP hypothesis. These include the quiet life hypothesis and relative market power hypothesis. The quiet life hypothesis (QLH), which is a special case of the SCP hypothesis, primarily postulates that market concentration reduces efficiency which consequently lowers performance (Lelissa & Kuhil, 2018). Hence, the quiet life hypothesis suggests a negative

relationship between concentration and efficiency. The QLH is also different to the SCP hypothesis as it states that market concentration results to lower performance.

Based on the QLH, in a concentrated banking market where banking firms have relatively high market power, managers have less incentive to maximize efficiency which results in low performance (Hicks, 1935). Managers are said to enjoy a “quiet life” as banks are expected to gain higher profits in a concentrated market. In contrast, in a competitive banking market, managers are said to aim to improve their status in the market due to rivalry with other banks. Banks, then, tend to be more risk-averse in a concentrated banking industry than in a competitive industry. Industry concentration and efficiency, in this regard, are inversely related to profitability (Fare, Grosskopf, Maudos, Tortosa-Ausina, 2015).

The relative market power (RMP) hypothesis, on the other hand, postulates that market concentration does not necessarily generate profit for firms. Like the ESH, it postulates that market share and profitability have a positive relationship which is in contrast to as what the SCP hypothesis suggests on the positive relationship between concentration and profitability (Smirlock, 1985). However, the hypothesis claims that, in a noncompetitive banking market where banking firms are said to have market power, only banks that can gain supernormal profits are those with a large share in the market with higher quality products as a result of product differentiation (Berger, 1995 & Shepherd, 1982). In traditional industrial organization analysis, the RMP also considers market share, not only as a proxy of efficiency but of market power as well, hence the notion of relative market power (Nissan, 2023).

There are also literary works that propose to modify and develop the SCP paradigm. For instance, Neuberger (1997) emphasized that the conditions of the market for information are critical in the structure, behavior, and performance of financial intermediaries thus, the SCP approach in analyzing banking industries must be revised by incorporating market imperfections such as information asymmetry, uncertainty, and the cost of transaction especially that these imperfections have an impact on the key elements of the SCP framework.

Another critique of the SCP paradigm of the traditional industrial organization lies in its assumption that a high level of concentration weakens market competition. However, proponents of the new empirical industrial organization (NEIO) contest such an assumption arguing that a concentrated industry would result in a competitive environment if contestability or the legitimate threat of firm entry and exit exists (Coccorese, 2014). In other words, according to the NEIO, competition does not necessarily have a negative relationship with concentration. In the past decades, the NEIO gained popularity in the empirical applications of industrial organization analysis, however, the SCP framework still dominates the industrial organization literature (Lee, 2007).

Structure-Performance Relationship in Banking Literature

There are numerous studies linking the structure of the banking industry to its performance (i.e., profitability), however, authors have diverging results and findings. For instance, Kocisova (2016) and Bhatti and Husain (2010) showed that under the SCP framework, a high concentration positively affects the profitability of banks. It also

postulates that increased concentration resulting in lesser competition results in supernormal profits experienced by banks (Bhatti and Hussain, 2010).

In the case of the Iranian Islamic banking system, Asl, Rashidi, and Ghorbani (2021) used the SCP paradigm and also found that market concentration and market share have a direct relationship with banking performance which does not satisfy the structure-conduct-performance (SCP) hypothesis and the efficient structure hypothesis. Their results also confirm that only a few banks in the Iranian Islamic banking industry "gain the highest share of profit and maintain their market share by colluding with each other" suggesting an oligopoly or cartel-like banking structure. This is consistent with economic logic. When the market is controlled by a few firms, then it is oligopolistic. Even if there are many banking firms in the market, if only a handful controls it, then the market is not competitive.

On the other hand, Oloniluyi and Ogunleye (2016) examined the SCP paradigm's applicability in Nigerian banking and found that market concentration and the bank's market share are positively correlated to banking performance in terms of profits. They argued that bank performance increases as the bank expands. Khan and Hanif (2018) found a significant positive correlation between cost and scale efficiency and profitability in the Pakistan banking sector supporting the efficient structure hypothesis, however, they found that there is no significant statistical relationship between market concentration and profitability rejecting the SCP hypothesis and that market share of the firm is inversely related to bank profit which also rejects the relative market power (RMP) hypothesis.

In another study, Gavurova, Kocisova, and Kotaskova (2017) found that in European Union banking, the SCP paradigm does not apply. Instead, they found reverse causality in that it is the banking sector's performance that influences banking concentration and not the other way around. Moreover, they found an inverse correlation between market concentration and performance in the EU banking market.

To assess the relationship between market structure and the performance of Pakistan’s commercial banking industry, Bhatti and Hussain (2010) used the concentration ratio to test the structure-conduct-performance hypothesis and market share to test the hypothesis of efficient structure. Return on assets, return on capital, and return on equity served as the dependent variables. Their independent variables include firm-specific and market-specific variables such as the ten-firm concentration ratio and individual market shares of banks in terms of their total assets.

Multiple linear regression was conducted to determine the relationship between the dependent variables and independent variables. The study revealed that Pakistan’s banking market has a high concentration and that a large portion of it is handled by the top banks in the country. The authors found that using ROA as a measure of profit is positively and significantly related to market concentration. On the other hand, there is a significant negative relationship between ROA and competition. The other measure of profitability, ROE, showed the same results as ROA but has a weaker relationship to market concentration and competition because of its fluctuating trends (Bhatti and Hussain, 2010).

Kocisova (2016) conducted a similar study in the banking industry of the United States. Return on costs and cost efficiency were used as performance measures while market share, Herfindahl-Hirschman Index (HHI), and Hall-Tideman Index (HTI) were used to measure concentration. The author also used banking sector-specific independent variables like size, capitalization, asset quality, long and short-term liquidity, stability, profitability, and operational efficiency. Macroeconomic variables like economic growth, inflation, and interest rate spread were also used. Regression results show that there is a positive and significant relationship between ROC and HTI indicating that a more concentrated market will result in less costly mergers and acquisitions resulting in higher profits.

According to Bikker and Haaf (2002), one way to measure market competition is through concentration. The authors forwarded that there is an inverse relationship between the two – a high market concentration indicates lower competition. Řepková (2012) and Galetíc and Obradović (2018) used this theory to observe the relationship between market concentration and competition in the banking industry of the Czech Republic and Croatia. Řepková (2012) analyzed the Czech banking industry from the year 2000-2010 using 150 observations across 15 banks. The author used the Herfindahl-Hirschman index and 8-firm concentration ratio to measure the market concentration and found a modest decrease in concentration in the market throughout the observation period. Additionally, the banking industry became less and less concentrated among the three largest banks in the Czech Republic from 2000 to 2010. Aside from measuring market concentration, the study also used price-cost margin to measure the market power of the banks. The study revealed that there is a positive relationship between

concentration and market power which is consistent with SCP's hypothesis – a higher concentration will result in large banks having greater market power. The Czech banking industry also showed a high level of concentration indicating that there is a low level of competition.

Galetíc and Obradović (2018) got the same results from studying the Croatian banking industry. The total assets of 26 commercial banking institutions in the year 2017 were used by the authors to derive the concentration values. For the concentration ratio, two calculations were made, one that consists of the four largest banks in Croatia, and another that includes the eight largest banks. The results show that the four largest banks own 68.28% of the total banking sector while the top 8 banks own 89.76% of the total market shares. The authors used the following scale to interpret the Herfindahl-Hirschman index: less than 0.1 means a low concentration, 0.1 to 0.18 for medium concentration, and a value higher than 0.18 signifies a high market concentration. The Herfindahl-Hirschman Index value of Croatia's banking market is at 0.14731887, indicating that it is moderately concentrated.

The Philippine Banking Industry

The Philippine banking industry is divided into different classifications – commercial and universal, thrift, rural, cooperative, and Islamic banks. In general, the Philippine banking industry was dominated by a small number of leading commercial banks and a large number of small-scale thrift and rural banks (Milo, 2002). In the 1960s, when the rapid expansion of the Philippine banking industry brought financial instability, restrictive banking policies started to be implemented (Milo, 2000). Minimum capital

requirements were raised as it was believed that bigger banks would result in a more stable industry. Acquisitions and mergers were encouraged to decrease the number of commercial banks while increasing their bank size.

Reyes (2001) noted that higher capital requirements, liquidity cover on foreign currency liabilities, and a limit on real estate loans were continued to be upheld after the rebranding of the Central Bank to the Bangko Sentral ng Pilipinas in 1993. Guinigundo (2011) pointed out that despite the international financial instability during the 2008 global financial crisis, the Philippine banking industry remained resilient because of high profitability, improved risk and liquidity management, stronger supervisory and regulatory organization, and the transition of banks to consumer lending to earn more profit. Noland (2000) noted that the high barriers to entry into the Philippine banking industry caused cartelization in the sector. Those who were able to have banking licenses had supernormal profits.

Contrary to the claims that the Philippine banking industry remained resilient in the 1997 Asian financial crisis attributed to the restrictive nature of the industry, Dacanay (2002) found that the Asian financial crisis had a negative effect on banking profitability By examining the relationship of structure and performance of the Philippine banking industry using the structure-conduct-performance (SCP) and efficiency-structure hypotheses. Additionally, he found out that the SCP hypothesis does not apply to the country's banking industry while the ESH hypothesis does.

Pasadilla and Milo (2005) underscored the importance of policy reforms in the banking sector by analyzing the effects of liberalization on banking competition. When

Republic Act No. 7721, or *"An Act Liberalizing the Entry and Scope of Operations of Foreign Banks,"* was enacted in 1994, more foreign banks were allowed to enter the banking industry. Due to financial liberalization, banks and bank branches in the country grew in number which, according to the authors, possibly reduced net interest spread indicating increased operational efficiency and market confidence as well as the reduction of monopoly profits by large commercial banks.

This is in contrast to the empirical findings of Dacanay (2002) stating that the entry of foreign banks into the Philippine banking industry did not have a significant effect on the profitability of universal and commercial banks in the country. Moreover, according to Manlagnit & Lamberte (2005), domestic banks are more sensitive to external factors such as the Asian financial crises, hence liberalization should be partnered with prudential regulations that could help domestic banks during crises.

Ofreneo (2015) argued that even after the amendment of the banking liberalization law in 2014, banks continued to form alliances through consolidation, mergers, and acquisitions to fully equip themselves for the increase in competition. Bigger and more efficient banks also acquire and merge with weaker banks that are on the verge of bankruptcy not only to help the smaller bank but to expand themselves faster in the market as well. When Manlagnit and Lamberte (2005) examined the impact of policy reforms on the efficiency of the Philippine commercial banking industry, they found that smaller banks are more cost and profit efficient than bigger banks due to their closer relationships and a better understanding of their clients. Despite this, they still supported the Bangko Sentral's stand in encouraging merger and acquisition among banks. This is because merged banks can become more cost-efficient throughout the year despite its

initial negative impact on their efficiency. However, unlike in the 1990s when bank consolidation and mergers were encouraged and branching out was limited, BSP now also promotes the broadening of the banks' geographical presence through branching out.

CHAPTER III

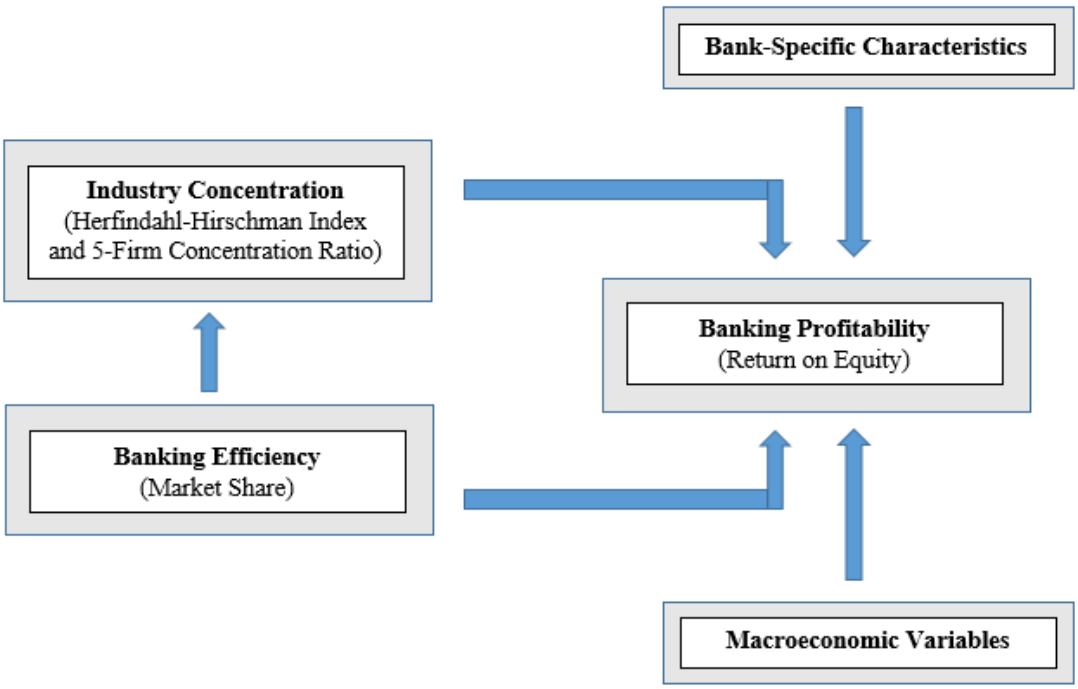
CONCEPTUAL FRAMEWORK

This study aims to examine the relationship between market concentration, efficiency, and profitability of the Philippine banking industry from 2011 to 2021 and test the applicability of the following structural hypotheses: the traditional SCP or simply SP hypothesis, the quiet life hypothesis, and the efficient structure hypothesis in terms of cost efficiency. The independent variables are market concentration (as measured by the HHI and CR5) and efficiency (as measured by the market shares of each bank). The dependent variable, on the other hand, is bank profitability (as measured by return on equity), which is a widely-used performance indicator in the banking literature.

Structural Hypotheses

To examine the relationships, three competing theories will be utilized: the traditional SCP or simply SP hypothesis, the efficient structure hypothesis in terms of cost efficiency, and the quiet life hypothesis. Following the SP hypothesis, also known as the collusion hypothesis (Bain, 1951 & 1952), the structural attributes of the banking industry are said to determine banking performance, particularly in the long run (Andreano & Warner, 1958; Smit & Trigeorgis, 2004). This is based on the assumption that collusion among banks is prevalent in a concentrated industry as the cost of collusion is lower in such an industry (Ornstein, 1972; Lelissa & Kuhil, 2018). Through collusion, banks have higher market power, can set higher prices in the market, and consequently, earn higher profits (Bain, 1951 & 1952).

Figure 1. Variable Scheme



This study focused on the relationship between banking industry concentration and profitability and took the collusive tendencies among banks in a concentrated industry as implied, as in most industrial organization literature involving the SCP hypothesis. The concentration indices HHI and CR5 were used in this study as indirect measures of market power, as traditionally (Brekke, 2017). The CR5 only measures the relative concentration of the industry as it measures concentration based only on the five largest banks in the banking industry while HHI, on the other hand, measures overall industry concentration by including all banks in its computation (Galetíc & Obradović, 2018).

For the SCP hypothesis to hold, two conditions need to be observed. First, HHI and CR5 must have a positive and significant relationship with ROE. Second, the two market concentration indicators must be established to determine profitability (Edwards, Allen, & Shaik, 2006).

The efficient structure hypothesis (ESH), on the other hand, suggests that efficiency in a competitive banking industry increases the profitability of banks which results in a greater tendency for market concentration (Smirlock, 1985). To test the applicability of the ESH, the market share of each bank was used to measure banking efficiency. In the industrial organization literature, market share is traditionally used as an indirect indicator of efficiency since firms operating at a lower cost through better management practices and strategies are argued to have higher market shares (Smirlock, 1985 & Smirlock, Gilligan, & Marshall, 1986). Efficient banks not only increase industry concentration but also earn higher profits (Berger, 1995). Hence, the ESH argues that the positive relationship between industry concentration and profitability is spurious (Lelissa & Kuhil, 2018). Banking efficiency leads to higher profits and higher levels of concentration in the banking industry.

For the ESH hypothesis to hold for the Philippine banking industry, two conditions should be met. First, the market share of banks must have a significant and positive relationship with ROE and market concentration. Second, the banks' market share must determine profitability. Third, market share must also determine market concentration. That is, the structure of the market is the result, and not the cause, of banking efficiency and profitability.

The third hypothesis to be tested is the quiet life hypothesis which suggests that concentration in the banking industry reduces the efficiency of banks which, in turn, leads to low profitability (Hicks, 1935). According to this hypothesis, bank managers are said to have less incentive to be efficient in their bank operations when the industry is concentrated as they expect high profits regardless. As a result, they earn lower profits

than they expect. In a competitive banking industry, on the other hand, bank managers are said to operate more efficiently which increases bank profits.

Hence, for the quiet life hypothesis to hold applicable, the following conditions should be met: First, there must be a significant positive relationship between the market share of each bank and its ROE. Second, there must be a significant and negative relationship between the two concentration indicators and ROE.. Third, there must be a causal relationship among the variables so that the two concentration indicators determine ROE.

The above-mentioned conditions for all three theories are necessary and sufficient. If at least one condition of a hypothesis is not satisfied, the hypothesis will not hold applicable in explaining the structure and performance of the Philippine banking industry.

Bank-Specific Characteristics

The study also incorporates bank-specific characteristics which are considered internal factors that influence bank profitability and macroeconomic variables which are considered external factors that influence bank profitability. The bank-specific variables include bank size and liquidity measure as control variables and bank type, ownership, and classification as dummy variables.

Bank size as measured by total assets is said to be positively correlated with bank performance (Naseri, Bacha, & Masih, 2014). For this study, the total assets of banks are transformed in the natural logarithmic form to account for the effects of scale economies. Literature suggests that larger banks are more able to diversify their products and

services which allows them to benefit from economies of scale and obtain larger assets (Demsetz, 1997).

The loans-to-assets ratio will be used as an indicator of long-term liquidity. According to Dacanay (2002), loans constitute the biggest income-generating assets in banks as they produce higher income than main alternative assets including government securities. He posited that intensive loan marketing means that banks will generate large higher profits from investors. However, managing high amounts of loans is costly and may lead to loan losses. As a result, higher loans may lead to reduced profits. Hence, the relationship between the loans-to-assets ratio and bank profitability is indeterminate.

The banks included in this study are categorized either as commercial or universal banks. Universal banks are expected to generate more profits than commercial banks because they are expanded commercial bank that provides a variety of financial services. According to the BSP (2018), it does not only operate through issuing credits, accepting deposits, participating in the foreign exchange markets, and other general powers of commercial banks but also serves as an investment house, able to own 100% of a thrift bank's equity and invest in other non-allied enterprises. Since universal banks have other functions than commercial banks, the dummy variable also accounts for the economies of scope of commercial banks.

The banks are also categorized based on ownership: domestic or foreign. Following the findings of Claessens, Demirgüç-Kunt, and Huizinga (2001), foreign banks are expected to earn higher profits, especially in developing countries like the Philippines. This is because foreign banks are said to have better financial conditions including higher net interest margins and overhead expenses.

