

## MARKET CONCENTRATION SCENARIO IN FINANCIAL SECTOR OF BANGLADESH

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### ABSTRACT

The Herfindahl–Hirschman Index (HHI) is one of the most commonly used measures to assess market concentration in industries and an increase in the value of the index is interpreted as an indicator of reduced level of competition. Measuring the level of competitiveness in an industry should help the decision makers and regulators formulate policies to facilitate proper growth of the industry. In this study, popular measures such as Herfindahl-Hirschman Index (HHI), 3-firm concentration ratio, and entropy concentration index were measured using market capitalization data of companies across different financial sectors such as banks, non-banking financial institutions (NBFI), insurance companies – life and general, and mutual funds. A total of about 140 companies in financial sector listed at the Dhaka Stock Exchange (DSE) were considered in this study and daily trading data from last ten years starting from January 2009 were analyzed. The NBFI, life insurance companies, and asset managers of mutual funds were found to be operating in highly concentrated market that offers relatively less competitiveness. On the other hand, industries such as banks and general insurance companies were found to have relatively less market concentration that fosters high competitiveness.

**Keywords:** market concentration, Herfindahl–Hirschman Index, entropy concentration index, 3-firm concentration ratio, Dhaka Stock Exchange, financial sector

### INTRODUCTION

Market concentration refers to the extent to which the market shares in terms of sales, assets, etc. of the largest firms within a market account for a large proportion of economic activity. Other things remaining same, high levels of market concentration are more conducive to firms engaging in monopolistic practices. (OECD, 2003). If market concentration increases, it reduces competition and efficiency. In order to ensuring availability of products and services at a competitive price, it is essential to create a healthy competitive environment in the market. This also brings forth maximum utility of those products and services. Accordingly, regulators constantly monitor the state of market concentration esp. before and after possible merger and acquisition activities. Detection of high market concentration, which leads to lack of market competitiveness, at an early stage of the market development may help the regulators take appropriate proactive measure. Alternatively, if high market concentration, i.e., low competitiveness, is detected at a later stage, the regulators could also take corrective measures to reduce market concentration. Objective of this study is to analyze level of market concentration in financial sector in Bangladesh during the last decade, i.e., 2009-2019. Such a sector-wide analysis using more than ten years' data provides a relatively comprehensive study that tracks the evolution of market competitiveness in the financial sector of a developing nation such as Bangladesh. Till date there has not been similar studies in Bangladesh context and hence, this study could also contribute to the development of capital market since financial sector comprises a large part of the capital market and proper functioning of capital market depends on competitive environment in financial sector.

### LITERATURE REVIEW

While measuring market concentration, many indices have been used, but the best-known among them are the m-firm concentration ratio, esp. the 3-firm concentration ratio (CR3), the 4-firm concentration ratio (CR4), entropy concentration index, and more commonly, the Herfindahl-Hirschman index (HHI). (Herfindahl, 1950;

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Hirschman, 2018). HHI has long been used as a tool to measure market concentration, while the entropy index has been used mostly in economics literature, as a tool to measure competition.

Concentration indices have traditionally been used in measuring how a quantity is distributed among entities such as households or companies. For instance, few indices have been used to assess how income is distributed among a population and a few other indices have been applied to analyze the market structure to check the appropriateness of merger and acquisition operations (Naldi and Flamini, 2014). Relevant literature survey in the context of banking sector revealed that HHI, CR3 and CR4 have predominantly been used to measure market concentration (Bikker and Haaf, 2002). HHI requires market share data of all the companies in an industry while, CR3 and CR4 require data on the top three and four, respectively. The HHI has been a popular choice among the researchers as well as practitioners and have been compared to indices established among statisticians (namely those due to Gini, Bonferroni, and Amato). Compared to HHI, the CR4 is not much data intensive and hence relatively easy to calculate and interpret. This has been periodically provided by the U.S. Census Bureau for a number of industries (U.S. Census Bureau, n.d.).

Using different measures of concentration, i.e., market competitiveness has raised question among the practitioners since the researchers are yet to decide on an acceptable measure that captures the market scenario better compared to the rest. Most researchers report multiple indices since they fear no single index can capture everything happening within an industry (Kowka, 1985). Curry and George (1983) state that due to complexity of business life, a single concentration index cannot be judged best. Instead, they opted for a number of measures. Accordingly, this study computes a number of indices to better capture the level of market concentration in different segments of the financial sector esp. in the context of a developing economy such as Bangladesh. This approach was applied in the context of the USA by Nissan and Caveny (1993) who used six different measures to conclude that there was an increase in industry concentration in the 1980s.

