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Measuring the market power of commercial banks and market structure in the financial sector in Nepal

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Abstract. Nepal has reformed its financial sectors to align with sector performance and growth, with the aim of mobilizing resources and capitalizing them for higher economic growth and poverty reduction throughout the country. This paper aims to measure the degree of competitiveness in financial sectors in Nepal. The research design, methods, and theory employed in this paper include both structural and nonstructural approaches. The structural approach uses concentration ratios and HHI to measure market competitiveness, while the non-structural approach uses the profit elasticity model/Boone indicator. The paper's sample size is 6 of 22 total commercial banks in Nepal, using the sample size formula and time series data from 2011/12 to 2020/21. The authors collected the data from their annual reports. Commercial banks represent institutional power, serve as symbols of financial liberalization, and are competitive stakeholders in the post-liberalization era. Financial reforms have ushered in a banking sector that is perfectly competitive. The paper found no change rather than oligopoly market with their shareholding powers and controlled in the banking sector of the financial market in contrast to the remaining banks. The result of the structural and non-structural approach unhides low competition to the remaining rival banks. It implies that there are no significant challenges, other than the need to share power and commands in the supposedly liberal and competitive market. This is not limited to large private banks, but also extends to large public institutions. The paper found low concentration in the banking sector. Further, the policy of merger and consolidation has increased the competitiveness and oligopoly of big banks instead of strengthening and promoting a competitive open market. Therefore, we cannot expect financial reforms and liberalization to foster a competitive, open financial market without regulation. Therefore, the central bank must focus on crafting monetary policy and financial reforms, and ensuring their efficacy in a manner that promotes financial market expansion and optimal competition. The paper covered only six big commercial banks. It implies understanding the competitiveness degree of banking sectors and the financial market and finding out the best solution to strengthen the open and competitive banking sector in the financial market for a higher rate of resource mobilization and capitalization at competitive interest rates and access to banking services.

Keywords: Banking, Banks, Competition, Financial Reforms, Mergers, Nepal, etc, Structure.

1. INTRODUCTION

The study is motivated by the context of oligopoly market forces as outcomes of financial reforms and upgrading capital size of commercial banks posing challenges to free, open, and fair market competition in the banking sectors of the financial market in Nepal. The transformation of oligopoly market forces has theoretical and empirical implications on bank variables including capital formation, capital investment, interest rate, liquidity ratio, profit margin, non-performing loans, etc. and further on macro-economic variables including inflation, unemployment, economic growth and balance of payment. In such market, the bankers as producers have controlled and commanded financial market instead of promoting the degree of competition for maximizing profit margin. In contrast, the clients as customers have lost their freedom to choice and access and consumer surplus from the fair competition. Thus, the financial indicators of the banking sector are not healthy and friendly to entrepreneurs and further indicate financial instability and a challenge of non-performing loans. In this context, this study aims to clear understand the financial status of commercial banking sectors and to assess the level of competitiveness of banks and their market performances in Nepal.

2. LITERATURE REVIEW

Competition is simple understood to contest in which firm takes part for establishing superiority in the market. Klimenko, Pfeil and Rochet (2015) explains it as economic contest between producers to sale goods and services to consumer. The competition theory argues it as a best solution of economic problems in production and distribution (Abbott, 1955, McNulty, 1968, McAfee, & McMillan, 1996, Motta, 2004 and Na, 2015). Mazylkina and Yaskal (2013) mentions different aspects one of which efficient competition makes any market economy work without a hitch. Smith (1987) and Smith (1937) explains it as invisible hand assuming opposing and complementary self-interest forces in *lassie fair* market. Yadgorova & Akhmedova (2021) argues competition as the most important factor in expanding and improving business efficiency with consumers a wider range of products and services at more attractive prices and better quality, which contributes to increasing production efficiency and redistributing financial resources to the most competitive organizations. Thus, competition fosters in free market where producers hold *competitiveness with comparative advantages, productivity and efficiency* and complements fair and efficiency to make *win-win* to producer and consumer.