The banks are also classified as private or government banks. The Asian Development Bank (2020) stated that compared to private banks, government-operated banks in the Philippines offer a wider financial inclusion as evidenced by their target customers which include the agricultural sector and women. They also offer loans even during economic crises (Gonzales-Garcia and Grigoli, 2014).

Because it is easier to take out loans and credits from government banks, there should be a significant effect on their credit risk management (ADB, 2020). Thus, this paper assumed that being a government-operated bank should have a negative correlation with profitability.

Macroeconomic Indicators

The macroeconomic variables in this study include the inflation rate and gross domestic product (GDP) growth rate as control variables and the coronavirus pandemic as a dummy variable. Literature suggests that the inflation rate has an inverse relationship with banking profitability. Boyd and Champ (2006) posited that inflation discourages banks from providing loans to the private sector. In addition, they argued that when banks are not able to gauge inflation and increase their nominal interest rates on bank loans, the real return rates on bank loans decline.

The GDP growth rate measures the changes in GDP in constant price from one year to another. It is expected to have a positive relationship with banking profitability. This is because a growing economy is said to boost demand for services provided by banks (Kocisova, 2016). To ensure that inflation is accounted for, the growth rate of GDP

at constant prices will be used in the study. This is to avoid multicollinearity between the economic growth indicator and the inflation rate.

This study also accounts for the effects of the coronavirus pandemic on bank profitability. Literature suggests that the coronavirus pandemic has an unfavorable impact on the profitability of banks. Demirguc-Kunt, Pedraza, and Ruiz-Ortega (2020) pointed out that the banking industry is more vulnerable than other domestic markets. This is because the banking industry is expected to absorb, at least to a certain extent, the impact of the coronavirus pandemic by lending to the corporate sector and non-financial institutions. Hence, during the pandemic period, banks are expected to earn more profit than during the pre-pandemic period.

CHAPTER IV

METHODOLOGY

A. Research Design and Data Collection

This study used a longitudinal research design as it involved the collection of secondary data covering 47 commercial and universal banks (UKBs) in the Philippine banking industry from the first quarter of 2011 to the last quarter of 2021. The secondary data were primarily sourced from the online statistical database of the Bangko Sentral ng Pilipinas (BSP) which compiles monetary, financial, banking, and non-banking statistics including the balance sheets of banks.

The total assets of each of the 47 UKBs were collected from the balance sheets of each bank and were used to derive their market share and the market concentration indices: the Herfindahl Hirschman Index (HHI) and the 5-banking firm concentration ratio (CR5). The data on return on equity (ROE) were obtained from the BSP database based on the annual reports of each UKB. It is obtained by dividing the net income of the banks by their shareholder's equity. It is a popular measure of profitability alongside ROA and is generally helpful to investors as it computes the level of return they get for each investment they make to a bank.

Market share

This was derived by dividing the total assets of each bank by the total assets of the thirty-six commercial and universal banks covered by the study.

$$\mathrm{MS} = \frac{Bank's\ assets}{Industry\ assets} \quad (1)$$

Herfindahl-Hirschman Index

HHI or Herfindahl-Hirschman Index was used in this study as a proxy for market structure and a measure of overall concentration, and for this paper, the formula by Bikker and Haaf (2002) was used:

$$HHI = \sum_{i=1}^{n} S_i^2 \quad (2)$$

Where n is the total number of commercial and universal banks covered by the study, and $S_i{}^2$ is the squared market share. According to Galetic and Obradovic (2018), an HHI value less than 0.1 indicates low concentration, values between 0.1 and 0.18 indicate medium concentration, while an HHI value higher than 0.18 indicates a highly concentrated market.

5-firm Concentration Ratio

This market concentration ratio was determined by summing up the market shares of the five largest banks in the industry. This is also used as a measure of market concentration but only based on the five largest banks in the industry per quarter. Following the formula of Bikker and Haaf (2002), it will be calculated by:

$$CR_5 = \sum_{i=1}^{k} S_i \quad (3)$$

A CR5 value that is close to 0 indicates low market concentration while a value closer to 1 indicates high concentration (Galetic & Obradovic, 2018).

Bank specific-variables

The researchers included bank-specific variables to control for their effects on the estimated value of ROE. The value of the total assets of each bank, as an indicator of bank size, was transformed to its natural logarithmic form to account for economies of scale. The loans-to-deposits ratio, as an indicator of long-term liquidity, was manually computed for each bank. The banks were also categorized according to type, ownership, and classification to describe the characteristics of banks based on nominal level of measurement and to create dummy variables for regression analysis. The data used for the computation of the bank-specific variables and for categorizing the UKBs were sourced from the BSP database.

Macroeconomic variables

Furthermore, macroeconomic determinants were also included in the study to control for their effects on banking profitability. The growth rate of the gross domestic product (GDP) at constant prices and the rate of inflation were sourced from the Philippine Statistics Authority (PSA) and BSP respectively. The coronavirus pandemic was also included as a dummy variable in the research study to differentiate bank operations in

2020 and 2021 from the rest of the time series. This is to contribute to the theoretical developments in the banking literature brought about by the pandemic.

B. Data Analysis Plan

Descriptive analysis was first conducted to show the trends in the Philippine banking industry. The data of 47 UKBs in the industry from the first quarter of 2011 to the last quarter of 2021 were used for the descriptive analysis. Graphs and tables were produced to present the distribution of banks in terms of type, ownership, and classification from 2011 to 2021. The changes in the total assets, industry concentration, and the average return on equity (ROE) in the Philippine banking industry over time were also shown in tables and figures.

Panel data analysis was used to determine the relationships between industry concentration, banking efficiency, and banking profitability. The panel regression model estimation was restricted to balanced panels. This is because the entrance and exit of universal and commercial banks in the Philippine banking industry at different points in time results in severely unbalanced longitudinal data sets. Hence, for the regression analysis, the total number of banks was limited to 36 UKBs across the same period. The values of the HHI and CR5 have been adjusted accordingly.

Panel Data Estimation

According to Gujarati and Porter (2008), panel data, which combines time-series and cross-sectional observations, improves empirical analysis in that it combines space and time dimensions. Baltagi (2005) explained that panel data can detect and account for heterogeneity using subject-specific variables, factor in dynamics of change, and reduce

bias as it disaggregates individual observations. In addition, panel data has a bigger sample size resulting in higher degrees of freedom and a smaller degree of collinearity among variables resulting in better estimation of individual regression coefficients. Hence, it is better than time-series or cross-sectional data alone in that it makes it possible to study complicated models as it yields more variable, efficient, and comprehensive statistical inference.

Gujarati and Porter (2008) and Wooldridge (2013) discussed different estimation techniques for panel data regression models including pooled ordinary least squares (OLS) method, fixed effects (FE) model, and random effects (RE) model.

Pooled OLS Regression Model

Pooled OLS method is a straightforward application of the OLS regression model. It lumps together individual observations which omit cross-section and time effects in the data (Wooldridge, 2013). The general structure of the pooled regression model is as follows:

$$Y_{it} = \beta_1 + \beta_2 X_{1it} + \beta_3 X_{2it} + \ldots + \beta_n X_{nit} + u_{it} \quad (4)$$

Where *i* is the i^{th} subject and *t* is the time period for the variables.

However, Greene (2012) notes that the process of pooling all observations into a single regression model may not take into account the heterogeneity that may exist across individual subjects. The heterogeneity of each subject is subsumed in the error term u_{it}. As a result, the disturbance term may be correlated with other explanatory variables which makes the OLS estimates biased and inconsistent.

Fixed Effects One-Way Model

Fixed effect least squares dummy variable (LSDV) regression model or simply, fixed effects regression model (FEM) aims to eliminate unit-specific characteristics in the error term u_{it} (See Equation 4) which may be correlated with each explanatory variable across time (Wooldridge, 2012). It factors in the differences of intercepts of each unit as denoted by *i* in the intercept term:

$$Y_{it} = \beta_{1i} + \beta_2 X_{1it} + \beta_3 X_{2it} + \ldots + \beta_n X_{nit} + u_{it} \quad (5)$$

The intercept term in this equation denotes that the intercept is different across subjects (i.e. unit-variant) but does not vary across time (i.e. time-invariant). Hence, it accounts for unit-specific, time-invariant heterogeneity. This is also known as a one-way fixed effects model as it allows the intercepts to be different across entities (Gujarati & Porter, 2008).

Fixed Effects Two-Way Model

FEM estimators, however, can also account for unit-specific, time-variant heterogeneities at the same time as denoted by *it* in the intercept term:

$$Y_{it} = \beta_{1it} + \beta_2 X_{1it} + \beta_3 X_{2it} + \ldots + \beta_n X_{nit} + u_{it} \quad (6)$$

This is also known as a two-way fixed effects model as the intercept of each subject incorporates both individual and time effects in the model (Gujarati & Porter, 2008).

Fixed Effect Within-Group (WG) Estimator

Greene (2012) discussed that the within-group estimator expresses the values of the regressor and regressand into their mean-corrected values[1] so that the fixed effect B_{1i} is removed:

$$Y_{it} = \beta_2 X_{1it} + \beta_3 X_{2it} + \ldots + \beta_n X_{nit} + u_{it} \quad (7)$$

The WG estimators provide consistent values of the regression coefficients but are inefficient in that they have a higher variance unlike the pooled OLS model (Gujarati & Porter, 2008). In employing the WG estimation, variables that do not vary across time are wiped out to address the problem of a possible correlation between the regressors and the disturbance term, u_{it}. Hence, the within-group estimators do not take into account the long term effects of the variable due to differencing variables leaving only the short-run component of the variable.

Random Effects Estimation

According to Wooldridge (2013), the random effects model (REM) builds upon the assumptions of the FEM. However, it treats the intercept value of each unit, B_{1i}, as a random variable so that each unit will have a common average value of intercept B_1 and a random error term e_i with a mean value of zero (Gujarati & Porter, 2008),

$$B_{1i} = \beta_1 + \varepsilon_i \quad (8)$$

hence the equation:

$$Y_{it} = \beta_1 + \beta_2 X_{1it} + \beta_3 X_{2it} + \ldots + \beta_n X_{nit} + \varepsilon_i + u_{it} \quad (9)$$

[1] In Equation 7, $X_{1it} \ldots X_{nit}$ and Y_{it} are mean-corrected values.

The REM accounts for heterogeneity by incorporating a time-invariant, unit-specific error component ε_i and a time-variant, unit-specific error component u_{it} (also known as idiosyncratic term). In this regard, it includes time-invariant explanatory variables, unlike the FEM which subsumes all time-invariant characteristics in its intercept.

Diagnostic Test for Model Specification

To choose among the different estimation techniques for panel data analysis, this study used two diagnostic tests to specify the appropriate model for the panel data: the Breusch-Pagan Lagrange multiplier test and the Hausman specification test.

Breusch-Pagan Lagrange Multiplier Test

First, the Breusch-Pagan (1980) Lagrange multiplier test was used to determine random effects in the model. The null hypothesis is that there are no random effects present in the panel data. In such a case, pooled OLS is appropriate for panel regression analysis. However, if random effects are detected in the model, either FE or RE model is to be used. The hypothesis test is as follows:

H_0: Random effects are not present in the panel data; pooled OLS can be used.

H_A: Random effects are detected in the panel data; FE or RE model is to be used.

Hausman Test

Second, the FE and the RE models were compared using the Hausman (1978) Chi-squared test. The null hypothesis is that the FE and the RE estimators are consistent. In this case, the RE estimation will be used for panel regression analysis. If the test

indicates that there is a significant difference in the coefficients of the models (i.e. the FE and RE estimators are inconsistent), the FE estimation will be employed for panel regression. The hypothesis test is as follows:

H_0: There is no significant difference between FE and RE estimators; REM is to be used.

H_A: There is a significant difference between FE and RE estimators; FEM is to be used.

Econometric Model

This study used the random effects estimation model for the panel regression analysis. The independent variables of the study include the market shares of each bank, the HHI and the CR5. ROE is the dependent variable. The control variables include two bank-specific indicators – the total assets of a bank in logarithmic form and the loans-to-assets ratio – and two macroeconomic indicators – inflation rate and GDP growth rate. The dummy variables indicate the type (commercial or universal), the ownership (foreign or domestic), and classification (private or government) of banks as well as the impact of the coronavirus pandemic on banks (banks before the pandemic or during the pandemic).

To determine the relationships between industry concentration, banking efficiency, and banking profitability, two panel regression models were used. The first regression equation used HHI as its market concentration indicator while the second equation used CR5. This is in consideration for the expected multicollinearity between HHI and CR5 as both measure industry concentration. Hence, we have:

$$ROE_{it} = \beta_1 + \beta_2 HHI_t + \beta_3 MS_{it} + \beta_4 ASSETS_{it} + \beta_5 LA_{it} + \beta_6 GDP_t + +\beta_6 INF_t + D_1 TYPE_{it} + D_2 FORDOM_{it} + D_3 PRIVGOV_{it} + D_4 COVID_t + \varepsilon_{it} + u_{it} \quad (10)$$

$$ROE_{it} = \beta_1 + \beta_2 CR5_t + \beta_3 MS_{it} + \beta_4 ASSETS_{it} + \beta_5 LA_{it} + \beta_6 GDP_t + +\beta_6 INF_t \quad (11)$$
$$+ D_1 TYPE_{it} + D_2 FORDOM_{it} + D_3 PRIVGOV_{it} + D_4 COVID_t + \varepsilon_{it} + u_{it}$$

Where: ROE is the banking performance indicator represented by the return on equity of each bank, CR5 is the 5-firm concentration ratio, HHI is the Herfindahl-Hirschman Index, MS is the market share of each bank, ASSETS is a control variable defined by the total assets of banks in natural logarithmic form, LA is a control variable defined by loans-to-assets ratio, INF is a control variable defined by the rate of inflation, GDP is a control variable defined by the GDP growth rate, TYPE is a dummy variable where 1 = universal banks, FORDOM is a dummy variable for ownership where 1 = foreign-owned bank, PRIVGOV is a dummy variable where 1 = government-owned bank, and lastly, COVID is a dummy variable where 1 = bank during the coronavirus pandemic. β_1 is the regression constant, ε_i is the time-invariant, unit-specific error term, and u_{it} is the time-variant, unit-specific error term.

CR5, HHI, GDP, INF, and COVID are unit-invariant and time-variant indicators which means that their values do not change across each bank but vary across each time period. In contrast, MS, ASSETS, LA, TYPE, FORDOM, and PRIVGOV are unit-specific and time-variant indicators, which means that their values are different across each bank in each time period.

Testing for Structural Hypothesis

The researchers tested the three structural hypotheses – structure-conduct-performance (SCP) hypothesis, efficient structure hypothesis (ESH), and quiet life

hypothesis – to determine which of them applies to the Philippine universal and commercial banking industry.

The SCP hypothesis states that market concentration is positively related to bank performance. Hence, applying the hypothesis formulation of Dacanay (2002), the SCP hypothesis indicates that the regression coefficient of the market concentration indicators, HHI and CR5 is positive while controlling for market share. If the parameter estimate is not positive, the SCP hypothesis is rejected. That is,

$H_0 : \beta_2 > 0,\ \beta_3 = 0$*; SCP hypothesis is supported*

$H_A : \beta_2 \leq 0,\ \beta_3 = 0$*; SCP hypothesis is rejected*

In contrast, the efficient structure hypothesis assumes that there is a positive relationship between banking efficiency and profitability. Hence, the null hypothesis indicates that the regression coefficient of market share is positive while controlling for the market concentration indicators (Dacanay, 2002). If otherwise, the ESH is rejected. The null and alternative hypothesis, respectively, is given by:

$H_0 : \beta_2 = 0,\ \beta_3 > 0$*; ESH is supported*

$H_A : \beta_2 = 0,\ \beta_3 \leq 0$*; ESH is rejected*

Furthermore, the quiet life hypothesis postulates that there is a negative relationship between market concentration and banking profitability and that banking efficiency has a positive relationship with banking profitability. Hence, the null hypothesis indicates that the regression coefficient of the market concentration indicators is negative while that of market share is positive. If at least one of the parameter estimates indicates

otherwise, the quiet life hypothesis is rejected. Hence, the researchers sought to test the joint hypothesis:

$H_0 : \beta_2 < 0,\ \beta_3 > 0$; quiet life hypothesis is supported

H_A : H_0 is false; quiet life hypothesis is rejected

Other Statistical Tests

Granger Causality Test

The Granger causality test was used to reinforce the results of the hypothesis tests for the structural hypotheses. According to Gujarati and Porter (2008), the Granger test is used to test the direction of causality of one variable to another by determining whether a variable can forecast another variable across time. The hypothesis is as follows:

H_0 : X does not "Granger-cause" Y.

H_A : X "Granger-causes" Y.

Panel Data Unit Root Test

A unit root stochastic process is present if the mean, the variance, or both the mean and the variance of a variable in panel data varies across time (Gujarati & Porter, 2008). According to Barreira and Rodriguez (2005), the presence of unit roots in the variables of panel data may lead to the misinterpretation of regression coefficients. The augmented Dickey-Fuller test was used to determine whether stochastic trends are present in each variable in the panel data. The null hypothesis states that the series is non-stationary. If stochastic trends are present, Greene (2012) suggests the use of

differencing or detrending approaches depending on the nature of the case. The hypothesis test is as follows:

H_0 : All cross-sectional units have unit roots.

H_A : All cross-sectional units have unit roots (i.e. stationary).

Testing for Heteroscedasticity

Heteroscedasticity occurs when the variance of the error terms is not constant across different observations (Breusch & Pagan, 1979). It results in imprecise, although unbiased, coefficients estimate. To detect the presence of heteroscedasticity in panel regression models, the Breusch-Pagan Lagrangian multiplier test was used. The null hypothesis for the test is that the residuals do not vary across observations (i.e. homoscedasticity). If heteroscedasticity is detected, White's (1980) heteroscedasticity-consistent covariance matrix estimation in R statistical software will be used to estimate robust standard errors while allowing heteroscedasticity. The hypothesis test is as follows:

H_0 : Residuals do not vary across observations.

H_A : Residuals vary across observations (i.e. heteroscedasticity is present).

Testing for Autocorrelation

Autocorrelation happens when error terms are correlated with each other which renders the error terms not "identically independently distributed" (Greene, 2012). When autocorrelation is present, the t and F tests of significance and the R2 are also likely to be imprecise resulting in unreliable statistical inferences (Gujarati & Porter, 2008). To test for serial correlation for panel models, the Breusch-Godfrey test was used (Godfrey, 1978

& Breusch, 1979). The null hypothesis is that there is no presence of autocorrelation. If autocorrelation is detected, Newey and West's (1987) robust covariance matrix estimator in R statistical software will be used. The hypothesis test is as follows:

H_0 : Error terms are not correlated with each other.

H_A : Error terms are correlated with each other (i.e. autocorrelation is detected).