Nawrocki & Carter (2010) argued that if the capital markets can value a firm's prospects, then market value of equity of firms in an industry could be used as a proxy to quantify market concentration. They also cautioned against such an approach by raising two points - it requires that all firms in an industry have the same leverage ratio and using market capitalization is only possible when the firms are listed (i.e., publicly traded). Keeping this limitation in mind, this study collected market capitalization data from listed companies belonging to different segments in the financial sector with a view to assessing the level of market concentration, i.e., competitiveness.

## RESEARCH METHODOLOGY

This article applies primarily two measures of market concentration, the Herfindahl–Hirschman Index (HHI) and the entropy concentration index to financial sector in Bangladesh. The Herfindahl–Hirschman Index (HHI) is computed as the sum of the squared firm proportions within an industry and should vary between 0 and 10,000.

$$HHI = \sum (s * 100)^2,$$

where,  $s$  is the market share of the specific firm on basis the of sales, market capitalization, etc., and the value should be between 0 and 1. The HHI indicates concentration within an industry where a high number could be interpreted as high degree of concentration (i.e., monopoly power) while a low number could be interpreted as high degree of competition.

Besides, another measure described by Horowitz and Horowitz (1968) is the entropy measure of competition. Let  $s$  be the probability of a discrete event, the entropy  $H$  is given by:

$$H = - \sum s \ln s.$$

If entropy is used as a measure of the degree of competitiveness, then  $s$  is the firm's proportional market value within the industry and the higher the entropy value the higher the degree of competitiveness. The entropy measures have found acceptance within the economics literature as a measure of competition (Curry and George, 1983; Attaran and Saghafi, 1988). Furthermore, Kelly (1981) and White (1982) have suggested that a numbers equivalent be used to improve the performance of the Herfindahl Index (and subsequently the entropy measures). Fortunately, an equivalent number of firms' calculation is available from information theory.

$$E = e^H,$$

where  $E$  is the number of equal size firms that would result in the same amount of entropy  $H$ . The equivalent number of equal size firms,  $E$  can be used to compare the degree of competition in one industry with that in another industry or to compare the degree of competition at one period of time with that at another. In general, higher values of  $E$  is indicative of less market concentration, i.e., better competition.

The CR3 index (the concentration ratio of the largest three firms) have also been used to measure market concentration. It is computed by summing market shares of the three largest firms –

$$CR3 = \sum_{i=1}^3 s_i.$$

Despite the ease of calculation and subsequent easy interpretation, its shortcoming should be noted, too – differences in the market structure may not be evident since the market share distribution among the top three cannot be captured by this method. The same argument is applicable for 4-firm concentration ratio, CR4 and 5-firm concentration ratio, CR5 that are used by many researchers. However, higher values of CR3 generally indicate high market concentration, i.e., less competition among the firms.

### ***Dataset***

Market concentration measures such as HHI, CR3 and entropy indices were calculated using market capitalization data from different companies in sectors such as commercial banks, non-banking financial institutions, general as well as life insurance companies, and mutual funds. As explained earlier, daily trading data from financial companies listed at stock exchange were utilized in the study. This way only equity or market capitalization data were utilized assuming that capital structure remained similar across the different companies in a segment. Also, non-listed companies could not be included in the study.

Daily trading data from January 2010 to October 2019 were collected from Dhaka Stock Exchange (DSE) and analyzed in this study. Table I in Appendix lists all the companies selected for this study. Data from a total of 30 commercial banks, 23 non-banking financial institutions, 36 general insurance companies, 12 life insurance companies, and 37 mutual funds were analyzed in this study.

### ***The Empirical Results***

Result from the analysis are presented and discussed below following the U.S. Department of Justice guidelines (2010) for horizontal mergers. According to the guidelines, HHI value of less than 1,500 is indicative of 'un-concentrated market', while values exceeding 2,500 indicates a highly concentrated market. HHI values between 1,500 and 2,500 could be interpreted to be representing a moderately concentrated market.

### ***Commercial Banks***

Commercial banks constitute an integral part of financial sector, and in capital market, their market share stood at 40% at the beginning of the analysis period, i.e., January 2009. However, by the end of October 2019, the market share dropped to approximately 16% which is significant.

The presence of thirty listed commercial banks has contributed to an apparently unconcentrated market and it indicates to a highly competitive market. The HHI could be measured based on deposit, loan & advance, or, market capitalization data from the commercial banks. In all three cases, the HHI based on annual data showed that it never exceeded the 500 mark (Figure 1).