Financial market is claimed free, open and competitive in Nepal, where big commercial banks have competitiveness with comparative advantages, highly accepted financial services, powerful modern marketing strategy and digital savvy (Fedyshyn, Abramova and Zhavoronok, 2019). Arguing that every industry has an

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underlying structure or a fundamental economic and technical characteristic which give rise to a competitive force, Porter (2008) emphasizes competitiveness as profitability and stability within the available structures, policies and regulatory framework. This bank perspective is complemented by macro-economic perspective of Rahman and Chowdhury (2021) with argument of financial stability. Ahi and Laidroo (2019) examined bank stability as complementary to competitiveness of bank. Radojičić, Jemovic and Dragiievic (2021) stressed structural change in financial market. Malali & Gopalakrishnan (2020) noted affordable cost of goods and services. From bank perspectives, Musau, Muathe and Mwangi (2018) found it as partially mediate the relationship between financial inclusion and credit risk. Sadat et al., (2020) and Nahar (2021) focused brand value and customer satisfaction as most influential factors of competitiveness. However, Abbott (2016) emphasized brand value. Thus, competitiveness of commercial banks depends on bank and macro variables and structural and policy measures.

In contrast, competition and market concentration of the commercial banks have an inverse relationship (Ramadhan, 2024). Bank market concentration reducing competition is assumed for greater financial stability (Beck et al. 2013, Anh, Hang, & Nhung, 2023, Benchimol, & Bozou, 2024, Dacanay, Odtuhan, & Meriño 2024, Shala, Ozili, & Ahmeti, 2024, Verma & Chakarwarty 2024). On other hand, Boyd and De Nicoló (2005) argues that bank's market concentration causes the financial market more fragile and less likely to absorb financial shocks. Curti et al. (2022) discloses an operational risk in the banking sector of financial market with three reasons: persistent, countercyclical component and materialize through more frequent tail risk events. On other hand, Ramadhan (2024) and Liebersohn (2024) mentions market concentration leading to decline in prices within the banking sector. Mergers improves economies of scale and competitiveness. However, its impact reduces bank profitability.

Despite the competitiveness power, the banking sectors have suffered from excessive self-interest for abnormal profit margin in financial market. In the world, there are many fluctuating financial markets having negative effects on the competitiveness power of the banking sector. Bista (2021) mentions the financial recession in 2008 in USA. It exposed fragility in the banking system which were underperformed with mis-and over-allocation of resources on real estate business made a loss of trust in USA. Recovering such fluctuation and competitiveness of banking sectors, the government of USA had poured billion dollars in the expansionary fiscal policy. In 2024, it happened in Nepal in the post-COVID-2019. Therefore, the competitiveness power of banking sector is crucial to stabilize the fluctuating financial market.

In Nepal, the government of Nepal has initiated many financial reforms in the last 70 years to deregulate banking sectors and make free, open and competitive financial market so that the higher rate of capital formation can lead productive investment to promote high value product industries, to reduce rural-urban gap, to generate employment, income and output and to achieve higher economic growth (Bista, 2021). First reform in 1980s had opened the financial market. The follow up reform in 1990s fully deregulated the market. The reform in 2004 and 2008 has scaled up competitiveness and performance of the commercial banks by increasing capital size of the bank. In contrast, the last reform has resulted to lead unexpectedly oligopoly market instead of perfect competitive market.

3. DATA AND METHODOLOGY

3.1. Theoretical Framework

Bikker and Haaf (2002) mentions two basic approaches for assessing competition: structural and non-structural approach. The structural approach considers market structure and its competition and efficiency. The non-structural approach focuses the behavior of banks and organizational efficiency. These approaches are widely used to assessing competition of banking sectors by Edward and Masons in 1949) (Alhadeff, 2022) and Bikker and Laura (2009). Based on these approaches, the conceptual framework is built in Figure 1.