Identifying Multicollinearity

Multicollinearity is present when two or more explanatory variables are correlated with each other (Wooldridge, 2013). The primary consequence of its presence in a regression model is that it makes the estimates of the regression coefficients imprecise. The researchers will use the variance inflation factor, following Greene (2012) to determine the strength of correlation among the explanatory variables.

CHAPTER V

RESULTS AND DISCUSSION

This chapter discusses the results of the research study regarding the structure and performance of the Philippine banking industry using the universal and commercial bank (UKB) group as its sample. The interpretation and analysis of these results are also presented in this chapter which is divided into two sections.

The first section of this chapter presents the discussion of the changes in the number of banks and changes in the total assets and market share of banks according to three categories: type (universal or commercial banks), classification (domestic or foreign banks), and ownership (government-owned or private-owned banks) from 2011 to 2021. This section also tackles the trends in the level of market concentration of the Philippine banking industry as measured by the Herfindahl-Hirschman index (HHI) which measures overall market concentration and the concentration ratio of the five largest banks (CR5) which measures relative market concentration. Additionally, it also discusses the trends in the banking profitability of the UKB group based on the overall return on equity (ROE) of the banks across the study period.

The second section of this chapter tests the applicability of the following structural hypotheses in the Philippine banking industry: the structure-conduct-performance (SCP) or simply SP hypothesis, the efficient structure hypothesis (ESH), and the quiet life hypothesis. It also includes a discussion of the results of the panel regression analysis using the random effects model (REM) to determine the relationships among the variables and a discussion of the results of the Granger causality tests to determine the direction

of causality. Additionally, this section includes a discussion on the model specification for panel data regression and other robustness checks.

A. Trend Analysis on the Philippine Banking Industry

Structural Trends in the Philippine Banking Industry

For the descriptive analysis, data from 47 universal and commercial banks from 2011 to 2021 were used to examine the dynamics of the structure of the banking industry. Microeconomic theory states that a core assumption of pure competition is the easy entry of new firms and exit of incumbent firms in the industry. In the case of the banking industry, fewer banks may indicate barriers to entry in the banking industry which limit competition (Alhadeff, 1974).

Table 1 presents the total number of commercial and universal banks (UKB) that have been operating in the Philippines since 2011. Based on **Table 1,** there is a gradual increase in the total number of banks from 2011 to 2021 which is largely attributed to the increase in the number of commercial banks. Majority of them are private foreign banks (see **Table 2**).

The Bangko Sentral ng Pilipinas (BSP) places a distinction between a commercial and universal bank. A universal bank is an “expanded” commercial bank that can perform a wider range of banking activities like having the power of being an investment house and owning 100% of a thrift bank’s equity (BSP, 2017). Commercial banks, on the other hand, only offer credit, deposits, and savings, and participate in the foreign exchange market (BSP, 2017).

There are three (3) government banks within the UKB group - Land Bank of the Philippines, Development Bank of the Philippines, and Al-Amanah Islamic Bank. All are universal banks and have the least number of banks across the categories in universal banking (see **Table 2**). From 2011 until 2021, the number of government-owned commercial banks in the country remained the same (see **Table 1**).

Similarly, there are no changes in the number of domestic private banks in the UKB group after 2013. In that year, the merger between Philippine National Bank and Allied Banking Corp. took effect leaving 17 private domestic banks in the country from then on. Data shows that private domestic banks have the highest number of banks among the categories in universal banking (see **Table 2**). Interestingly, there is no entry of new private domestic banks in the UKB group in the 11-year study period. This may indicate that there are existing barriers to entry in universal and commercial banking which impede the entry of banks to the UKB group.

Conversely, as presented in Table 1, there is an increasing trend observed in the number of private-owned foreign banks which may be attributed to RA 10641 or An Act Allowing the Full Entry of Foreign Banks in the Philippines, Amending for the Purpose Republic Act No. 7721 that allowed the full entry of foreign banks in 2014. A year after the law was passed, four (4) foreign banks entered the Philippine banking industry. From 2016 to 2021, there are more foreign banks compared to private domestic and government banks combined. All the new foreign banks that entered the Philippine banking market since 2015 are commercial banks (See Table 2). The number of commercial banks in the country increased from 15 in 2014 to 25 in 2021 due to the entry of foreign banks alone.

Table 1. Distribution of Banks according to Type, Ownership, and Operation (2011-2021)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
TYPE											
Commercial	21	20	15	15	19	21	22	24	25	25	25
Universal	16	17	21	21	21	21	21	21	21	21	21
TOTAL	**37**	**37**	**36**	**36**	**40**	**42**	**43**	**45**	**46**	**46**	**46**
OWNERSHIP											
Private Domestic	18	18	17	17	17	17	17	17	17	17	17
Private Foreign	16	16	16	16	20	22	23	25	26	26	26
Government	3	3	3	3	3	3	3	3	3	3	3
TOTAL	**37**	**37**	**36**	**36**	**40**	**42**	**43**	**45**	**46**	**46**	**46**

Source of Basic Data: Bangko Sentral ng Pilipinas

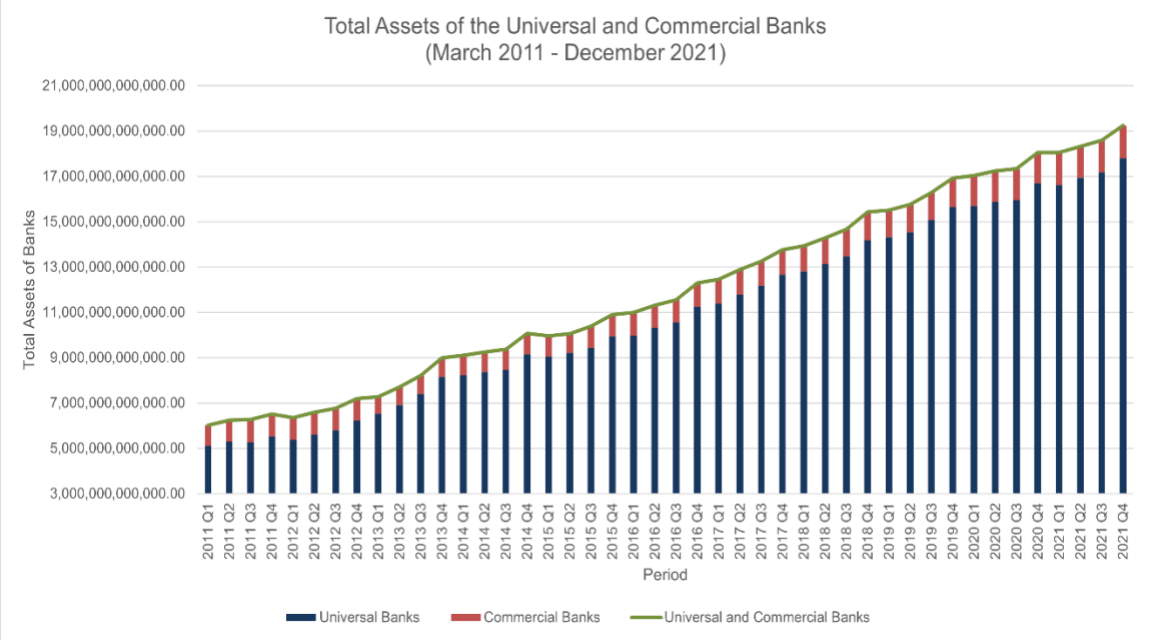
Table 2. Cross Tabulation of Universal and Commercial Banks according to Classification and Ownership (2011-2021)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
COMMERCIAL											
Private Domestic	7	6	5	5	5	5	5	5	5	5	5
Private Foreign	14	14	10	10	14	16	17	19	20	20	20
TOTAL	**21**	**20**	**15**	**15**	**19**	**21**	**22**	**24**	**25**	**25**	**25**
UNIVERSAL											
Private Domestic	11	12	12	12	12	12	12	12	12	12	12
Private Foreign	2	2	6	6	6	6	6	6	6	6	6
Government	3	3	3	3	3	3	3	3	3	3	3
TOTAL	**16**	**17**	**21**	**21**	**21**	**21**	**21**	**21**	**21**	**21**	**21**

Source of Basic Data: Bangko Sentral ng Pilipinas

It is not surprising then that in **Table 1,** there are more commercial banks than universal banks in the country since 2015. Prior to that, a total of six commercial banks changed their status to universal banks. In 2012, East West Bank, a private domestic bank, became a universal bank to further increase its flexibility in terms of investment, lending, and other banking services (East West, 2012). In 2013, a private domestic bank (Asia United) and four private foreign banks (ANZ, Deutsche Bank, ING, and Mizuho) changed their status to universal banking. These changes reduced the number of commercial banks to a total of 15 and increased the number of universal banks to 21 (See **Table 2**).

Figure 2. Total Assets of Universal and Commercial Banks (Q1 2011 – Q4 2021).



Source of Basic Data: Bangko Sentral ng Pilipinas

According to the BSP (2013), in order to obtain a universal banking license, a bank must comply with the following requirements: public offering of its stock which should not be less than 10% of the required minimum capital, has its name listed on the Philippine Stock Exchange, and meet the minimum capital requirement.

Figure 2 shows the generally increasing trend in the total assets of universal and commercial banks in the Philippines from 2011 to 2021. The distribution of assets according to bank type shows that universal banks dominate a large percent of the total assets of the UKB group as opposed to commercial banks. A significant proportion of the industry's total assets comes from universal banks ranging from a low of 84.08% to a high of 92.57% (see **Table 3**).

On the other hand, the proportion of the total assets of commercial banks ranges from 7.38% to 15.92%. This is despite the fact that there are more commercial banks than universal banks in the UKB group for a long time. This may be because universal banks have a wider range of services and sources of financial assets than commercial banks.

Table 3. Total Assets of Universal and Commercial Banks (Q1 2011 – Q4 2021)

PERIOD	TOTAL ASSETS	KB ASSETS	KB MS	UB ASSETS	UB MS
2011 Q1	6,018,247,361,456.98	902,880,294,231.79	15.00%	5,115,367,067,225.19	85.00%
2011 Q2	6,241,203,484,483.22	932,583,415,069.79	14.94%	5,308,620,069,413.43	85.06%
2011 Q3	6,268,531,875,934.32	997,902,470,002.72	15.92%	5,270,629,405,931.60	84.08%
2011 Q4	6,515,362,041,210.44	988,608,627,791.81	15.17%	5,526,753,413,418.63	84.83%
2012 Q1	6,352,741,721,409.54	973,338,905,813.22	15.32%	5,379,402,815,596.32	84.68%
2012 Q2	6,599,670,015,746.96	994,019,104,009.65	15.06%	5,605,650,911,737.31	84.94%
2012 Q3	6,765,180,687,967.07	969,248,488,046.92	14.33%	5,795,932,199,920.15	85.67%
2012 Q4	7,193,816,996,832.20	969,248,488,046.92	13.47%	6,224,325,078,852.70	86.52%
2013 Q1	7,272,953,775,170.84	748,225,098,988.00	10.29%	6,524,728,676,182.84	89.71%
2013 Q2	7,709,601,040,063.57	793,526,633,324.62	10.29%	6,916,074,406,738.95	89.71%
2013 Q3	8,207,941,279,514.93	810,830,387,526.32	9.88%	7,397,110,891,988.61	90.12%
2013 Q4	8,997,132,482,386.55	850,867,999,511.67	9.46%	8,146,264,482,874.88	90.54%
2014 Q1	9,104,850,115,166.93	867,899,276,333.16	9.53%	8,236,950,838,833.77	90.47%
2014 Q2	9,251,188,052,070.56	883,058,822,737.75	9.55%	8,368,129,229,332.81	90.45%

2014 Q3	9,377,860,685,858.68	913,551,664,089.75	9.74%	8,464,309,021,768.93	90.26%
2014 Q4	10,069,630,229,871.20	924,202,035,158.19	9.18%	9,145,428,194,712.99	90.82%
2015 Q1	9,955,102,214,559.05	903,877,828,172.39	9.08%	9,051,224,386,386.66	90.92%
2015 Q2	10,058,838,275,995.30	848,748,197,411.75	8.44%	9,210,090,078,583.58	91.56%
2015 Q3	10,396,518,438,951.70	957,398,269,856.18	9.21%	9,439,120,169,095.57	90.79%
2015 Q4	10,895,495,268,519.70	948,372,386,262.06	8.70%	9,947,122,882,257.68	91.30%
2016 Q1	10,991,732,422,028.50	1,019,275,615,780.52	9.27%	9,972,456,806,247.95	90.73%
2016 Q2	11,317,189,624,394.10	997,184,750,338.49	8.81%	10,320,004,874,055.60	91.19%
2016 Q3	11,555,015,562,859.30	994,660,238,111.21	8.61%	10,560,355,324,748.10	91.39%
2016 Q4	12,301,727,328,934.30	1,054,282,782,577.86	8.57%	11,247,444,546,356.50	91.43%
2017 Q1	12,455,452,682,960.90	1,069,647,604,212.07	8.59%	11,385,805,078,748.80	91.41%
2017 Q2	12,881,895,871,355.30	1,099,644,097,693.36	8.54%	11,782,251,773,662.00	91.46%
2017 Q3	13,256,889,283,322.60	1,087,024,249,644.16	8.20%	12,167,710,217,622.70	91.78%
2017 Q4	13,763,627,178,088.80	1,098,044,346,466.51	7.98%	12,663,433,092,682.00	92.01%
2018 Q1	13,930,086,977,968.10	1,115,660,623,519.15	8.01%	12,812,259,608,144.40	91.98%

2018 Q2	14,281,302,151,471.20	1,134,758,533,499.80	7.95%	13,144,324,104,526.70	92.04%
2018 Q3	14,673,296,883,616.50	1,197,168,316,094.04	8.16%	13,471,664,226,167.90	91.81%
2018 Q4	15,421,879,279,637.80	1,226,384,993,482.49	7.95%	14,190,752,653,088.70	92.02%
2019 Q1	15,516,954,414,330.20	1,198,799,740,393.53	7.73%	14,312,342,792,586.50	92.24%
2019 Q2	15,755,994,135,578.10	1,210,474,167,149.05	7.68%	14,538,972,239,956.90	92.28%
2019 Q3	16,295,450,950,031.50	1,214,527,297,173.24	7.45%	15,073,564,124,758.70	92.50%
2019 Q4	16,919,074,610,131.70	1,253,099,603,253.30	7.41%	15,658,682,934,175.20	92.55%
2020 Q1	17,037,265,554,033.10	1,323,029,342,741.98	7.77%	15,706,427,415,502.40	92.19%
2020 Q2	17,237,151,131,643.50	1,348,781,510,731.53	7.82%	15,880,369,647,648.20	92.13%
2020 Q3	17,335,156,299,619.10	1,371,662,623,770.79	7.91%	15,955,484,036,037.10	92.04%
2020 Q4	18,046,653,023,030.60	1,331,986,370,143.69	7.38%	16,706,035,104,397.60	92.57%
2021 Q1	18,049,021,974,664.20	1,413,511,235,830.70	7.83%	16,626,712,727,400.50	92.12%
2021 Q2	18,330,163,711,834.30	1,380,751,670,636.04	7.53%	16,939,202,329,853.60	92.41%
2021 Q3	18,587,640,268,343.30	1,405,655,619,822.48	7.56%	17,170,290,896,072.90	92.37%
2021 Q4	19,252,589,949,875.00	1,448,527,793,431.45	7.52%	17,792,412,428,725.20	92.42%

Source of Basic Data: Bangko Sentral ng Pilipinas

From 2011 to 2021, the market share of commercial banks exhibit a decreasing trend despite increasing total assets (see **Table 3**). This is in contrast to universal banks which exhibit an increasing trend in terms of both total assets and market share. Since 2011, universal banks own more than 80% of the total UKB assets. From the third quarter of 2013 onwards, their asset shares ranged from 90.12% to 92.57%. On the other hand, commercial banks own less than 20% of the total assets from March 2011 to June 2017. By the 4th quarter of 2014 until December 2021, they own less than 10% of the UKB industry.

Table 4 also shows the growth rate in total assets per bank type. The average growth rate of the commercial and universal bank group from the first quarter of 2011 to the last quarter of 2021 was calculated at 2.77%. Universal banks recorded a higher average growth throughout the time period at 2.97% than commercial banks which recorded an average of 1.24% growth rate. This explains why commercial banks are trailing behind universal banks in terms of market share even though both of them are increasing in terms of total assets. The highest growth rate attained by universal banks is 10.13% during the 4th quarter of 2013 while the lowest was in the first quarter of 2012 at -2.67%. Commercial banks, on the other hand, recorded the highest growth rate in assets at 12.80% during the 3rd quarter of 2015 which is the same period when foreign banks started entering the market. Meanwhile, they contracted the most at -22.80% during the first quarter of 2013.

Table 4. Growth Rates of the Universal and Commercial Bank Group (Q1 2011- Q4 2021)

PERIOD	TOTAL UKB ASSET GROWTH RATE	KB ASSET GROWTH RATE	UB ASSET GROWTH RATE
2011 Q1			
2011 Q2	3.70%	3.29%	3.78%
2011 Q3	0.44%	7.00%	-0.72%
2011 Q4	3.94%	-0.93%	4.86%
2012 Q1	-2.50%	-1.54%	-2.67%
2012 Q2	3.89%	2.12%	4.21%
2012 Q3	2.51%	-2.49%	3.39%
2012 Q4	6.34%	0.00%	7.39%
2013 Q1	1.10%	-22.80%	4.83%
2013 Q2	6.00%	6.05%	6.00%
2013 Q3	6.46%	2.18%	6.96%
2013 Q4	9.61%	4.94%	10.13%
2014 Q1	1.20%	2.00%	1.11%
2014 Q2	1.61%	1.75%	1.59%
2014 Q3	1.37%	3.45%	1.15%
2014 Q4	7.38%	1.17%	8.05%
2015 Q1	-1.14%	-2.20%	-1.03%
2015 Q2	1.04%	-6.10%	1.76%
2015 Q3	3.36%	12.80%	2.49%
2015 Q4	4.80%	-0.94%	5.38%
2016 Q1	0.88%	7.48%	0.25%
2016 Q2	2.96%	-2.17%	3.49%
2016 Q3	2.10%	-0.25%	2.33%
2016 Q4	6.46%	5.99%	6.51%
2017 Q1	1.25%	1.46%	1.23%
2017 Q2	3.42%	2.80%	3.48%
2017 Q3	2.91%	-1.15%	3.27%
2017 Q4	3.82%	1.01%	4.07%
2018 Q1	1.21%	1.60%	1.18%
2018 Q2	2.52%	1.71%	2.59%
2018 Q3	2.74%	5.50%	2.49%
2018 Q4	5.10%	2.44%	5.34%
2019 Q1	0.62%	-2.25%	0.86%
2019 Q2	1.54%	0.97%	1.58%
2019 Q3	3.42%	0.33%	3.68%
2019 Q4	3.83%	3.18%	3.88%

2020 Q1	0.70%	5.58%	0.30%
2020 Q2	1.17%	1.95%	1.11%
2020 Q3	0.57%	1.70%	0.47%
2020 Q4	4.10%	-2.89%	4.70%
2021 Q1	0.01%	6.12%	-0.47%
2021 Q2	1.56%	-2.32%	1.88%
2021 Q3	1.40%	1.80%	1.36%
2021 Q4	3.58%	3.05%	3.62%
AVERAGE	2.77%	1.24%	2.97%

Source of Basic Data: Bangko Sentral ng Pilipinas

Despite the coronavirus pandemic, the total assets of the universal and commercial bank (UKB) group of the Philippine banking industry generally maintained a positive average growth rate of 1.64% throughout the first quarter of 2020 and the last quarter of 2021. Comparatively, during the same period, commercial banks recorded a 1.90% average growth rate which is higher than the 1.62% average growth rate of universal banks.