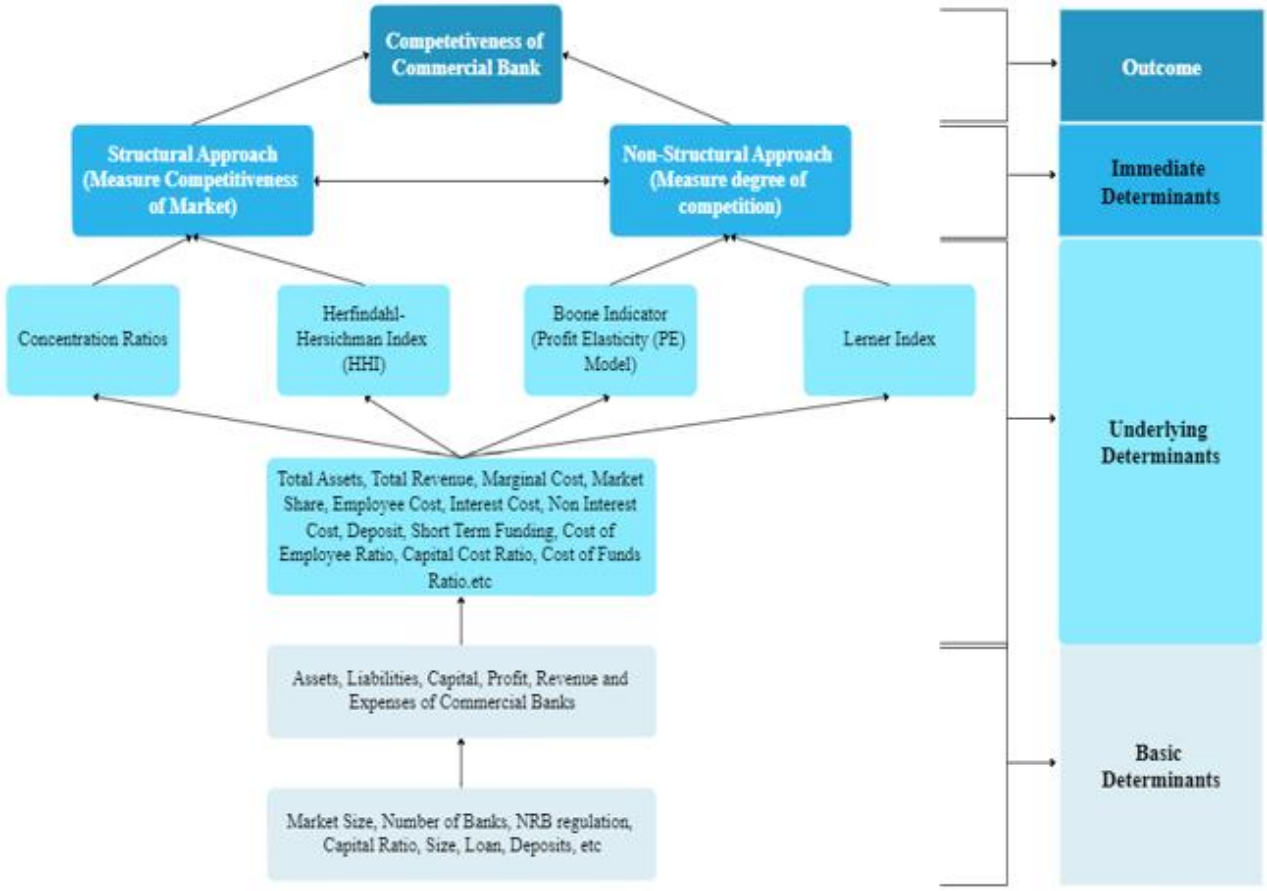

Figure 1: Conceptual Framework on Competition.

Based on above theoretical framework, the indicator based analytical methods are developed. They include structural measures (Concentration Ratio (CR) and Herfindahl-Hirschman Index (HHI)) and Non-structural measure (Profit Elasticity (PE)/Boone Indicator (BI)) to analyze competition. In this study, structural approach is used.

3.2. Sample Formation and Nature of Data

The information collected for this study is collected from the annual audit report of the sample commercial banks. The six sample commercial banks which were selected from 22 commercial banks using their profit margin by Cochran (1977). The six sample commercial banks were identified based on highest net profit. They are Nabil Bank with 3.41 billion NRPs Net Profit, NIC ASIA with 3.27 billion NRPs Net Profit, Global IME Bank Limited with 2.78 billion NRPs Net Profit, Rastriya Banijya Bank Limited with 2.71 billion NRPs Net Profit, Nepal Investment Mega Bank Limited with 2.08 billion NRPs and NMB Bank with 1.9 billion NRPs. The information was collected from these sample private and public commercial banks. Its nature was secondary sources including annual reports and audited financial reports. It covered information for decadal period from 2011 to 2021.

3.3. Descriptive and Index Method

Descriptive and Index Methods of Structure and non-structural approach were used in this study to analyze the status of competition and market structure and the competitiveness of commercial banks. These methods were selected intuitively and theoretically. In the structural approach, the structure-conduct-performance (SCP) paradigm is a central issue. The SCP hypothesis assumes a causal relationship running from the structure of the market to the firm's pricing behavior. It contains two hypotheses: first, structure is said to affect conduct and second, conduct is perceived to influence performance. This implies that concentration in the banking industry can generate banking power that allows banks to lower deposit rates and increase lending rates and earn monopolistic profits. Two methods are presented below.

3.3.1. Concentration Ratio (CR)

Gautam (2021) has used this method to analyze competition. The concentration ratio compares the size of firms in relation to their industry in the market.

$$CR_n = \sum_{i=1}^{n} S_{it}$$

where CR_n stands for n companies in the industry concerned, and S_{it}stands for the market share of the i-th company in the observed industry in year *t*.

In other words, the concentration ratio (CR) is the percent of combined production of firms in the industry.

$$= \frac{sum\ of\ market\ share\ of\ leading\ firms}{total\ market\ size} * 100\%$$

Where, CR value lies between 0 percent to 100 percent. Zero (0) CR value indicates no concentration/perfect competition. If it lies 0 percent to 40 percent, it is low concentration. It means the mid-point between perfect competition and oligopoly. Further, it lies between 40 percent and 70 percent. It is medium concentration. It is likely an oligopoly. Furthermore, it lies between 70 percent and 100 percent. It is high concentration. It is the mid-point between oligopoly and monopoly. If it is 100 percent. It is total concentration. It is monopoly (Baral, 2019).

3.3.2. Herfindahl-Hirschman Index (HHI)

HHI is used to measure market concentration of banking industry to check whether few numbers of firms account for large percentage of the total market. In this index, the sum of the squares of the market shares for each firm within the industry. It is functionally presented below.

$$\text{Herfindahl Index (HHI)} = \sum_{i=1}^{n} MS_i^2$$

Where, MS_i = Percent of market assets of the i^{th}bank and n = total number of banks.

The value of HHI measures competition and the market power of the bank. If it is larger value, it indicates less competition and higher concentration of banks. If not, it indicates higher competition and lower concentration of banks. US Department of Justice and FTC (2010) classified HHI lying between 1500 and 2500 points into moderately concentrated of banks and lying above 2500 points into highly concentrated of banks in the market.

Similarly, in the non-structural approach measures the behavior or response of the company to competitors or changes that occur in the market. The non-structural approach can be divided into two categories: static model based on oligopoly theory (neoclassical conception of competition) and dynamic model which follows Austrian dynamic conception of competition (Liu, Phil and Wilson, 2013 and Leon, 2015). Profit Elasticity (PE) model/Boone Indicator is used.

4. EMPIRICAL FINDINGS

4.1. Summary Statistics

Growing number and size of commercial banks improving free, open and competitive financial market in Nepal have increased financial services, the degree of competition and the concentration of asset ratio. Asset share of the commercial banks is a key measure of concentration of banks and degree of competition in the financial market. Its descriptive statistics including range, mean, standard deviation, minimum, maximum and sum are presented in Table 1 below.

Table 1: Summary Statistics.

Banks\Description	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation
NABIL	10	228046	63193	291239	1502049	150204.90	74118.061
NICASIA	10	320568	25580	346148	1356194	135619.40	106485.042
GIB	10	314759	30664	345423	1301800	130180.00	103386.113
RBB	10	235110	74880	309990	1771691	177169.10	74858.806
NIMB	10	162174	65756	227930	1398715	139871.50	56952.943
NMB	10	213052	18495	231547	950208	95020.80	70981.375

Source: Nepal Rastra Bank Financial Stability Reports and Annual Reports of Bank, 2023

Table 1 presents summary statistics in which there are different mean asset shares of the commercial bank including 177169 million NRs of RBB, 150204.90 million NRs of NABIL, 139871.5 million NRs of NIMB, 135619.4 million NRs of NICAISA, 130180.0 million NRs of GIB, and 95020.8 million NRs of NMB. RBB holds maximum mean value while NMB holds minimum mean value. In contrast, the range of assets shares of the commercial banks differentiate with their mean asset shares. It also indicates that public bank, RBB has highest of all private banks (NABIL, NICASIA, GIB, NIMB and NMB) to asset concentration.

Table 2: Concentration Ratios (CR) of sample banks (Figures in NPR millions).