In 2020, at the height of the pandemic, universal banks registered a relatively low growth rate in terms of total assets at 0.30%, 1.11%, and 0.47% during the 1st, 2nd, and 3rd quarters, respectively (See **Table 4**). During the 4th quarter of the same year, they recorded a growth of 4.70% which is higher than the average growth rate of the entire UKB industry at 4.10%. In the first quarter of 2021, universal banks' total assets shrunk by 0.47% but recovered by the next quarter with a 1.88% growth. By the 3rd and 4th quarters, they grew by 1.36% and 3.62%, respectively.

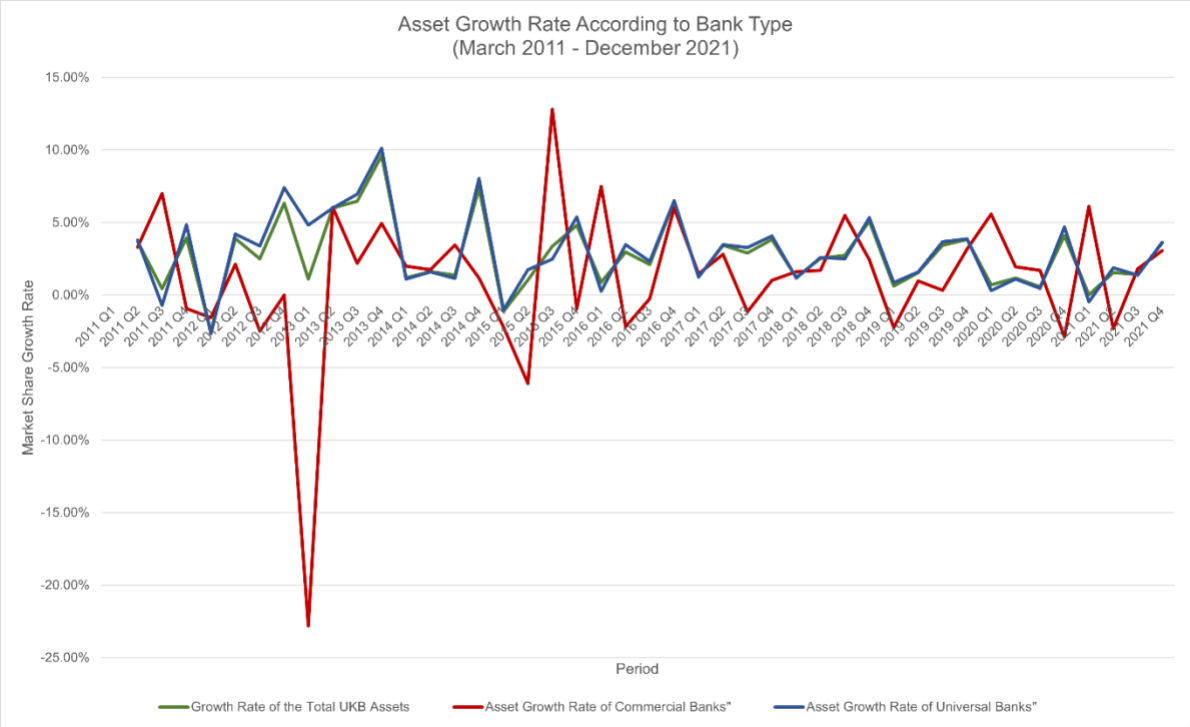
In the first quarter of 2020, commercial banks outperformed universal banks given their 5.58% growth rate compared to only 0.30% for the latter (see **Table 4**). They registered 1.95% and 1.70% asset growth for the 2nd and 3rd quarters of 2020,

respectively. However, unlike universal banks, commercial banks contracted by 2.89% during the 4th quarter of the same year. In the first quarter of 2021, commercial banks recovered with a 6.12% growth however, in the next quarter, they shrunk again by 2.32%. For the third and fourth quarters, commercial banks recorded 1.80% and 3.05% growth, respectively.

The assets of the UKB group posted a relatively small yet positive growth rate of 0.50% to 1% from the first to the third quarter of 2020 (see **Table 4**). By the 4th quarter of the same year, the industry managed to grow by 4.10%, withstanding the effects of the pandemic. This growth may be attributed to the increase in deposits, bond issuances, and capital infusions of banks (BSP, 2021). BSP may have also helped alleviate the impact of the pandemic on banks by easing monetary policies like imposing a lower reserve requirement which gives banks more money to transact with their customers (BSP, 2021).

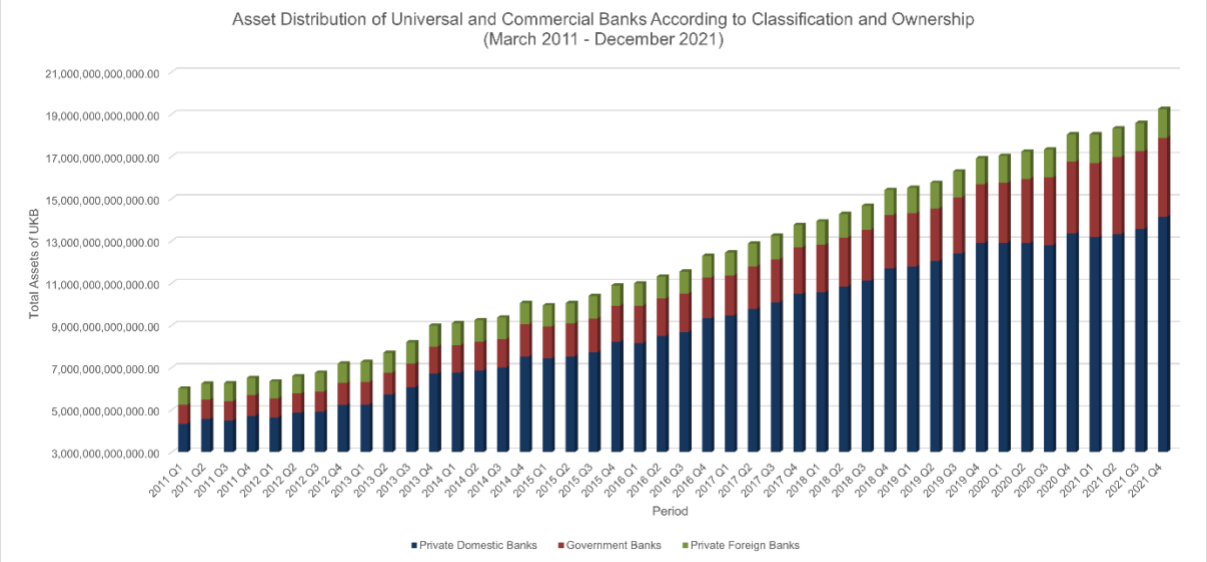
Figure 3 illustrates the growth rate trend of the UKB industry as well as the different growth rates per bank type. The red line represents commercial banks' growth rate, the blue line is the growth rate of universal banks, and the green line is the overall UKB industry growth rate. As observed in the graph, throughout the time period, the growth rates of universal banks are closer to the overall industry growth rate. This is to be expected given that 80% to 90% of total UKB assets are accounted for by universal banks.

Figure 3. Quarter-on-Quarter Growth Rates of Philippine UKBs (Q1 2011 – Q4 2021).



Source of Basic Data: Bangko Sentral ng Pilipinas

Figure 4. Asset Distribution of UKBs in terms of Classification and Ownership (Q1 2011 – Q4 2021).



Source of Basic Data: Bangko Sentral ng Pilipinas

The total assets of the universal and commercial banks in terms of classification and ownership generally exhibit an increasing trend (see **Figure 4**). The private domestic banks own the majority of the total assets in the UKB group followed by government-owned banks. Private foreign banks, meanwhile, have the least total assets in the UKB group. This is of particular interest because there are more foreign-owned banks than the number of private domestic and government banks combined since 2016. However, this might have to do with universal banking which is considered to have economies of scope. Majority of private domestic banks are universal banks as opposed to private foreign banks whose majority are commercial banks (See **Table 2**). All government banks are also universal banks.

Table 5 depicts interesting trends in the total assets and market shares of UKBs in each bank category from 2011 to 2021. While the total assets of the private domestic,

private foreign, and government-owned banks are increasing from 2011 to 2021, the trend of the market share of each bank category exhibits different patterns. The market share of private domestic banks is relatively constant from 2011 to 2021, fluctuating only between 71% and 77%. In contrast, government banks demonstrate a minimal yet increasing trend in their market share from around 13% to 19% while private foreign banks demonstrate a decreasing trend from around 13% to 7%.

Throughout the study period, private domestic banks dominate the UKB group based on market share, followed by government-operated banks and private foreign-owned banks having the least share in the market. This satisfies the provision in Section 3 of R.A No. 10641 stating that domestic banks should take control of at least 60% of the total assets of the banking sector in the Philippines (BSP, 2014).

Table 5. Market Shares of UKBs according to Classification and Ownership (March 2011 – December 2021)

PERIOD	TOTAL UKB ASSETS	PRIVATE DOMESTIC	PRIVATE DOMESTIC MS	GOVERNMENT	GOVERNMENT MS	PRIVATE FOREIGN	PRIVATE FOREIGN MS
2011 Q1	6,018,247,361,456.98	4,348,853,915,194.72	72.26%	901,492,073,912.38	14.98%	767,901,372,349.88	12.76%
2011 Q2	6,241,203,484,483.22	4,570,514,097,688.13	73.23%	916,631,822,416.17	14.69%	754,057,564,378.92	12.08%
2011 Q3	6,268,531,875,934.32	4,492,163,795,995.52	71.66%	915,003,059,775.26	14.60%	861,365,020,163.54	13.74%
2011 Q4	6,515,362,041,210.44	4,726,023,935,155.38	72.54%	979,672,672,465.14	15.04%	809,665,433,589.92	12.43%
2012 Q1	6,352,741,721,409.54	4,644,497,758,995.46	73.11%	907,862,088,901.74	14.29%	800,381,873,512.34	12.60%
2012 Q2	6,599,670,015,746.96	4,866,357,815,372.86	73.74%	910,877,095,925.06	13.80%	822,435,104,449.04	12.46%
2012 Q3	6,765,180,687,967.07	4,924,184,176,268.33	72.79%	943,855,352,244.69	13.95%	897,141,159,454.05	13.26%
2012 Q4	7,193,816,996,832.20	5,235,999,253,409.69	72.78%	1,043,655,221,918.95	14.51%	914,162,521,503.56	12.71%
2013 Q1	7,272,953,775,170.84	5,263,030,679,013.33	72.36%	1,065,868,549,139.98	14.66%	944,054,547,017.53	12.98%
2013 Q2	7,709,601,040,063.57	5,731,549,104,872.48	74.34%	1,031,319,397,706.22	13.38%	946,732,537,484.87	12.28%
2013 Q3	8,207,941,279,514.93	6,072,082,932,038.83	73.98%	1,125,542,513,985.48	13.71%	1,010,315,833,490.62	12.31%
2013 Q4	8,997,132,482,386.55	6,721,217,164,237.59	74.70%	1,278,957,619,496.30	14.22%	996,957,698,652.66	11.08%

2014 Q1	9,104,850,115,166.93	6,766,296,180,821.38	74.32%	1,298,425,308,362.63	14.26%	1,040,128,625,982.92	11.42%
2014 Q2	9,251,188,052,070.56	6,867,536,328,345.74	74.23%	1,363,561,621,837.38	14.74%	1,020,090,101,887.44	11.03%
2014 Q3	9,377,860,685,858.68	7,010,150,117,882.50	74.75%	1,348,395,048,173.28	14.38%	1,019,315,519,802.90	10.87%
2014 Q4	10,069,630,229,871.20	7,536,559,054,460.74	74.84%	1,527,188,694,488.99	15.17%	1,005,882,480,921.45	9.99%
2015 Q1	9,955,102,214,559.05	7,440,189,220,014.33	74.74%	1,515,477,846,991.61	15.22%	999,435,147,553.11	10.04%
2015 Q2	10,058,838,275,995.30	7,540,979,249,832.91	74.97%	1,554,390,743,413.67	15.45%	963,468,282,748.75	9.58%
2015 Q3	10,396,518,438,951.70	7,721,653,447,686.89	74.27%	1,605,714,734,990.25	15.44%	1,069,150,256,274.61	10.28%
2015 Q4	10,895,495,268,519.70	8,227,928,853,663.21	75.52%	1,706,902,727,480.82	15.67%	960,663,687,375.71	8.82%
2016 Q1	10,991,732,422,028.50	8,167,431,443,932.26	74.31%	1,769,367,330,351.88	16.10%	1,054,933,647,744.33	9.60%
2016 Q2	11,317,189,624,394.10	8,506,181,982,815.38	75.16%	1,777,843,705,417.54	15.71%	1,033,163,936,161.16	9.13%
2016 Q3	11,555,015,562,859.30	8,690,767,580,907.81	75.21%	1,828,155,729,983.27	15.82%	1,036,092,251,968.23	8.97%
2016 Q4	12,301,727,328,934.30	9,342,598,878,436.41	75.95%	1,931,776,601,565.81	15.70%	1,027,351,848,932.13	8.35%
2017 Q1	12,455,452,682,960.90	9,472,680,592,102.22	76.05%	1,889,021,005,117.40	15.17%	1,093,751,085,741.25	8.78%
2017 Q2	12,881,895,871,355.30	9,785,237,255,992.09	75.96%	2,017,599,354,635.42	15.66%	1,079,059,260,727.83	8.38%
2017 Q3	13,256,889,283,322.60	10,100,553,736,250.80	76.19%	2,037,542,541,957.70	15.37%	1,118,793,005,114.15	8.44%

2017 Q4	13,763,627,178,088.80	10,493,944,409,151.90	76.24%	2,212,796,489,706.56	16.08%	1,056,886,279,230.39	7.68%
2018 Q1	13,930,086,977,968.10	10,572,296,053,605.40	75.90%	2,251,769,645,636.10	16.16%	1,106,021,278,726.56	7.94%
2018 Q2	14,281,302,151,471.20	10,855,072,241,164.00	76.01%	2,314,363,991,658.23	16.21%	1,111,865,918,648.98	7.79%
2018 Q3	14,673,296,883,616.50	11,122,609,806,355.60	75.80%	2,405,283,563,172.44	16.39%	1,145,403,514,088.42	7.81%
2018 Q4	15,421,879,279,637.80	11,697,264,194,684.80	75.85%	2,546,497,354,586.90	16.51%	1,178,117,730,366.16	7.64%
2019 Q1	15,516,954,414,330.20	11,789,857,892,124.30	75.98%	2,531,245,841,730.02	16.31%	1,195,850,680,475.90	7.71%
2019 Q2	15,755,994,135,578.10	12,062,332,467,202.90	76.56%	2,481,299,460,686.36	15.75%	1,212,362,207,688.85	7.69%
2019 Q3	16,295,450,950,031.50	12,408,954,966,924.60	76.15%	2,662,861,114,190.53	16.34%	1,223,634,868,916.35	7.51%
2019 Q4	16,919,074,610,131.70	12,901,317,442,292.40	76.25%	2,795,616,020,975.94	16.52%	1,222,141,146,863.36	7.22%
2020 Q1	17,037,265,554,033.10	12,916,890,657,896.70	75.82%	2,834,526,231,065.86	16.64%	1,285,848,665,070.59	7.55%
2020 Q2	17,237,151,131,643.50	12,905,911,118,228.30	74.87%	3,040,741,716,660.24	17.64%	1,290,498,296,754.94	7.49%
2020 Q3	17,335,156,299,619.10	12,805,852,164,011.70	73.87%	3,202,976,915,405.95	18.48%	1,326,327,220,201.39	7.65%
2020 Q4	18,046,653,023,030.60	13,355,846,107,491.30	74.01%	3,404,793,857,655.26	18.87%	1,286,013,057,884.03	7.13%
2021 Q1	18,049,021,974,664.20	13,186,174,660,762.90	73.06%	3,508,713,460,265.33	19.44%	1,354,133,853,635.89	7.50%
2021 Q2	18,330,163,711,834.30	13,335,090,927,201.10	72.75%	3,651,488,968,232.82	19.92%	1,343,583,816,400.38	7.33%

2021 Q3	18,587,640,268,343.30	13,567,884,667,944.60	72.99%	3,683,171,409,794.47	19.82%	1,336,584,190,604.18	7.19%
2021 Q4	19,252,589,949,875.00	14,139,548,052,282.10	73.44%	3,745,043,078,057.32	19.45%	1,367,998,819,535.64	7.11%

Source of Basic Data: Bangko Sentral ng Pilipinas

These trends are also evident in **Figure 5** which shows the trend of market share according to ownership from the first quarter of 2011 to the last quarter of 2021. Private domestic banks (blue line) maintained their dominance in terms of market share in the UKB group throughout the period while the three government-operated banks exhibited a minimal increase in their shares on the UKB group as represented by the red line. Lastly, the market share of private foreign banks (green line) shows a decreasing trend through the years.

Figure 5. Market share of UKBs in terms of Classification and Ownership (Q1 2011- Q4 2021)

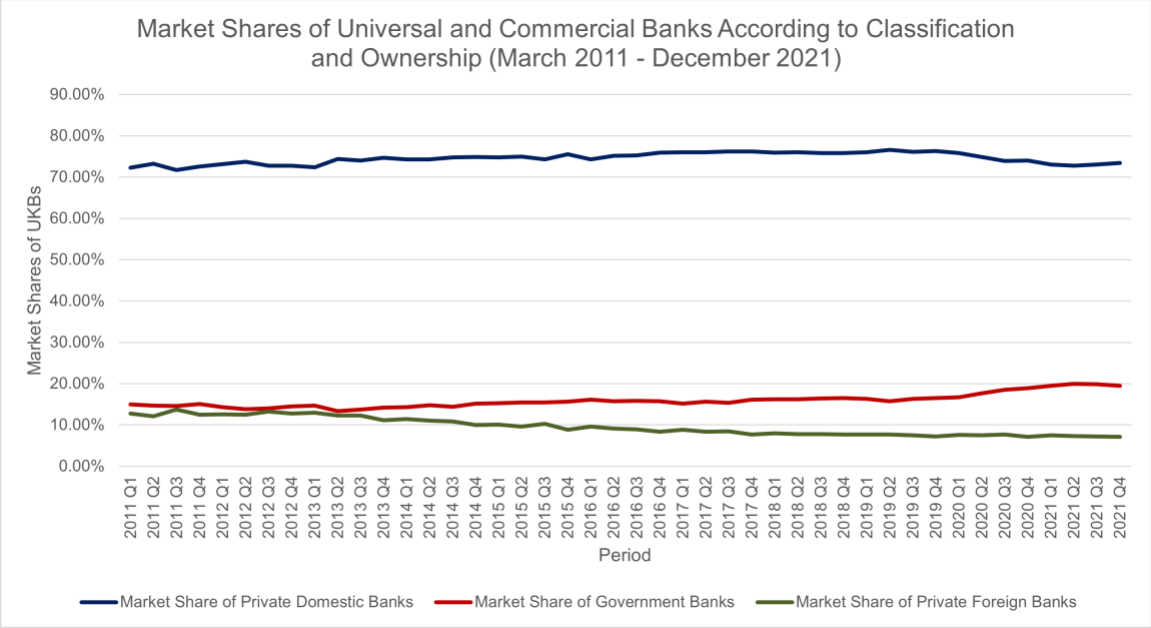


Table 6 shows the growth rates of universal and commercial banks according to classification and ownership. Interestingly, among the three categories, government-operated banks recorded the highest average asset growth rate at 3.45% which is almost 1% higher than the banking industry average. This explains why the market share of government-operated banks is slightly increasing throughout the study period.

The three government banks grew the most during the fourth quarter of 2013 at 13.63%, the highest ever recorded throughout the study's observation period. This high growth rate mostly accounted for the 22% asset growth that the Development Bank of the Philippines and the Land Bank of the Philippines achieved for the said quarter (Land Bank, 2014; DBP, 2014). Al-Amanah Bank registered a 4% decrease in total assets in the same period. Meanwhile, they recorded the lowest growth rate during the 1st quarter of 2012 at -7.33%.

Private domestic banks exhibited an average growth rate of 2.82% from 2011 to 2021 which is also higher than the overall average of the entire UKB industry (see **Table 6**). Their highest growth rate was recorded during the 4th quarter of 2013, at 10.69% while the lowest is -2.50% during the first quarter of 2012.

Private foreign banks, meanwhile, have the lowest average growth rate at 1.45% among the UKB categories. This is despite the increase in their number after the amendment of the bank liberalization law in 2014. They recorded their highest growth rate at 14.2% in September 2011 and the lowest growth rate at -10.15% in December 2015, which is the lowest growth rate recorded throughout the observation period.

Claessens and van Horen (2009) and Liu, Jang, Sathye, and Liu (2021) stated that foreign banks experience some location-based disadvantages as parent companies observe from afar and may have imperfect information on the state of the banking industry in other countries. In addition, according to Medalla (2017), foreign banks in the Philippines are having a hard time competing against domestic banks because of brand recognition and customer loyalty which he considers as behavioral barriers to entry.

Table 6. Asset Growth Rates According to Classification and Ownership (March 2011 – December

PERIOD	TOTAL UKB ASSET GROWTH RATE	PRIVATE DOMESTIC ASSET GROWTH RATE	GOVERNMENT ASSET GROWTH RATE	PRIVATE FOREIGN ASSET GROWTH RATE
2011 Q1	-	-	-	-
2011 Q2	3.70%	5.10%	1.68%	-1.80%
2011 Q3	0.44%	-1.71%	-0.18%	14.23%
2011 Q4	3.94%	5.21%	7.07%	-6.00%
2012 Q1	-2.50%	-1.73%	-7.33%	-1.15%
2012 Q2	3.89%	4.78%	0.33%	2.76%
2012 Q3	2.51%	1.19%	3.62%	9.08%
2012 Q4	6.34%	6.33%	10.57%	1.90%
2013 Q1	1.10%	0.52%	2.13%	3.27%
2013 Q2	6.00%	8.90%	-3.24%	0.28%
2013 Q3	6.46%	5.94%	9.14%	6.72%
2013 Q4	9.61%	10.69%	13.63%	-1.32%
2014 Q1	1.20%	0.67%	1.52%	4.33%
2014 Q2	1.61%	1.50%	5.02%	-1.93%
2014 Q3	1.37%	2.08%	-1.11%	-0.08%
2014 Q4	7.38%	7.51%	13.26%	-1.32%
2015 Q1	-1.14%	-1.28%	-0.77%	-0.64%
2015 Q2	1.04%	1.35%	2.57%	-3.60%
2015 Q3	3.36%	2.40%	3.30%	10.97%
2015 Q4	4.80%	6.56%	6.30%	-10.15%
2016 Q1	0.88%	-0.74%	3.66%	9.81%
2016 Q2	2.96%	4.15%	0.48%	-2.06%

2016 Q3	2.10%	2.17%	2.83%	0.28%
2016 Q4	6.46%	7.50%	5.67%	-0.84%
2017 Q1	1.25%	1.39%	-2.21%	6.46%
2017 Q2	3.42%	3.30%	6.81%	-1.34%
2017 Q3	2.91%	3.22%	0.99%	3.68%
2017 Q4	3.82%	3.89%	8.60%	-5.53%
2018 Q1	1.21%	0.75%	1.76%	4.65%
2018 Q2	2.52%	2.67%	2.78%	0.53%
2018 Q3	2.74%	2.46%	3.93%	3.02%
2018 Q4	5.10%	5.17%	5.87%	2.86%
2019 Q1	0.62%	0.79%	-0.60%	1.51%
2019 Q2	1.54%	2.31%	-1.97%	1.38%
2019 Q3	3.42%	2.87%	7.32%	0.93%
2019 Q4	3.83%	3.97%	4.99%	-0.12%
2020 Q1	0.70%	0.12%	1.39%	5.21%
2020 Q2	1.17%	-0.09%	7.28%	0.36%
2020 Q3	0.57%	-0.78%	5.34%	2.78%
2020 Q4	4.10%	4.29%	6.30%	-3.04%
2021 Q1	0.01%	-1.27%	3.05%	5.30%
2021 Q2	1.56%	1.13%	4.07%	-0.78%
2021 Q3	1.40%	1.75%	0.87%	-0.52%
2021 Q4	3.58%	4.21%	1.68%	2.35%
AVERAGE	2.77%	2.82%	3.45%	1.45%

Figure 6. Asset Growth Rates of Banks According to Classification and Ownership (March 2011 - December 2021)

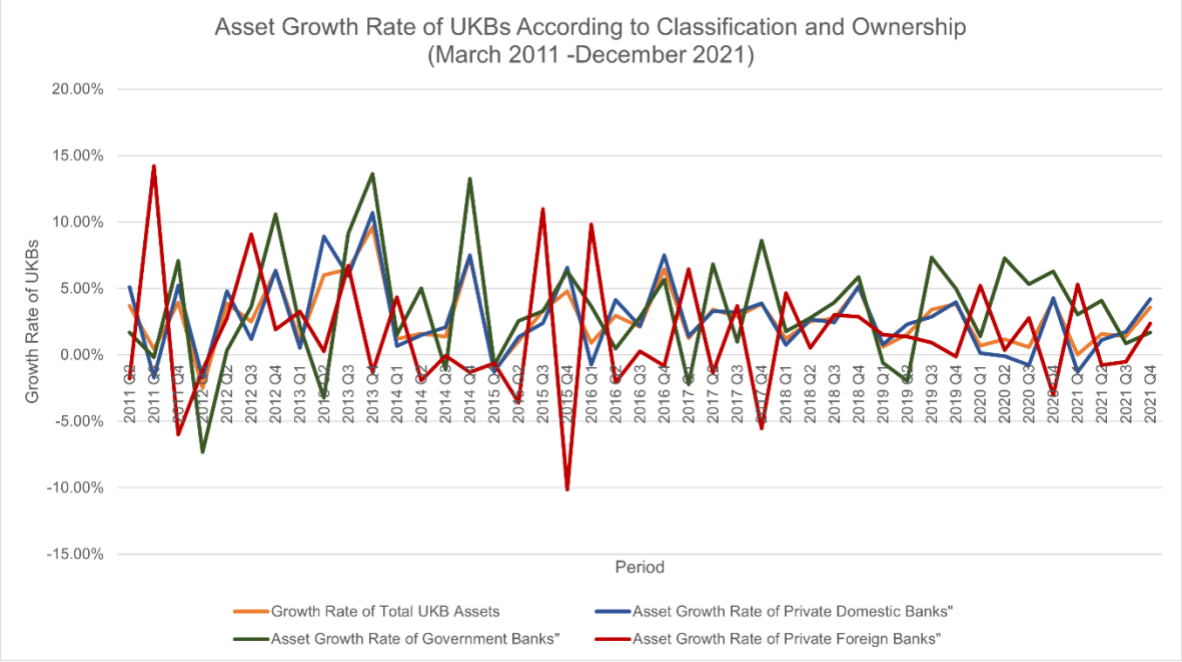


Figure 6 illustrates the trend of the asset growth rate of banks according to classification and ownership. Compared to private foreign and government banks, private domestic banks exhibit a more stable growth rate exhibiting the least fluctuations. Additionally, their growth rates are closest to the overall growth rate of the UKB industry. As shown in the graph, private foreign banks exhibit more volatile growth rates of their asset shares than private domestic banks and government banks throughout the study period.

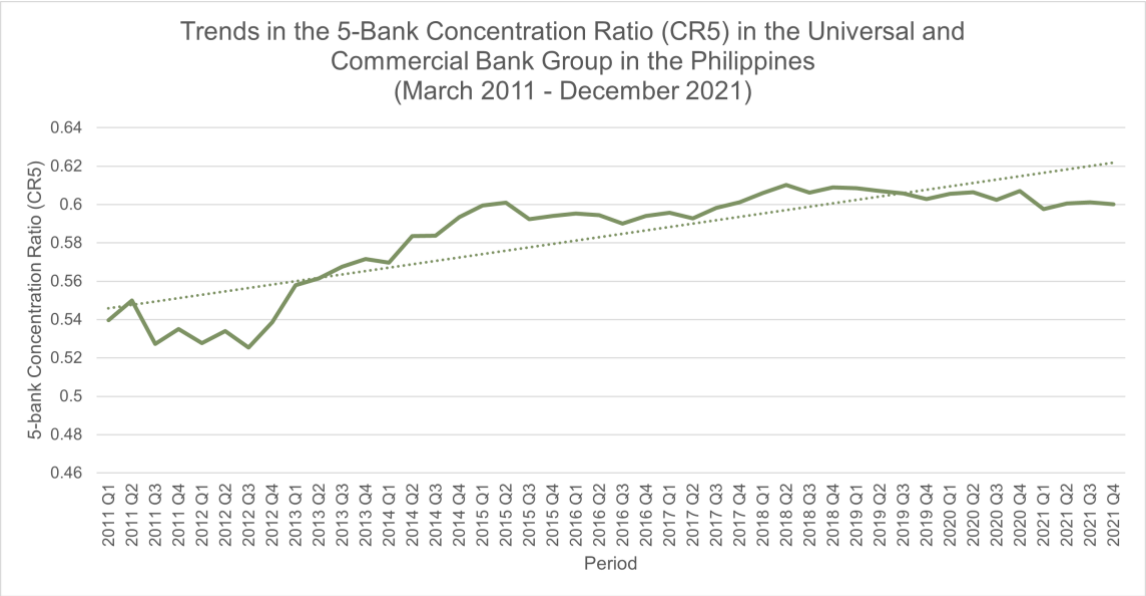
Concentration in the Philippine Banking Industry

Data shows that the level of concentration in the Philippine banking industry in terms of relative and overall concentration has been increasing over time. **Figure 7** shows an upward trend in the level of relative concentration in the Philippine banking industry as

measured by the concentration ratio of the five largest banks in the banking industry (CR5). The increase in the level of relative concentration of the industry started in the third quarter of 2012. This means that the UKB industry has increasingly become concentrated in the hands of the five largest banks in the industry which may imply that the top-performing banks are behaving oligopolistically (Galetíc and Obradović, 2018).

The highest level of market concentration was recorded at 0.61 during the 2nd quarter of 2018 while the lowest was 0.53 in September 2012 which is relatively not far from the value of the highest concentration level. Throughout the study period, CR5 ranged from 0.53 to 0.61 which implies that the Philippine banking industry is exhibiting medium to high concentration. This is based on the scale used by Galetic and Obradović (2018) wherein a value close to 0 indicates low market concentration while a value closer to 1 indicates high concentration. CR5 can also be interpreted as the combined market shares of the five largest banks from March 2011 to December 2021 which is 58.83% as it is calculated by merely adding all the market shares of the five top-performing banks per quarter.

Figure 7. Five-firm Concentration Ratio of the UKB Group (March 2011 to December 2021)



As presented in **Table 7**, the five largest banks in the Philippine banking industry, all of which are domestic banks, barely changed from 2011 to 2021. From 2013 to 2019, the five largest banks in the Philippine banking industry retained their ranking in the following order: BDO Universal Bank, Land Bank of the Philippines, Metropolitan Bank, Bank of the Philippine Islands, and Philippine National Bank.

BDO UniBank is named the largest universal bank in the country which first climbed its way up in 2007 after acquiring Equitable-PCI in 2007 which used to be one of the largest banks in the Philippines. Throughout the study period, BDO UniBank has the largest share in the market. Development Bank of the Philippines used to be the fifth largest bank but it was overtaken by Philippine National Bank in 2013.

Interestingly, in 2021, during the coronavirus pandemic, Land Bank of the Philippines became the second largest bank in the banking industry preceding

Metropolitan Bank which had been in the ranking for almost ten years. The Land Bank of the Philippines is the only government-owned bank among the five banks since 2013.

Table 7. Assets and Market Share of the Five Largest Banks in the Philippine Banking Industry (Q4 2011 – 2021)

YEAR / BANKS	TOTAL ASSETS	MARKET SHARES (%)
2011	**3,485,936,342,373.89**	**53.50%**
BDO UNIVERSAL/BDO UNIBANK	1,067,815,236,278.45	16.39%
METROPOLITAN BANK & TCO	753,866,493,712.51	11.57%
BANK OF THE PHIL. ISLANDS	685,340,468,888.15	10.52%
LAND BANK OF THE PHILS	638,922,536,967.33	9.81%
DEVELOPMENT BANK OF THE PHIL	339,991,606,527.45	5.22%
2012	**3,875,220,496,649.01**	**53.87%**
BDO UNIVERSAL/BDO UNIBANK	1,224,698,514,328.80	17.02%
METROPOLITAN BANK & TCO	820,842,303,957.68	11.41%
BANK OF THE PHIL. ISLANDS	786,737,997,508.87	10.94%
LAND BANK OF THE PHILS	681,880,337,138.10	9.48%
DEVELOPMENT BANK OF THE PHIL	361,061,343,715.56	5.02%
2013	**5,142,597,865,667.00**	**57.16%**
BDO UNIVERSAL/BDO UNIBANK	1,629,852,640,147.34	18.12%
METROPOLITAN BANK & TCO	1,132,034,652,714.64	12.58%
BANK OF THE PHIL. ISLANDS	965,619,575,199.67	10.73%
LAND BANK OF THE PHILS	841,852,855,245.16	9.36%
PHIL NATIONAL BANK	573,238,142,360.19	6.37%
2014	**5,974,391,183,322.03**	**59.33%**
BDO UNIVERSAL/BDO UNIBANK	1,812,863,626,079.19	18.00%
METROPOLITAN BANK & TCO	1,336,097,169,899.10	13.27%
BANK OF THE PHIL. ISLANDS	1,195,854,495,899.56	11.88%
LAND BANK OF THE PHILS	1,051,127,044,386.29	10.44%
PHIL NATIONAL BANK	578,448,847,057.89	5.74%
2015	**6,472,949,082,851.58**	**59.41%**
BDO UNIVERSAL/BDO UNIBANK	1,943,494,954,610.60	17.84%
METROPOLITAN BANK & TCO	1,461,169,103,947.74	13.41%
BANK OF THE PHIL. ISLANDS	1,241,654,294,148.38	11.40%
LAND BANK OF THE PHILS	1,197,659,849,613.59	10.99%
PHIL NATIONAL BANK	628,970,880,531.27	5.77%
2016	**7,308,443,301,146.91**	**59.41%**
BDO UNIVERSAL/BDO UNIBANK	2,198,231,090,443.50	17.87%

METROPOLITAN BANK & TCO	1,552,519,858,382.80	12.62%
BANK OF THE PHIL. ISLANDS	1,451,040,495,617.09	11.80%
LAND BANK OF THE PHILS	1,395,366,418,772.49	11.34%
PHIL NATIONAL BANK	711,285,437,931.03	5.78%
2017	**8,274,375,341,756.07**	**60.12%**
BDO UNIVERSAL/BDO UNIBANK	2,533,295,856,553.18	18.41%
METROPOLITAN BANK & TCO	1,709,895,231,124.07	12.42%
BANK OF THE PHIL. ISLANDS	1,636,388,136,020.08	11.89%
LAND BANK OF THE PHILS	1,615,001,419,572.25	11.73%
PHIL NATIONAL BANK	779,794,698,486.49	5.67%
2018	**9,389,738,534,397.33**	**60.89%**
BDO UNIVERSAL/BDO UNIBANK	2,893,588,312,807.13	18.76%
METROPOLITAN BANK & TCO	1,890,784,493,389.47	12.26%
BANK OF THE PHIL. ISLANDS	1,876,258,337,091.34	12.17%
LAND BANK OF THE PHILS	1,819,437,103,007.86	11.80%
PHIL NATIONAL BANK	909,670,288,101.53	5.90%
2019	**10,200,010,414,895.20**	**60.29%**
BDO UNIVERSAL/BDO UNIBANK	3,069,394,975,194.00	18.14%
METROPOLITAN BANK & TCO	2,116,897,171,973.28	12.51%
LAND BANK OF THE PHILS	2,033,417,296,175.92	12.02%
BANK OF THE PHIL. ISLANDS	1,912,624,657,026.10	11.30%
PHIL NATIONAL BANK	1,067,676,314,525.87	6.31%
2020	**10,955,605,537,761.00**	**60.71%**
BDO UNIVERSAL/BDO UNIBANK	3,246,648,692,252.82	17.99%
LAND BANK OF THE PHILS	2,361,932,397,832.90	13.09%
METROPOLITAN BANK & TCO	2,172,125,183,261.77	12.04%
BANK OF THE PHIL. ISLANDS	1,947,787,891,521.16	10.79%
PHIL NATIONAL BANK	1,227,111,372,892.40	6.80%
2021	**11,551,984,669,624.00**	**60.00%**
BDO UNIVERSAL/BDO UNIBANK	3,484,525,191,584.98	18.10%
LAND BANK OF THE PHILS	2,586,099,112,558.63	13.43%
METROPOLITAN BANK & TCO	2,179,338,995,979.87	11.32%
BANK OF THE PHIL. ISLANDS	2,102,113,773,210.61	10.92%
PHIL NATIONAL BANK	1,199,907,596,289.94	6.23%