Year	Total Assets of All Commercial Banks (B)	Total Assets of NABIL (a)	Total Assets of NICA (b)	Total Assets of GIB (c)	Total Assets of RBB (d)	Total Assets of NIMB (e)	Total Assets of NMB (f)	Total Assets of Sample Banks {g = (a+b+c+d+e+f)}	CR of Sample Bank (%) = (g/B)	CR of Sample Private Bank (%) = (g-d/B)	CR of Sample Public Bank (%) = (d/B)
2011-12	1,052,451	63,193	25,580	30,664	74,880	65,756	18,495	278,568	26	19	7
2012-13	1,242,881	73,241	46,535	39,018	93,905	73,152	25,126	350,978	28	21	8
2013-14	1,467,152	87,275	51,500	60,536	122,558	86,174	30,611	438,654	30	22	8
2014-15	1,774,505	115,986	60,519	69,186	139,561	104,345	45,177	534,775	30	22	8
2015-16	2,639,100	127,300	83,574	87,701	166,432	129,783	78,865	673,655	26	19	6
2016-17	3,008,920	144,018	103,108	117,894	173,545	150,818	93,074	782,457	26	20	6
2017-18	3,574,985	160,978	170,943	125,847	197,640	171,893	112,391	939,693	26	21	6
2018-19	4,286,193	201,139	217,697	151,654	226,410	185,841	135,470	1,118,211	26	21	5
2019-20	4,953,745	237,680	250,590	273,877	266,770	203,023	179,452	1,411,392	28	23	5
2020-21	6,068,987	291,239	346,148	345,423	309,990	227,930	231,547	1,752,277	29	24	5
Total	**30,068,918**	**1,502,049**	**1,356,195**	**1,301,801**	**1,771,691**	**1,398,715**	**950,209**	**8,280,660**	**28**	**22**	**6**

Source: Nepal Rastra Bank Financial Stability Reports and Annual Reports of Bank, 2023

4.2. Structural Analysis on Competition and Concentration of Bank

Asset concentration of Bank that is a pivotal measure aims to measure the degree of competition in the financial market. The structural tools including concentration ratio (CR) and Herfindahl-Hirschman index (HHI) are used to calculate asset concentration ratio of banks in financial market by using the ratio of asset of bank and total asset of banks. The results are presented in Table 2 above.

The Table 2 shows the concentration ratio (CR) of the commercial banks in the financial market in which there are three concentration ratios (CR): total CR of commercial banks, CR of private commercial banks and CR of public commercial bank. Total CR of commercial banks is 28 percent. CR of private commercial banks is 22 percent. CR of public bank is 6 percent. These three CR values lie between 0 percent and 40 percent. It means low concentration of asset shares of the commercial banks. It implies the degree of competition is not moderate from perfectly competition to oligopoly. In the market, the concentration of asset shares of the private commercial banks is nearly four-fold more than public commercial bank.

The concentration ratio of the banks, five private banks and one public bank changes over time. This study aims to dynamics of total CR of commercial banks, CR of private commercial banks and CR of public commercial bank for the period of 10 years from 2011 to 2021. Its figure is presented below.