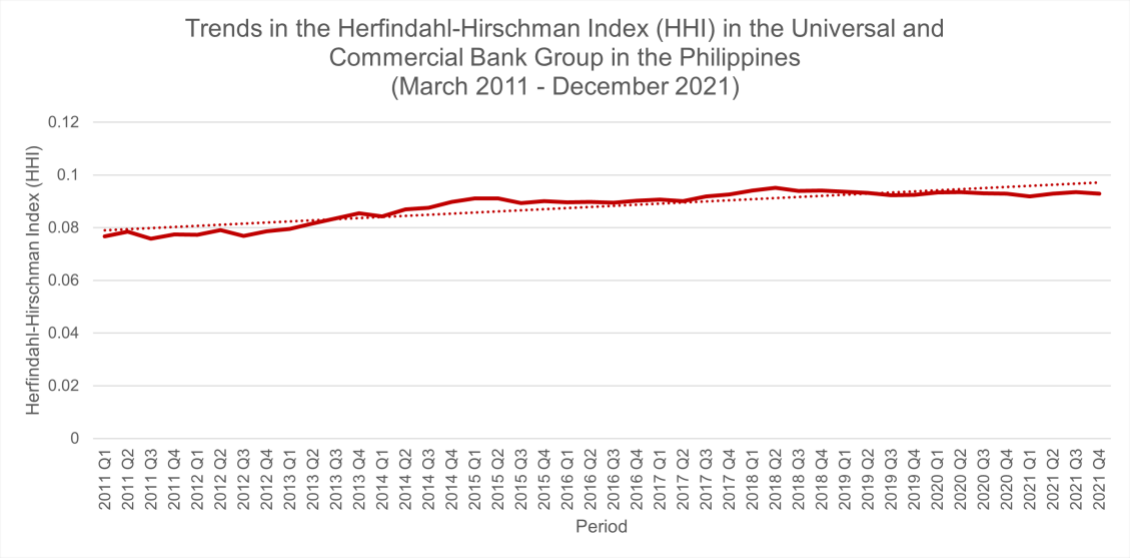
Source of Basic Data: Bangko Sentral ng Pilipinas

Consistent with the increase in their total assets, the market share of the five largest banks was also increasing (see **Table 7**). The five best-performing banks in terms of asset shares account for around 53.5% of the UKB market in end-2011. This increased

to 53.87% in 2012 and then jumped to 3.29% one year later resulting in a 57.16% total market share for the five largest banks in the country. This increased further to 59.33% in 2014 and stayed at the 59% level until 2016 before reaching 60.12% in 2017. From 2017 until 2021, the top-performing banks maintained their market share level at 60%. Considering that they are all domestic banks, these banks already meet the minimum standard set by the BSP that at least 60% of the banking industry should be controlled by local banks. However, the data indicates high market concentration (Galetíc and Obradović, 2018)**.**

In contrast to CR5, the Herfindahl-Hirschman Index (HHI) which measures the overall concentration of the banking industry also exhibited a gradual increase from March 2011 to December 2021 (See **Figure 8**). The HHI was stable throughout the period at around 0.08 to 0.09, unlike the CR5 which showed evident fluctuations. Following Galetíc and Obradović (2018), an HHI value less than 0.1 means low concentration, medium concentration for values between 0.1 and 0.18, while an HHI higher than 0.18 means the market is highly concentrated. The HHI value from March 2011 to December 2021 has been less than 0.1 which means that in terms of overall concentration, the Philippine universal and commercial banking industry has a low market concentration. This is in contrast to the CR5 which indicated high market concentration. The highest HHI value was equal to 0.095 recorded during the 2nd quarter of 2018 while the lowest was in September 2011 at 0.076.

Figure 8. Herfindahl-Hirschman Index of UKB Group (March 2011 to December 2021)



The HHI and CR5 provided contrasting results and interpretations of the level of concentration in the Philippine banking industry. However, it is important to note that CR5 is only a measure of relative concentration. Interpretations using relative concentration may be limited as it only considers a certain number of banks in the equation (Pavic, Galetic, & Piplica, 2016). The results show that in the case of the Philippine banking industry, using CR5 seems to overestimate overall market concentration as it can detect high levels of concentration with just the five largest banks in the country. Despite that, studies still used it because it illustrates the relationship between the level of assets controlled by a few large banks and banking performance (Dacanay, 2002).

The increasing trend of both concentration measures shows that the Philippine universal and commercial banking industry became more concentrated despite the entry of 10 new foreign banks since 2015. This is of particular interest because economic literature suggests that bank liberalization increases competition in the industry (Beck, 2008; Schaeck, Cihak, & Wolfe, 2009).

Table 8 shows the new banks that entered the Philippine banking industry after the liberalization law took effect in 2014 and their corresponding assets and market shares. Since 2015, a total of 10 banks, all of which are foreign-owned, entered the UKB group in the Philippine banking industry. Their highest combined asset share is 0.60% which was recorded at the end of 2021. Although their combined market shares have been increasing since 2015, they are still to surpass the 1% mark and make a significant dent in the market concentration of the Philippine universal and commercial banking industry.

Table 8. Assets and Market Shares of New Foreign Banks (Q4 2015-2021)

YEAR / BANK	NEW FOREIGN BANKS ASSETS	MARKET SHARE
2015	**20,168,338,361.07**	**0.19%**
CATHAY UNITED BANK CO. LTD	2,205,801,057.66	0.02%
INDUSTRIAL BANK OF KOREA	2,460,052,498.31	0.02%
SHINHAN BANK	2,370,302,316.92	0.02%
SUMITOMO MITSUI BANKING CORP.	13,132,182,488.18	0.12%
2016	**41,129,360,991.18**	**0.33%**
CATHAY UNITED BANK CO. LTD	5,001,069,651.99	0.04%
FIRST COMMERCIAL BANK	2,152,993,474.78	0.02%
INDUSTRIAL BANK OF KOREA	3,610,175,040.13	0.03%
SHINHAN BANK	2,939,126,309.57	0.02%
SUMITOMO MITSUI BANKING CORP.	23,191,768,707.10	0.19%
UNITED OVERSEAS BANK	4,234,227,807.61	0.03%
2017	**44,490,971,134.79**	**0.32%**
CATHAY UNITED BANK CO. LTD	3,782,330,391.92	0.03%
FIRST COMMERCIAL BANK	2,047,018,356.96	0.01%
HUA NAN CMM'L BANK LTD	2,149,738,940.35	0.02%
INDUSTRIAL BANK OF KOREA	3,958,768,026.15	0.03%
SHINHAN BANK	3,138,103,592.16	0.02%
SUMITOMO MITSUI BANKING CORP.	25,543,920,503.81	0.19%
UNITED OVERSEAS BANK	3,871,091,323.44	0.03%
2018	**71,086,949,125.05**	**0.46%**
CATHAY UNITED BANK CO. LTD	7,786,829,533.38	0.05%
CHANG HWA COMM'L BANK	2,536,408,743.37	0.02%
CIMB BANK LTD	2,539,073,014.36	0.02%

FIRST COMMERCIAL BANK	2,463,378,391.94	0.02%
HUA NAN CMM'L BANK LTD	2,205,224,323.23	0.01%
INDUSTRIAL BANK OF KOREA	4,275,565,767.39	0.03%
SHINHAN BANK	5,257,939,783.89	0.03%
SUMITOMO MITSUI BANKING CORP.	40,027,540,114.35	0.26%
UNITED OVERSEAS BANK	3,994,989,453.14	0.03%
2019	**80,684,264,999.80**	**0.48%**
CATHAY UNITED BANK CO. LTD	6,755,133,020.26	0.04%
CHANG HWA COMM'L BANK	4,134,624,290.19	0.02%
CIMB BANK LTD	3,871,426,967.91	0.02%
FIRST COMMERCIAL BANK	3,126,677,844.65	0.02%
HUA NAN CMM'L BANK LTD	3,157,448,413.07	0.02%
INDUSTRIAL AND COMMERCIAL BANK OF CHINA	6,652,890,716.31	0.04%
INDUSTRIAL BANK OF KOREA	7,055,665,182.21	0.04%
SHINHAN BANK	5,486,803,356.70	0.03%
SUMITOMO MITSUI BANKING CORP.	35,882,440,343.31	0.21%
UNITED OVERSEAS BANK	4,561,154,865.19	0.03%
2020	**101,115,589,216.74**	**0.56%**
CATHAY UNITED BANK CO. LTD	6,615,681,891.85	0.04%
CHANG HWA COMM'L BANK	3,718,894,511.30	0.02%
CIMB BANK LTD	12,425,967,998.57	0.07%
FIRST COMMERCIAL BANK	3,475,825,579.22	0.02%
HUA NAN CMM'L BANK LTD	4,912,653,977.98	0.03%
INDUSTRIAL AND COMMERCIAL BANK OF CHINA	9,283,551,173.90	0.05%
INDUSTRIAL BANK OF KOREA	6,593,891,084.09	0.04%
SHINHAN BANK	6,055,733,141.47	0.03%
SUMITOMO MITSUI BANKING CORP.	44,182,222,360.82	0.24%
UNITED OVERSEAS BANK	3,851,167,497.54	0.02%
2021	**115,802,039,054.05**	**0.60%**
CATHAY UNITED BANK CO. LTD	6,185,227,669.93	0.03%
CHANG HWA COMMERCIAL BANK LTD - MANILA BRANCH	5,570,090,456.69	0.03%
CIMB BANK PHILIPPINES INC	20,688,721,698.96	0.11%
FIRST COMMERCIAL BANK	3,473,592,079.48	0.02%
HUA NAN COMMERCIAL BANK LTD. MANILA BRANCH	6,079,637,261.73	0.03%
INDUSTRIAL AND COMMERCIAL BANK OF CHINA	9,785,153,708.87	0.05%
INDUSTRIAL BANK OF KOREA	8,112,699,576.19	0.04%
SHINHAN BANK	7,106,149,334.98	0.04%
SUMITOMO MITSUI BANKING CORP.	43,837,339,093.72	0.23%
UNITED OVERSEAS BANK	4,963,428,173.50	0.03%

Source of Basic Data: Bangko Sentral ng Pilipinas

It is interesting to note that as new foreign banks enter the Philippine banking industry, their combined market share continuously increases throughout the study period however, the market share of the five largest foreign banks in the country has been decreasing over time (see **Table 9**). This may suggest that the 2014 bank liberalization law increased competition only among foreign-owned banks, and not the whole Philippine banking industry. This may be explored further in future studies.

As shown in **Table 9,** while the total assets of the five largest foreign banks in the Philippine banking industry have gradually increased, their market shares have been decreasing throughout the study period. In 2011, they used to own at least 8.86% of the market shares of the UKB group which slightly decreased to 8.80% in 2012. Their asset shares dropped to 5.98% in 2015, a year after the bank liberalization law was passed. By 2021, their market share is only at 4.25% which is half of what they used to own 10 years ago.

From 2011 to 2021, Citibank is the largest foreign bank in the Philippines in terms of total assets whose share in the market has also been steadily declining. Its asset shares in the Philippine UKB group decreased from 4.09% to 1.83% throughout the study period. This is, to a great degree, smaller compared to the asset share of BDO Unibank, the largest bank in the Philippines. The second largest foreign bank throughout the study period is Hongkong and Shanghai Banking Corporation. Like Citibank, its share in the market has also been gradually decreasing from 2.61% to 1.03% from 2011 to 2021. Standard Chartered Bank, the first foreign bank in the Philippines that entered the banking industry in 1872 is also one of the largest foreign banks in the country. It is among the

five largest foreign banks in the country until 2015 and only returned in the ranking after six years to 2021.

Table 9. Assets and Market Share of Five Largest Private Foreign Banks (Q4 2011-2021)

YEAR / BANK	ASSETS	MARKET SHARES
2011	**577,388,587,241.13**	**8.86%**
CITIBANK, N.A	266,728,787,533.33	4.09%
HONGKONG & SHANGHAI BANKING CORP	170,032,441,547.01	2.61%
STANDARD CHARTERED BANK	53,230,079,362.59	0.82%
MAYBANK PHILIPPINES INC.	46,183,203,604.49	0.71%
ANZ BANKING GROUP LTD.	41,214,075,193.71	0.63%
2012	**632,860,168,059.17**	**8.80%**
CITIBANK, N.A	238,257,378,975.06	3.31%
HONGKONG & SHANGHAI BANKING CORP	203,247,681,335.23	2.83%
JP MORGAN CHASE BANK NATIONAL ASSN.	68,755,259,665.51	0.96%
STANDARD CHARTERED BANK	61,595,380,670.49	0.86%
DEUTSCHE BANK AG	61,004,467,412.88	0.85%
2013	**690,401,086,091.58**	**7.67%**
CITIBANK, N.A	272,163,431,213.25	3.03%
HONGKONG & SHANGHAI BANKING CORP	194,684,954,066.14	2.16%
STANDARD CHARTERED BANK	75,545,876,916.72	0.84%
DEUTSCHE BANK AG	74,214,652,906.05	0.82%
MAYBANK PHILIPPINES INC.	73,792,170,989.42	0.82%
2014	**693,404,899,052.11**	**6.89%**
CITIBANK, N.A	295,137,086,105.91	2.93%
HONGKONG & SHANGHAI BANKING CORP	199,613,645,454.50	1.98%
MAYBANK PHILIPPINES INC.	78,119,611,599.18	0.78%
STANDARD CHARTERED BANK	64,818,310,608.84	0.64%
BANK OF TOKYO/MUFG	55,716,245,283.68	0.55%
2015	**651,810,661,350.25**	**5.98%**
CITIBANK, N.A	274,512,359,896.20	2.52%
HONGKONG & SHANGHAI BANKING CORP	171,797,671,315.13	1.58%
MAYBANK PHILIPPINES INC.	87,864,331,710.48	0.81%
BANK OF TOKYO/MUFG	60,821,932,643.46	0.56%
STANDARD CHARTERED BANK	56,814,365,784.98	0.52%

2016	**699,604,464,107.79**	**5.69%**
CITIBANK, N.A	298,303,909,583.15	2.42%
HONGKONG & SHANGHAI BANKING CORP	173,275,229,098.45	1.41%
MAYBANK PHILIPPINES INC.	96,474,942,099.33	0.78%
BANK OF TOKYO/MUFG	66,432,339,348.51	0.54%
MIZUHO CORPORATE BANK LTD-MANILA BR	65,118,043,978.35	0.53%
2017	**707,195,056,785.54**	**5.14%**
CITIBANK, N.A	291,236,440,569.19	2.12%
HONGKONG & SHANGHAI BANKING CORP	162,128,508,985.34	1.18%
MAYBANK PHILIPPINES INC.	109,201,755,614.10	0.79%
MIZUHO CORPORATE BANK LTD-MANILA BR	79,302,326,494.74	0.58%
BANK OF TOKYO/MUFG	65,326,025,122.17	0.47%
2018	**739,133,876,017.20**	**4.79%**
CITIBANK, N.A	307,913,818,904.41	2.00%
HONGKONG & SHANGHAI BANKING CORP	160,514,460,029.18	1.04%
MAYBANK PHILIPPINES INC.	125,339,940,775.51	0.81%
BANK OF TOKYO/MUFG/MUFG	74,107,197,395.01	0.48%
MIZUHO CORPORATE BANK LTD-MANILA BR	71,258,458,913.09	0.46%
2019	**755,213,381,621.20**	**4.47%**
CITIBANK, N.A	327,736,637,433.78	1.94%
HONGKONG & SHANGHAI BANKING CORP	177,209,090,730.86	1.05%
MAYBANK PHILIPPINES INC.	105,055,746,133.98	0.62%
BANK OF TOKYO/MUFG/MUFG	74,078,622,155.69	0.44%
MIZUHO CORPORATE BANK LTD-MANILA BR	71,133,285,166.89	0.42%
2020	**784,005,632,306.75**	**4.35%**
CITIBANK, N.A	331,318,563,462.29	1.84%
HONGKONG & SHANGHAI BANKING CORP	179,999,329,575.40	1.00%
MAYBANK PHILIPPINES INC.	100,556,870,550.94	0.56%
BANK OF TOKYO/MUFG/MUFG	94,217,005,898.84	0.52%
MIZUHO CORPORATE BANK LTD-MANILA BR	77,913,862,819.28	0.43%
2021	**817,419,440,613.88**	**4.25%**
CITIBANK, N.A	351,162,265,573.45	1.83%
HONGKONG & SHANGHAI BANKING CORP	198,844,921,407.37	1.03%
MAYBANK PHILIPPINES INC.	102,117,267,113.90	0.53%
BANK OF TOKYO/MUFG	84,020,484,004.89	0.44%

STANDARD CHARTERED BANK	81,274,502,514.27	0.42%

Source of Basic Data: Bangko Sentral ng Pilipinas

Aside from the presence of large banks, the increasing number of mergers and acquisitions may have also contributed to the increasing concentration in the banking industry (see **Table 10**). According to Tang (2015), merger and acquisition activities can help increase the market shares of banks involved in the process and create stronger players in the banking industry, which may, in turn, increase concentration in the banking market.

As evident in **Table 10**, banks increased their assets by acquiring, purchasing, merging with other banks, and absorbing their subsidiaries. Among these methods, acquisition is mostly used by UKBs to increase their assets. The type of banks acquired by major banks is mostly thrift and rural banks. The Bangko Sentral specifies that acquisition refers to buying the bank's entirety while purchasing refers to buying a part of the assets or capital of the bank. Merger takes place when two banks combine their assets together.

One notable merger is between Philippine National Bank and Allied Banking Corporation which increased PNB's assets by over P200 billion from P320 billion in December 2012 to P537 billion by the first quarter of 2013. The merger made PNB the fourth-largest bank in the Philippines during that time. Banks also can also absorb their own subsidiary through an asset transfer to the absorbing company. This is what RCBC and Metrobank end up doing in 2019 and 2020 respectively.