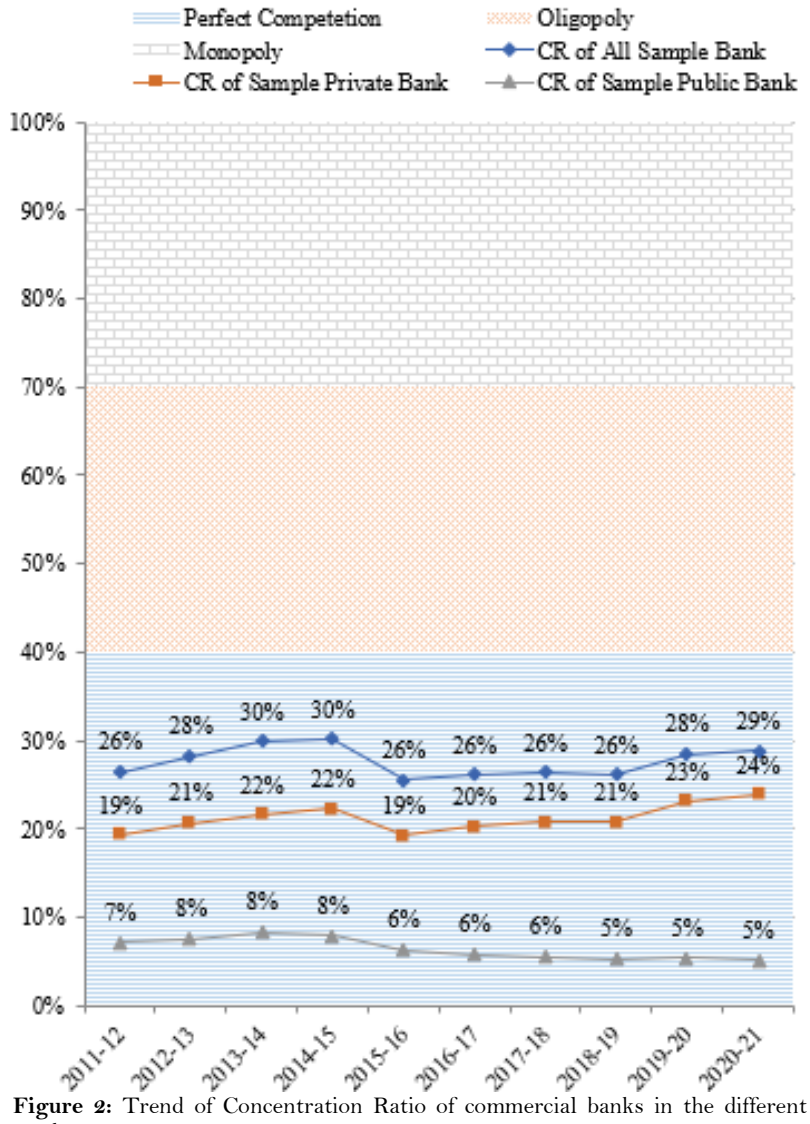

Figure 2: Trend of Concentration Ratio of commercial banks in the different market structures.

The Figure 2 shows the figure of total CR of commercial banks, CR of private commercial banks and CR of public commercial bank across three markets: perfect competition, oligopoly and monopoly. In the figure, total CR of commercial banks, CR of private commercial banks and CR of public commercial bank lie in perfect competition market, where total CR of commercial banks are slightly fluctuating in trend. Considering 2011 as reference year, CR of commercial banks have inclining trend with 3 percent incremental concentration ratio in 2021. In this decadal trend line, the great earthquake's negative implication in 2015 can be found. In the pre-2015, total CR of commercial bank reached at 30 percent. In the post 2015, it was nearly constant at 26 percent

for four successive years. In the post-COVID-2019, it has recovered at 29 percent. It tells us no drastic change in CR over a decade. It is less than 40 percent. It means low concentration ratio. It indicates no market power concentrating to few commercial banks in financial market in Nepal. It is learned a lesson of competitive market maintaining fair competition having positive implication on better quality and quantity of goods and services and productivity. Further, the commercial banks have costumer's preference centric and demand driven, along with market growth. Therefore, financial market is free, competitive and open.

Dis-aggregately, total CR of commercial banks is comprised of CR of private commercial banks and CR of public commercial bank. The CR trend of private commercial banks is like total CR trend of commercial banks with including trend. It shows the growth of private commercial banks and their concentration ratio with 3 percent in 2021. It indicates market power of the private commercial banks. In contrast, the CR trend of public commercial bank moves different direction with declining trend. It shows the de-growth of public commercial banks and their concentration ratio with 2 percent negative growth. It indicates weak market power of the public commercial banks. In the financial market, concentration ratio of private and public commercial banks are below 40 percent. It indicates low concentration ratio. Despite increasing CR of private commercial banks, there is no market power to few private commercial banks. It further illustrates building of free, open and competitive financial market with efficient and productive private commercial banks and inefficient and less productive public commercial bank. Therefore, the role of the private commercial banks is stronger than the role of public commercial banks.

Herfindahl-Hirschman Index (HHI) measures market concentration of banks and determine market competitiveness in financial market in Nepal. This index aims to measure the degree of competition in the financial market. The structural tool, Herfindahl-Hirschman index (HHI) is constructed to measure asset concentration ratio of banks in financial market by using the ratio of asset of bank and total asset of banks. The results are presented in Table 3 below.

Table 3: Herfindahl-Hirschman Index (HHI) of the commercial banks (Figures in NPR millions)

Year	CR of Total Sample Bank	CR of Sample Private Bank	CR of Sample Public Bank	Portion of sample private banks in total assets (%) (a)	Portion of sample public banks in total assets (%) (b)	Portion of sample banks in total assets (%) (c)	HHI of sample banks	HHI of sample private bank HHI	HHI of sample public bank $HHI = c^2$
2011-12	0.26	0.19	0.07	26	19	7	700.58	374.56	50.62
2012-13	0.28	0.21	0.08	28	21	8	797.44	427.81	57.08
2013-14	0.30	0.22	0.08	30	22	8	893.91	464.18	69.78
2014-15	0.30	0.22	0.08	30	22	8	908.21	496.03	61.85
2015-16	0.26	0.19	0.06	26	19	6	651.57	369.39	39.77
2016-17	0.26	0.20	0.06	26	20	6	676.24	409.53	33.27
2017-18	0.26	0.21	0.06	26	21	6	690.91	430.85	30.56
2018-19	0.26	0.21	0.05	26	21	5	680.62	432.90	27.90
2019-20	0.28	0.23	0.05	28	23	5	811.76	533.90	29.00
2020-21	0.29	0.24	0.05	29	24	5	833.63	564.77	26.09
Total	0.28	0.22	0.06	28	22	6	758.39	468.59	34.72

Source: Nepal Rastra Bank Financial Stability Reports and Annual Reports of Bank, 2023

The Table 3 shows Herfindahl-Hirschman Index (HHI) of the commercial banks in the financial market in which there are three Herfindahl-Hirschman Index (HHI): total HHI of commercial banks, HHI of private commercial banks and HHI of public commercial bank. Total HHI of commercial banks is 758.39. CR of private commercial banks is 468.59. CR of public bank is 34.72. These three CR values lie between 0 percent and 1500. It means low HHI of the commercial banks with low concentration of asset shares of the commercial banks. It implies the degree of competition is no concentration with higher competition. In the market, the concentration of asset shares of the private commercial banks is nearly twenty-one times more than public commercial bank.

The concentration ratio of the banks, five private banks and one public bank changes over time. This study aims to dynamics of total HHI of commercial banks, HHI of private commercial banks and HHI of public commercial bank for the period of 10 years from 2011 to 2021. Its figure is presented below.