Table 10. Mergers, Acquisitions, and Purchases (2011-2021)

YEAR	MAJOR BANK	ACQUIRED/ MERGER	BANK TYPE	METHOD	ASSETS BEFORE M&A	ASSETS AFTER M&A
2011	EAST WEST BANKING CORP.,	GREEN BANK, INC	RURAL BANK	ACQUISITION	83,117,752,110.04	89,154,975,994.25
2011	ASIA UNITED BANK CORP.	COOPERATIVE BANK OF CAVITE	COOPERATIVE BANK	ACQUISITION	49,564,465,427.82	63,406,652,922.44
2012	ASIA UNITED BANK CORP.	ASIATRUST DEVELOPMENT BANK, INC,	DEVELOPMENT BANK	ACQUISITION	49,564,465,427.82	63,406,652,922.44
2012	BDO UNIBANK, INC.	RURAL BANK OF SAN JUAN, INC.	RURAL BANK	ACQUISITION	1,150,226,075,773.28	1,153,777,032,429.4
2012	EAST WEST BANKING CORP.,	FINMAN RURAL BANK	RURAL BANK	PURCHASE	91,941,294,005.39	96,112,840,221.15
2013	PHILIPPINE NATIONAL BANK	ALLIED BANKING CORP.,	UNIVERSAL BANK	MERGER	323,843,239,367.05	537,637,641,246.40
2013	BDO UNIBANK, INC.	CITIBANK SAVINGS, INC. (SUBSIDIARY OF CITIBANK)	SAVINGS BANK	ACQUISITION	1,219,634,921,561.35	1,307,191,293,489.6
2014	CHINA BANKING CORP.	PLANTERS DEVELOPMENT BANK (CAPITAL)	DEVELOPMENT BANK	PURCHASE	396,058,016,978.86	387,859,548,918.21
2014	BDO UNIBANK, INC.	DEUTSCHE BANK AG (THRUST)	UNIVERSAL BANK	ACQUISITION	1,629,852,640,147.34	1,601,922,425,911.3
2014	PHILIPPINE BANK OF	RURAL BANK OF	RURAL BANK	PURCHASE	58,664,250,095.63	63,742,924,259.54

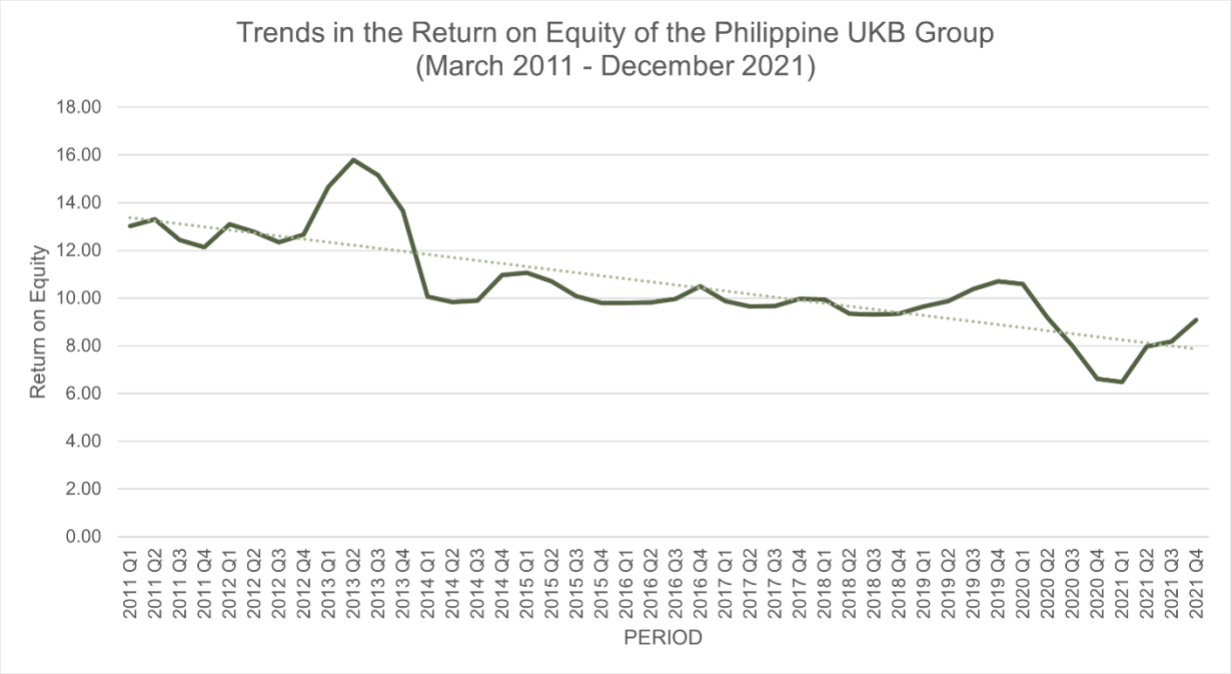
	COMMUNICATIONS	NAGCARLAN, INC.				
2014	PBCOMM	BANCODIPOLIG, INC.	RURAL BANK	ACQUISITION	58,664,250,095.63	63,742,924,259.54
2014	BDO UNIBANK, INC.	ONE NETWORK BANK, INC.	RURAL BANK	ACQUISITION	1,812,863,626,079.19	1,811,366,923,726.36
2014	BDO UNIBANK, INC.	THE REAL BANK	THRIFT BANK	ACQUISITION	1,640,833,597,693.88	1,702,377,093,974.39
2017	LAND BANK OF THE PHILIPPINES	PHILIPPINE POSTAL SAVINGS BANK	THRIFT BANK	ACQUISITION	1,479,365,223,422.43	1,615,001,419,572.25
2019	RIZAL COMMERCIAL BANKING CORP. (RCBC)	RCBC SAVINGS BANK INC.,	SUBSIDIARY OF RCBC; A UNIVERSAL BANK	ABSORPTION	546,633,931,974.53	665,407,677,250.24
2020	METROPOLITAN BANK & TCO	METROBANK CARD CORP (FINANCE COMPANY)	SUBSIDIARY OF MERTROBANK; A UNVERSAL BANK	ABSORPTION	2,116,897,171,973.28	2,090,788,145,043.64

Source: Ofreneo (2015), Bangko Sentral ng Pilipinas

Performance of the Universal and Commercial Bank (UKB) Group

The performance of the Philippine banking industry has been declining in terms of profitability over time. **Figure 9** illustrates a decreasing trend in the average return on equity (ROE) of the universal and commercial bank (UKB) group in the country from the first quarter of 2011 to the last quarter of 2021.

Figure 9. Return on Equity of the UKB Group (March 2011 to December 2021)



Source of Basic Data: Bangko Sentral ng Pilipinas

The average UKB ROE first exhibited a drastic decline from 15.79% in the second quarter of 2013 to 9.83% in the same quarter of 2014 (see **Table 11**). This may be attributed to the transition period in 2013 after the Bangko Sentral released a new framework increasing the minimum capital requirements of UKBs. This is consistent with the findings of Martynova (2015) that raising minimum capital regulation can decrease ROE.

Data shows that the coronavirus pandemic had a negative impact on banking profitability (see **Table 11**). During the height of the coronavirus pandemic, the overall ROE of the UKB exhibited another drastic decline. In the first quarter of 2020, the average ROE of the UKB group was recorded at 10.59%. By December 2020, the banks' ROE dropped to 6.61%. The lowest UKB ROE was recorded in the first quarter of 2021, at 6.48% which is less than half of the highest average ROE at 15.79%, recorded during the 2nd quarter of 2013.

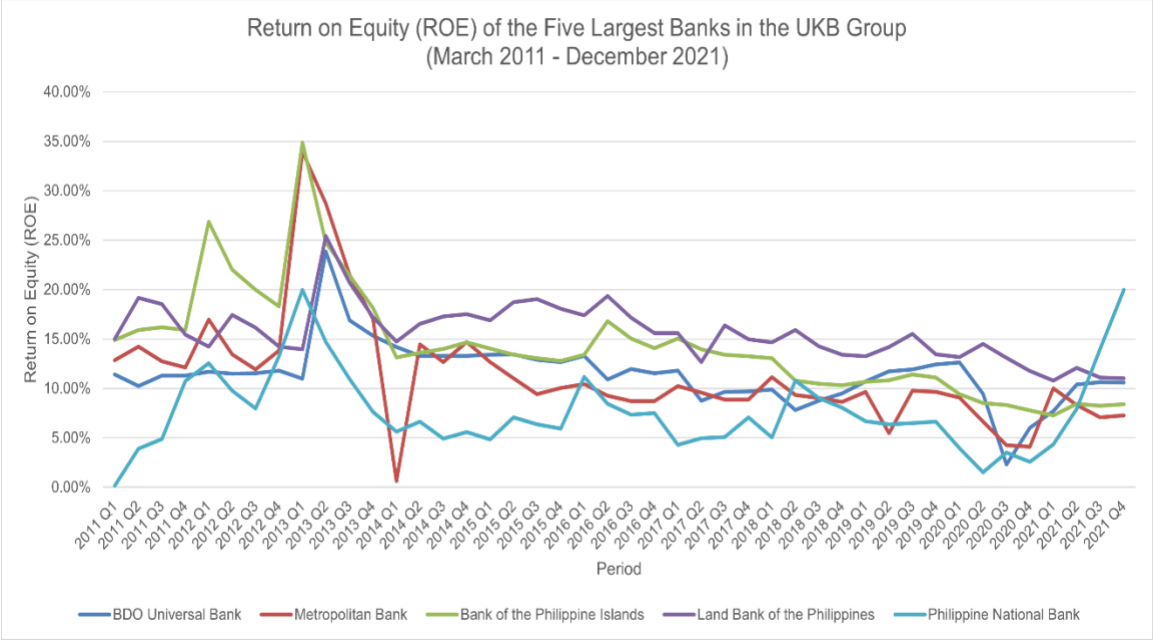
Table 11. Return on Equity (ROE) of the UKB Group and the Five Largest Banks in Philippine Banking (Q1 2011 – Q4 2021)

PEROD	AVERAGE UKB ROE	BDO UNIBANK ROE	METRO BANK ROE	BANK OF THE PHIL. ISLANDS ROE	LAND BANK ROE	PHIL. NATIONAL BANK ROE
2011 Q1	13.03	11.42	12.86	14.91	15.03	0.15
2011 Q2	13.30	10.25	14.21	15.91	19.16	3.92
2011 Q3	12.44	11.28	12.74	16.18	18.53	4.87
2011 Q4	12.14	11.28	12.10	15.90	15.44	10.76
2012 Q1	13.09	11.67	16.97	26.86	14.21	12.55
2012 Q2	12.78	11.49	13.46	22.02	17.43	9.75
2012 Q3	12.33	11.51	11.93	19.96	16.13	7.96
2012 Q4	12.67	11.80	13.82	18.31	14.21	13.25
2013 Q1	14.67	10.98	33.93	34.90	13.96	19.96
2013 Q2	15.79	23.86	28.71	24.77	25.43	14.71
2013 Q3	15.15	16.87	21.49	21.41	20.67	10.96
2013 Q4	13.65	15.32	17.01	18.15	17.21	7.60
2014 Q1	10.06	14.17	0.60	13.12	14.74	5.62
2014 Q2	9.83	13.30	14.48	13.62	16.53	6.62
2014 Q3	9.89	13.28	12.66	14.01	17.27	4.90
2014 Q4	10.96	13.29	14.69	14.67	17.53	5.57
2015 Q1	11.07	13.42	12.65	14.02	16.90	4.83
2015 Q2	10.70	13.43	11.01	13.42	18.73	7.06
2015 Q3	10.09	12.90	9.42	13.04	19.04	6.37
2015 Q4	9.80	12.68	10.05	12.78	18.08	5.92
2016 Q1	9.80	13.30	10.45	13.41	17.39	11.16
2016 Q2	9.82	10.89	9.26	16.80	19.34	8.42

2016 Q3	9.97	11.97	8.70	15.05	17.18	7.34
2016 Q4	10.49	11.52	8.72	14.07	15.60	7.51
2017 Q1	9.88	11.81	10.23	15.04	15.59	4.28
2017 Q2	9.65	8.77	9.58	13.97	12.67	4.95
2017 Q3	9.66	9.65	8.85	13.41	16.38	5.07
2017 Q4	9.96	9.68	8.87	13.27	14.96	7.08
2018 Q1	9.95	9.87	11.13	13.07	14.66	5.05
2018 Q2	9.35	7.83	9.35	10.79	15.92	10.79
2018 Q3	9.30	8.77	9.03	10.48	14.25	9.01
2018 Q4	9.35	9.49	8.65	10.33	13.40	8.05
2019 Q1	9.64	10.69	9.67	10.65	13.25	6.66
2019 Q2	9.87	11.71	5.46	10.82	14.17	6.38
2019 Q3	10.38	11.91	9.77	11.42	15.51	6.50
2019 Q4	10.70	12.44	9.67	11.11	13.43	6.63
2020 Q1	10.59	12.64	9.07	9.41	13.18	3.94
2020 Q2	9.18	9.45	6.65	8.50	14.52	1.52
2020 Q3	8.01	2.31	4.25	8.31	13.11	3.51
2020 Q4	6.61	6.03	4.08	7.77	11.76	2.57
2021 Q1	6.48	7.69	9.99	7.25	10.77	4.32
2021 Q2	7.98	10.40	8.32	8.44	12.07	7.92
2021 Q3	8.18	10.63	7.06	8.25	11.09	14.00
2021 Q4	9.08	10.59	7.26	8.39	11.02	19.98

Source of Basic Data: Bangko Sentral ng Pilipinas

Figure 10. Return on Equity of Five Largest Banks in the UKB group (Q1 2011 to Q2 2021)



Source of Basic Data: Bangko Sentral ng Pilipinas

Figure 10 illustrates the ROE of the five largest banks in the Philippine banking industry from the first quarter of 2011 to the fourth quarter of 2021. Each bank's ROE depicts a decreasing trend which is similar to that of the overall UKB industry. Additionally, they exhibit volatility with extreme highs and lows throughout the time period. According to de Wet and du Toit (2006), ROE can show significant fluctuations as it can be affected by different factors like bank restructuring, debt, inflation, and asset turnover.

Figure 11 shows the trends of the average ROE of the UKB group alongside the relative concentration. The CR5 depicts an upward trend (blue line) from the first quarter of 2011 to the last quarter of 2021. ROE (green line), on the other hand, shows a downward trend throughout the same period. This may indicate a negative relationship between banking industry concentration and banking profitability in the Philippine banking

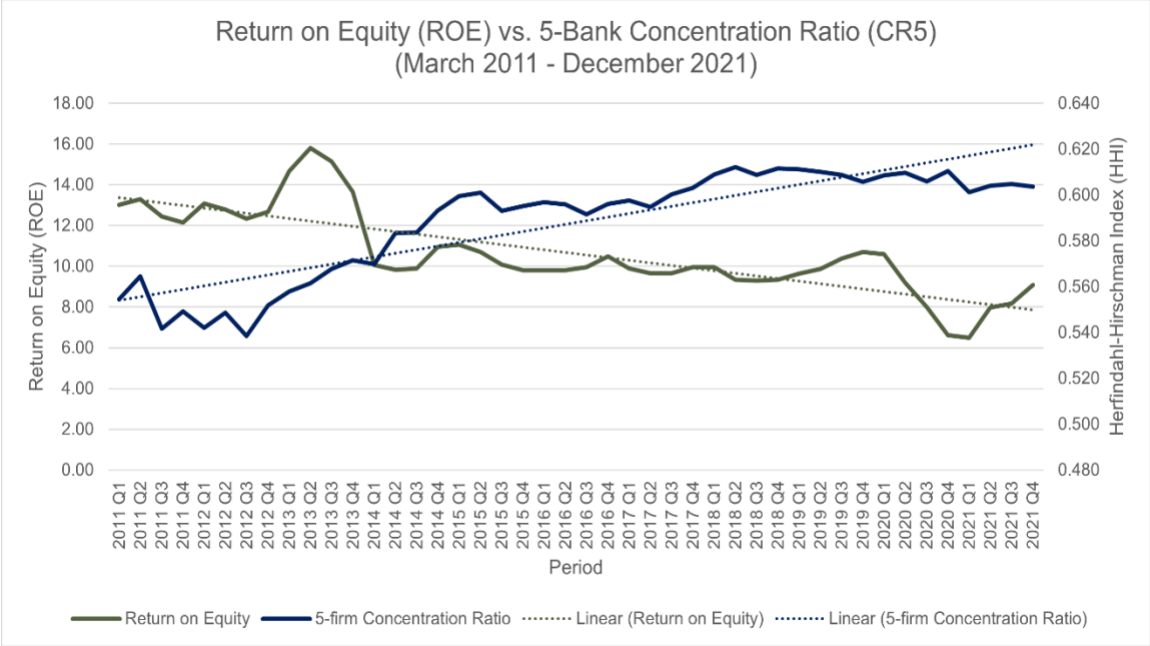
industry. That is, banking profitability in the country declines as the concentration in Philippine banking increases due to the growth of the combined market shares of the five largest banks in the country.

There is also a similar opposite trend in the overall concentration of the Philippine banking industry as measured by the HHI and the average ROE of the UKB group (See **Figure 12**). The HHI (red) shows an upward trend which implies that the concentration in the Philippine UKB industry has been increasing since March 2011. Meanwhile, the overall ROE of the UKB group shows a downward trend. This seems to also show that, in the case of the Philippine banking industry, the overall ROE decreases as the banking industry becomes more concentrated.

Both **Figures 11** and **12** seem to depict a negative relationship between banking industry concentration and banking profitability as both concentration ratios show a positive trend while average UKB ROE declines throughout the study period. The contrasting trend between market concentration and profitability is not consistent with the structure-conduct-performance (SCP) hypothesis which suggests that industry concentration and performance have a positive relationship. The observed trend, however, supports the quiet life hypothesis (QLH) which posits that a decreasing banking performance is to be expected as the banking industry becomes more concentrated.

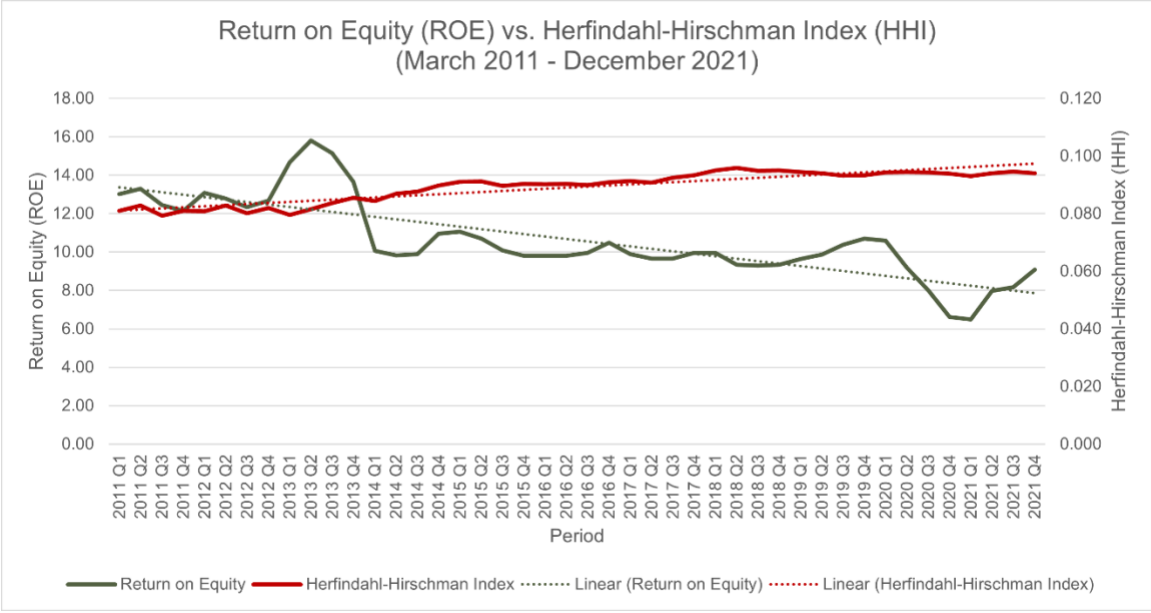
Despite the interesting pattern of the two market concentration indices alongside the profitability measure, the relationships depicted in the graphs may exhibit spurious correlations in that the relationships may have occurred through chance alone. In the next section, the researchers provided a detailed discussion of the relationship between banking industry concentration and banking profitability using robust statistical estimates.

Figure 11. ROE vs CR5 (March 2011 to December 2021)



Source of Basic Data: Bangko Sentral ng Pilipinas

Figure 12. ROE vs HHI (March 2011 to December 2021)



Source of Basic Data: Bangko Sentral ng Pilipinas

B. Structure-Performance of the Philippine Banking Industry

For the purpose of regression model estimation, the longitudinal data sets were restricted to balanced panels such that the total number of banks, N, multiplied by the time period T, yields the total number of observations, n. The data included individual observations of each of the 36 universal banks across 44 quarters from 2011 to 2021. The total number of observations is 1,584. Using balanced panel data for the estimation procedure, in this instance, primarily means that the new foreign banks that entered the banking industry after the amendment of the bank liberalization law in 2014 are not part of the sample. In this manner, only banks with complete data points throughout the study period were included. As discussed above, the combined market shares of the foreign market entrants are below 1% (see **Table 8**) so the influence on market concentration and consequently, the results of the panel regression analysis, are negligible.

The Breusch-Pagan Lagrange multiplier test indicates that there are significant random effects across units in the panel data for both models (See *Appendix 2*). This means that pooled ordinary least squares method is not suitable for the regression models. The Hausman specification test showed that there is no correlation between the unique errors and independent variables of each unit in the regression models. Hence, the use of random effects estimation for panel data regression analysis is more appropriate than fixed effects.

Initially, heteroscedasticity and autocorrelation were detected in the models using the Breusch-Pagan test and the Breusch-Godfrey test respectively (See *Appendix 3*). Heteroscedasticity-consistent covariance matrix estimators were incorporated into the models to address the problem regarding heteroscedasticity (White, 1980). Additionally,

robust covariance matrix estimators, introduced by Newey and West (1987), were also used to address the autocorrelation in the models. All variables are stationary based on the augmented Dickey-Fuller test for unit roots (*See Appendix 2)*. However, moderate to high multicollinearity among the independent variables was also detected.

Relationship among Independent and Control Variables

Table 12 depicts the correlation among the independent and control dummy variables of the study (See *Appendix 1 for the interpretation of correlation values*). The Herfindahl-Hirschman Index (HHI) has a very strong positive correlation with the concentration ratio of the five largest banks in the Philippine banking industry (CR5) indicating their consistency in measuring market concentration. The five largest banks in the country contribute a large percentage to the value of the HHI and are enough to determine the overall concentration in the Philippine banking industry. The two concentration indicators are not correlated with the banking firms' market shares (MS), despite being functions of the said variable.

Table 12. Correlation Matrix of Independent and Control Variables

	HHI	**CR5**	**SHARES**	**ASSETS**	**LA**
HHI	1				
CR5	0.980***	1			
SHARES	0.000	0.000	1		
ASSETS	0.143***	0.141***	0.753***	1	
LA	-0.000	0.000	0.978***	0.701***	1

*p < 0.05, **p < 0.01, ***p<0.001

The bank-specific control variables also indicate interesting relationships with the independent variables. The correlation matrix shows that banks' total assets in natural

logarithmic form have a strong positive correlation with their market share and a weak positive association with the two market concentration indicators. The relationships among the variables may have manifested because they are all derived from banks' total assets. The loan-to-assets ratio, on the other hand, has a very strong positive correlation with market shares and a strong positive correlation with the total assets of banks. This is consistent with Dacanay's account (2002) explaining that the loans generate the most income than the main alternative assets of banks.

Table 13. Random Effects Panel Regression Model Results

	Dependent Variable			
	Return on Equity (ROE)			
Model	(1)	p-value	(2)	p-value
Herfindahl-Hirschman Index (HHI)	-2.655*** (0.689)	0.000		
5-Banks Concentration Ratio (CR5)			-0.509*** (0.152)	0.001
Market Shares	7.390*** (1.695)	0.000	7.391*** (1.695)	0.000
Total Assets (in natural logarithmic form)	0.003 (0.003)	0.296	0.003 (0.003)	0.298
Loans-to-Assets Ratio	-5.663*** (1.318)	0.000	-5.664*** (1.318)	0.000
Type of Bank	-0.004 (0.010)	0.662	-0.004 (0.009)	0.648
Ownership	0.016 (0.011)	0.138	0.016 (0.011)	0.139
Classification	-0.299*** (0.079)	0.000	-0.299*** (0.079)	0.000
Inflation Rate	-0.001 (0.002)	0.721	-0.001 (0.002)	0.604
GDP Growth Rate	-0.004 (0.004)	0.291	-0.004 (0.004)	0.278
COVID-19	-0.122* (0.055)	0.054	-0.127* (0.054)	0.019
Observations	1,584		1,584	
R2	0.155		0.154	
Adj. R2	0.149		0.149	
Chi-square	162.343*** df = 10		156.913*** df = 10	

*p < 0.05, **p < 0.01, ***p<0.001

Analysis of the Random Effects Regression Results

The result of the random effects regression models indicates that the bank's return on equity has a significant relationship with the concentration indicators HHI and CR5 as well as the efficiency indicator – the bank's market shares (See **Table 13**). The result of the first regression model with HHI as a concentration indicator suggests that a one-unit increase in the HHI is associated with a 2.66 percent decrease in the bank's ROE. Meanwhile, a one percent increase in a bank's market share is associated with a 7.39 percent increase in its ROE. On the other hand, the second model with CR5 as a concentration indicator suggests that a one-unit increase in the concentration ratio of the five largest Philippine banks in the universal and commercial bank group (UKB) is associated with a 0.51 percent decrease in ROE. The second model yields almost the same results as the first model for market share and its relationship with ROE.

Interestingly, a bank's ROE has a significant relationship with the bank's liquidity, the classification of a bank, and the coronavirus pandemic. Both models indicate that a one percent increase in the loans-to-assets ratio of a bank is associated with a 5.66 percent decrease in its ROE. According to Dacanay (2002), the inverse relationship between the long-term liquidity measure and banking profitability may suggest that banks are managing high amounts of loans which are costly. This results in loan losses and a decrease in profits.

The panel regression models also indicated that banks owned by the government are more likely to have a lower ROE than privately owned banks. This suggests that public ownership of banks has important implications on banking performance. Based on the

empirical findings, government-owned banks are more likely to earn lower profits than their private-owned counterparts. This is consistent with the studies of Phi, Taghizadeh-Hesary, Tu, Yoshino, and Kim (2019) and Anvarova and Isakov (2022) reporting a negative and statistically significant relationship between state ownership of banks and their profitability.

Among the macroeconomic variables, only the COVID-19 dummy variable has a significant relationship with banking profitability. The empirical findings suggest that banks during the COVID-19 pandemic were more likely to have suffered lower profits than during the non-pandemic period. This is hardly surprising since the coronavirus pandemic had a pervasive impact on many industries across the globe. Recent studies in banking also posit the effect of the pandemic on the financial system and, most specifically, on the banking sector (Salehi, 2022; Xiazi & Shabir, 2022; Xie, Chang, Hafeez, & Saliba, 2021).

Moreover, the regression coefficients show that banking sector specific indicators such as the total asset of a bank which measures bank size, type of bank (i.e., commercial or universal bank), and classification of banks (i.e. private or government) are all insignificant. In addition, macroeconomic indicators such as the growth rate of GDP and inflation are also insignificant.

Both regression models using the random effects estimators reported relatively low R-squared values of 0.155 and 0.154 for the first and second models respectively which implies a weakness in the models at predicting ROE for the Philippine UKBs across time. Despite this, Ozili (2023) explained that a low R-squared value of at least 0.1 percent is acceptable provided that some or most of the independent variables show statistical significance.

Banking Concentration, Efficiency, and Profitability

The regression results indicate that market concentration indicators HHI and CR5 are negatively correlated to banking performance measured by bank profitability (See **Table 13**). This is consistent with the analysis of the trends of HHI and CR5 alongside ROE as discussed above (See **Figures 11** and **12**). The relationship does not satisfy the first condition of the structure-conduct-performance or SCP hypothesis which posits that the level of concentration in the market has a positive correlation with performance. Hence, the inverse relationship between the variables rejects the SCP hypothesis which means that it does not apply to the Philippine banking industry.

The regression results show a significant positive relationship between the bank's market share and banking profitability. At first glance, the relationship may point to the efficient structure hypothesis (ESH). However, the correlation matrix does not indicate a significant positive correlation between the bank's market shares and the market concentration indicators (See **Table 12**). Hence, it does not satisfy the first condition of the ESH hypothesis: the market share of banks must have a significant and positive relationship with market concentration.

The Granger causality test also indicates that the bank's market share does not Granger-cause the two indicators of market concentration, which may imply reverse causality (See *Appendix 4*). This may imply that a high (low) market share does not increase (decrease) market concentration as what the ESH suggest. Additionally, the Granger causality test show that market share does not Granger-cause ROE. The result of the causality test, therefore, does not support the ESH because the hypothesis

postulates that banking efficiency - measured by market share - results in increased banking profitability and concentration.

The negative relationship between the performance and the market concentration indicators, however, is in line with the quiet-life hypothesis as seen in the study of Gavurova, Kocisova, and Kotaskova (2017). The hypothesis postulates that higher concentration in the industry results in the bank's minimal efforts to increase its performance (Hicks, 1935). Additionally, the Granger causality test performed in this study supports the causal relationship between the two variables as explained by the hypothesis. The test indicates that both HHI and CR5 may be used to forecast ROE (*See Appendix 4*).

The Granger causality test results of the two concentration indices and market share are critical because these support the applicability of the quiet life hypothesis in explaining the Philippine banking industry. The ESH and the quiet life hypothesis are two competing hypotheses. Unlike the ESH which posits that greater firm efficiency leads to a highly concentrated market, the quiet life hypothesis suggests that concentration leads to inefficiency (Lelissa & Kuhil, 2018).

Hence, the empirical results are more in line with the quiet life hypothesis which is consistent with the study of Gavurova, Kocisova, and Kotascova (2017) in the European Union banking industry. These findings suggest that in the case of the Philippine banking industry, banking competition has a positive impact on banking profitability. Based on the quiet-life hypothesis, high concentration reduces the motivation of managers to increase banking efficiency which consequently, results in lower performance hence, the term 'quiet life' (Berger & Hannan, 1988). Conversely, the hypothesis posits that greater

competition in the banking industry forces bank managers to strengthen their position in the industry, resulting in increased performance.

CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

This research study aimed to understand the relationship between the structure and performance of the Philippine banking industry using data on universal and commercial banks (UKB) from the first quarter of 2021 to the fourth quarter of 2022. Specifically, the researchers examined the distribution of banks by type (universal or commercial), classification (domestic or foreign), and ownership (private or government-owned) as well as their total assets and market shares. The study also analyzed the relationship between market concentration, efficiency, and profitability using the random effects panel regression model and their direction of causality using the Granger causality test. Lastly, the structure-conduct-performance (SCP) hypothesis, the efficient structure hypothesis in terms of cost efficiency, and the quiet life hypothesis were tested to determine their applicability to the Philippine banking industry. The following is the summary of the study's major findings:

1. **Although the majority of the UKBs are commercial banks, universal banks still dominate the Philippine banking industry in terms of assets and market share for two reasons:** First, the majority of the commercial banks in the country are private foreign banks whose market share and total assets is the lowest in the banking industry. Second, universal banks perform a wider range of banking activities than commercial banks which help them grow and earn higher shares in the market.
2. **The amendment of the bank liberalization law in 2014 attracted the entry of private foreign banks into the Philippine banking industry but it was not**

effective in ensuring banking competition. The changes in the number of UKBs from 2011 to 2021 are attributed mostly to the entry of private foreign banks after the new bank liberalization law took effect in 2014. Since 2016, the majority of banks in the UKB group are private foreign banks. Despite this, the concentration in the banking industry has continued to increase. In fact, private foreign banks trail behind private domestic banks and government-owned banks in terms of market shares. The overall market share of private foreign banks and the combined market share of the five largest foreign banks in the country has been declining since 2011. They also recorded the lowest average growth rate at 1.45% throughout the study period.

3. **Despite an increase in bank size, The UKB group experienced declining profitability during the pandemic.** During the COVID-19 pandemic, the UKB group exhibited a positive growth rate in their total assets at 1.64% from 2020 to 2021 indicating growth in the size of banks. The policies implemented by the Bangko Sentral ng Pilipinas (BSP) during the pandemic such as easing monetary policies might have been of great help to the UKBs. However, the return on equity (ROE) of the UKB group plummeted during the same period.
4. **While the country's banking industry increasingly became more concentrated, its performance based on profitability has declined over time.** The HHI and the CR5 have been increasing since 2011 indicating an increasingly concentrated Philippine banking industry over time. However, the trends in the average return on equity (ROE) of the UKB group indicated a declining banking profitability from 2011 to 2021.

5. **There are bank-specific and macroeconomic variables that influence banking profitability.** The loans-to-assets ratio has a significant negative relationship with ROE which may be attributed to the costly management of higher loans. The study also found that government banks are more likely to earn lesser profits than their private-owned counterpart. Additionally, the study also supported recent banking literature on the adverse impact of the coronavirus pandemic on banking profitability. Hence, external shocks are important considerations in banking performance.
6. **The quiet life hypothesis applies to the Philippine banking industry.** The random effects panel regression models indicated that the bank's performance indicator, ROE, is negatively related to the concentration indicators, HHI and CR5, but is positively related to the efficiency indicator, firm-specific market shares. The regression results rejected structure-conduct-performance (SCP) hypothesis, but are in line with the efficient structure hypothesis (ESH) and the quiet life hypothesis (QLH). However, the Granger causality test indicates the two market concentration indicators HHI and CR5 may be used to forecast ROE while market share does not. Hence, the direction of causality among the variables only supports the QLH. Therefore, in the case of the Philippine banking industry, banking competition has a positive impact on banking profitability.

Recommendations

Given the results of the study, the researchers propose for the following recommendations:

1. Given the implications of the quiet life hypothesis, policymakers should consider reorienting towards promoting competition in the country's banking industry so as to

address declining banking profitability. Policies assessing and regulating managerial efficiency of banking companies are necessary to ensure banking performance.

2. While encouraging the entry of private foreign banks was not effective in ensuring banking competition, the impact of the entry of domestic banks in the banking industry remains unexplored. Policymakers should consider approaches that facilitate and incentivize the entry of private domestic commercial and universal banks to promote banking competition among domestic banks.
3. Research studies examining the relationship between banking structure and performance in the Philippines remain scarce. Researchers and policymakers alike are encouraged to address these gaps in literature especially since the banking sector is said to be subjected to many structural changes.
4. One recommendation for future studies is the use of other performance indicators to verify the consistency of the research findings as well as the applicability of the structural hypotheses in the Philippine banking industry. The use of direct measures of the independent variables such as the Lerner index for the level of market concentration, as suggested by New Empirical Industrial Organization, may also be explored in future studies.
5. Relatively low R2 values were reported in the panel regression models which indicate weaknesses in the predictive value of the models despite significant regression coefficients. The researchers recommend future research studies on banking competition and performance to study and account for other variables that may be crucial in determining the profitability of banks in terms of return on equity.

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APPENDICES

Appendix 1. Interpretation of Correlation Values

Size of Correlation	**Interpretation**
.90 to 1.00 (−.90 to −1.00)	Very high positive (negative) correlation
.70 to .90 (−.70 to −.90)	High positive (negative) correlation
.50 to .70 (−.50 to −.70)	Moderate positive (negative) correlation
.30 to .50 (−.30 to −.50)	Low positive (negative) correlation
.00 to .30 (.00 to −.30)	negligible correlation

Source: Mukaka (2012)

Appendix 2. Stationarity Test for Independent and Dependent Variables

Augmented Dickey-Fuller test for stationarity at lag 2 (p-values < 0.05 indicates stationarity)		
Variable	Test statistics	p-value
ROE	z = -14.627***	0.01
HHI	z = -10.739***	0.01
CR5	z = -10.438***	0.01
MS	z = -4.6769***	0.01
ASSETS	z = -5.0404***	0.01
LA	z = -4.5495***	0. 01
TYPE	z = -5.4939***	0.01
FORDOM	z = -3.9686***	0.01056
PRIVGOV	z = -4.7718***	0.01
GDP	z = -21.112***	0.01
INF	z = -18.408***	0.01
COVID	z = -12.313***	0.01

*p < 0.05, **p < 0.01, ***p<0.001

Appendix 3. Model Specification for Panel Regression Model

Model 1: ROE~HHI+MS+ASSETS+LA+GDP+INF+TYPE+FORDOM+PRIVGOV+COVID		
Breusch-Pagan Lagrange multiplier test (*p-value < 0.05 indicates pooled OLS is inappropriate)*		
Test statistic	p-value	Implication
χ^2 = 6.4304 (df = 1)***	0.01122	Use FE or RE model
Hausman Test *(p-value < 0.05 indicates FE is preferred)*		
Test statistic	p-value	Implication
χ^2 = 0.63283 (df = 6)	0.9958	Use RE model
Breusch-Godfrey/Wooldridge test for serial correlation *(p-value < 0.05 indicate serial correlation)*		
Test statistic	p-value	Implication
χ^2 = 630.09 (df = 36)***	p-value < 2.2e-16	Serial correlation is detected.

		Apply robust covariance matrix estimator
studentized Breusch-Pagan test for heteroscedasticity *(p-value < 0.05 indicate heterscedasticity)*		
Test statistic	p-value	Implication
χ^2 = 52.097 (df = 10)***	p-value = 1.095e-07	Heteroscedasticity is detected. Apply heteroscedasticity-consistent covariance matrix estimator.

Model 2: ROE~CR5+MS+ASSETS+LA+GDP+INF+TYPE+FORDOM+PRIVGOV+COVID		
Breusch-Pagan Lagrange multiplier test (*p-value < 0.05 indicates pooled OLS is inappropriate)*		
Test statistic	p-value	Implication
χ^2 = 5.6663 (df = 1)***	0.01729	Use FE or RE model
Hausman Test *(p-value < 0.05 indicates FE is preferred)*		
Test statistic	p-value	Implication
χ^2 = 0.53629 (df = 6)***	0.9974	Use RE model
Breusch-Godfrey/Wooldridge test for serial correlation *(p-value < 0.05 indicate serial correlation)*		
Test statistic	p-value	Implication
χ^2 = 629.39, df = 36	2.2e-16	Serial correlation is detected. Apply robust covariance matrix estimator
studentized Breusch-Pagan test for heteroscedasticity *(p-value < 0.05 indicate heterscedasticity)*		
Test statistic	p-value	Implication
χ^2 = 52.105 (df = 10)	1.091e-07	Heteroscedasticity is detected. Apply heteroscedasticity-consistent covariance matrix estimator.

*p < 0.05, **p < 0.01, ***p<0.001

Appendix 4. Test of Causality

Granger causality test (p-values < 0.05 means precedence)		
Model	Test statistics	p-value
ROE~HHI	Z = 22.556***	2.226e-06
ROE~CR5	Z = 16.518***	5.055e-05
ROE~SHARES	Z = 0.7765	0.3783
SHARES~HHI	Z = 0	0.9958
SHARES~CR5	Z = 0.0011	0.9736

*p < 0.05, **p < 0.01, ***p<0.001