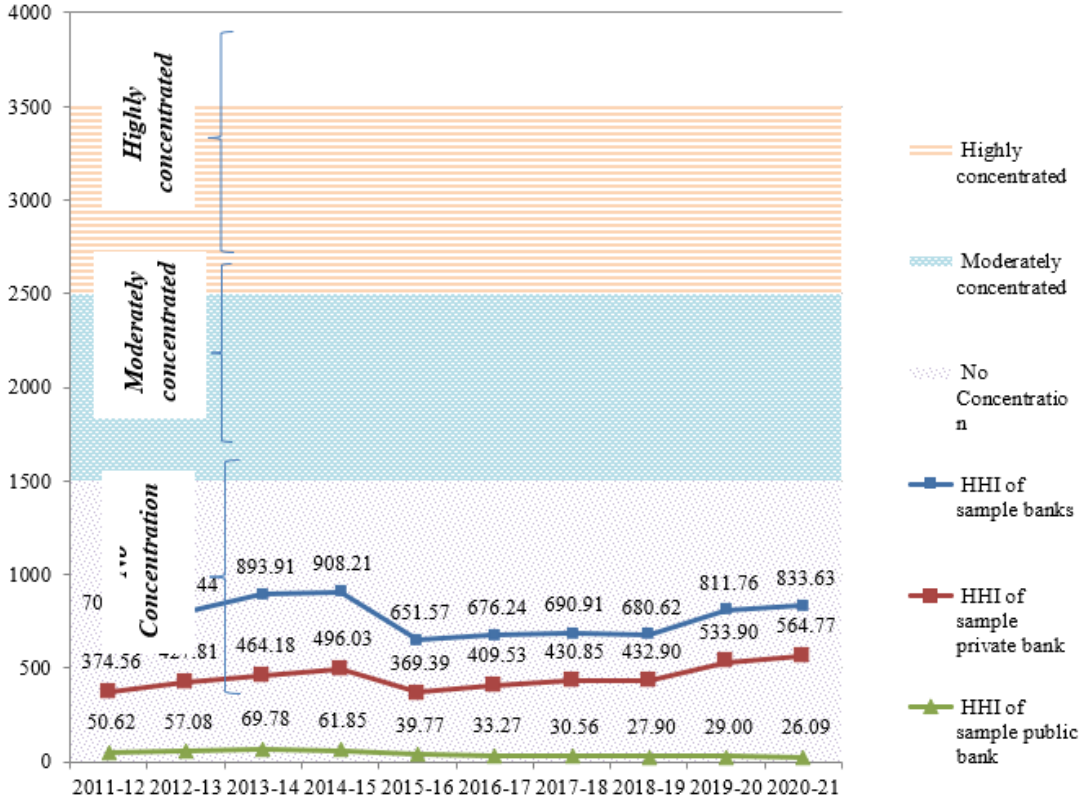

Figure 3: Trend of Herfindahl-Hirschman Index (HHI) across the degree of concentration and competition.

The Figure 3 shows the figure of total HHI of commercial banks, HHI of private commercial banks and HHI of public commercial bank across three concentrations in the financial markets: no concentration, moderately concentration, and highly concentration. In the figure, total HHI of commercial banks, HHI of private commercial banks and HHI of public commercial bank lie in no concentration market, where total HHI of commercial banks are slightly fluctuating in trend. Considering 2011 as reference year, HHI of commercial banks have inclining trend with 15 percent incremental HHI in 2021. In this decadal trend line, the great earthquake's negative implication in 2015 can be found. In the pre-2015, total HHI of commercial bank reached at 908.21. In the post 2015, it has inclined slightly for six successive years. In the post-COVID-2019, it has recovered at 833.63. It is less than 1500 percent. It means no concentration ratio of the commercial banks. It indicates higher degree of competition in financial market in Nepal. In contrast, increasing HHI of the commercial banks' threats degree of competition.

Differently, HHI trend of private commercial banks follows total HHI trend of commercial banks with increasing trend except for the great earthquake in 2015. It shows the growth of private commercial banks and their concentration ratio with 15 percent in 2021. It indicates increasing market power of the private commercial banks and declining degree of competition. In contrast, the HHI trend of public commercial bank has been declining in trend. It shows declining concentration ratio with 3 percent negative growth and higher competitiveness. It is learned a lesson of less market power than private commercial banks. Increasing HHI of private commercial banks have reduced degree of competition building of free, open and competitive financial market. Therefore, the stronger market power of few private commercial banks is a big threat to competitive market.

5. DISCUSSION

The study aims to analyze market structure and power of banks in the financial market through CR and HHI. The CR of commercial banks shows lower lying between 0 percent to 40 percent. It tells us lower concentration and lower market power of commercial banks indicates the structure of perfectly competitive market. The positive trend of CR does not pose a threat of possible oligopoly market power and structure. The reform through the new policy of merger and consolidation has good impact to maintain financial stability and health and to improve competency and efficiency of the commercial banks to have positive implication on capital formation, investment, employment and output of the commercial banks. This result differs with the study of Baral (2019). The study found decreasing CR while studying CR of five sample commercial banks for the period

from 2009 to 17. It argued highly competitive market. It might be decreasing number of commercial banks in the merger and acquisition policy.

The result of HHI is less than 1500. This value shows competitive financial market in Nepal with decreasing commercial banks. HHI trend line reveals increasing trend. However, financial market remains free, open and competitive, although there are big banks. This is similar with Shrestha (2022). The study found that HHI was moving upward with the decrease in number of commercial banks due to merger and acquisition throughout the study period which has led to increase in concentration and market power rather than decrease. Concern authority should perform absolute analysis on optimality of commercial bank's number and size.

6. CONCLUSION

This study examines market concentration and structure of the commercial banks in Nepal using six sample commercial banks over the period of 2011 to 21 by applying CR and HHI. The study found heterogeneous commercial banks with market asset share and performance in competitive financial market and increasing market concentration of private commercial banks in the effectiveness of merger and acquisition policy. In the result, the low percent of CR shows low market power of commercial banks in perfectly competitive market structure, although there is a threat of increasing concentration ratio of the commercial banks. Further, the low value of HHI verify it with no concentration with higher degree of competition. The study concludes the merger and acquisition policy has not increased market concentration of few big commercial banks to reduce the degree of competition in the financial market. Therefore, the reform should improve competitiveness of the commercial banks rather than concentration ratio for improving more open, more free and more competitive financial market for their efficiency and productivity and their size, access, delivery and performance for higher rate of capital formation and higher total factor productivity for higher economic growth and welfare of the people.

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