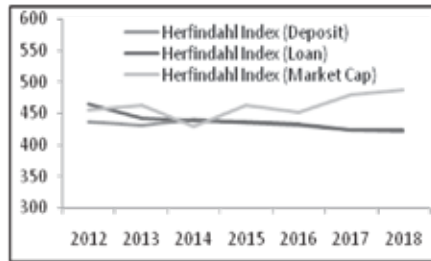
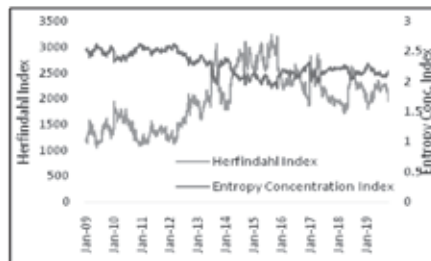
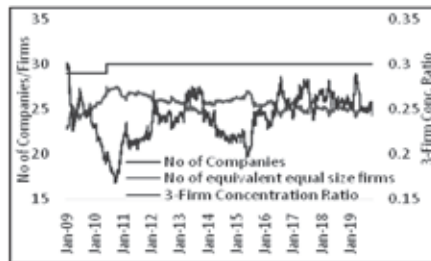


Figure 1: Level of market concentration in commercial bank sector (listed banks only) (2012-19)

Further, similar analysis was done using daily trading data that revealed similar findings - the HHI never exceeded the 600 mark while the number of equivalent equal-sized (hypothetical) firms was pretty close to the actual number of firms present and it never fell below 20 (Figure 2a, 2b). The 3-firm concentration ratio, at no point during the analysis period, exceeded 0.30. In other words the 3 largest banks never enjoyed more than 30% of the total market share. That, too, supports the finding from other measures of market concentration. (Figure 2b)



(a)



(b)

Figure 2: Level of market concentration in commercial bank sector (listed banks only) (2009-19)

**Non-Banking Financial Institutions:** Unlike the commercial banks, the NBFIs sectors showed little sign of market competitiveness. The average value of HHI stood at 2000 when the daily market cap data were analyzed over the analysis period, i.e., 2009-2019 that suggests a moderate level of market concentration. A further scrutiny suggests that the HHI level was below 1500 mark during most of the period between 2009 and 2012. However, since then the market started becoming less competitive or, more concentrated. The entropy concentration index fell during that period. Also, things are improving since 2015-16 and the HHI value is falling down. (Figure 3a).

The 3-firm concentration ratio paints an alarming picture of the NBFIs sector in terms of market concentration as Figure 3b shows that, on average, more than 60% of the market share are being enjoyed by top three NBFIs listed at the bourse and more alarmingly there is an upward trend in CR3 value. Further, the equivalent number of equal size firms was found to be less than half the number of NBFIs actually operating in the sector. The average number of NBFIs that operated during the analysis period, i.e., 2009-2019 was found to be 22.2 against the average number of equivalent equal size firms that stood at less than ten. Such a relatively lower number of equivalent equal size firms indicates high level of market concentration, i.e., less competition.



(a)



(b)

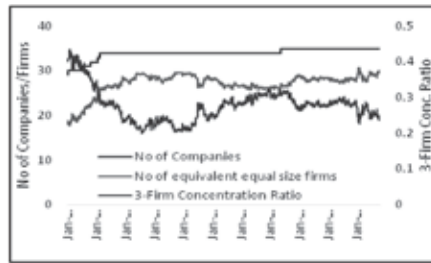
Figure 3: Level of market concentration in NBFIs (2009-2019)

**General Insurance Companies:** The number of listed general insurance companies rose from about 29 in 2009 to 36 in 2019 that shows relatively high level of market competition in this sector. The HHI value never exceeded the 900 mark and the average value was found to be less than 500 over the last eleven years. Such a low number is indicative of low market concentration and relatively high level of business competitiveness. (Figure 4a).

The number of equivalent equal size of firms was pretty high compared to actual number of firms operating in the sector. Its average over the last eleven years was found to be 27 compared to the average 33 general insurance companies actually operating. Such a high number indicates high level of market competitiveness. Besides, the 3-firm concentration ratio also suggests low market concentration. The highest value of CR3 during the last eleven years was found to be 43% while the lowest was 20% with an average of 27%. All these findings suggest that the market was not concentrated among few top players in the sector. (Figure 4b)



(a)

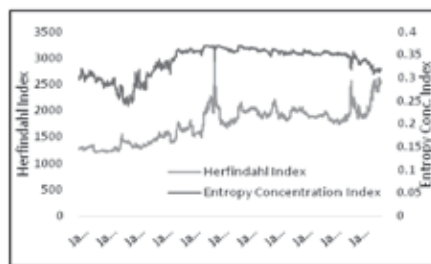


(b)

Figure 4: Level of market concentration in general life insurance sector (listed companies only) (2009-19)

**Life Insurance Companies:** The number of life insurance companies listed at DSE was only 9 in January 2009 and since then the number only grew to 12 till October 2019. Accordingly, the level of market concentration only deteriorates which is evident from the HHI value that averages 1,750, i.e., moderate level of market concentration, over the last eleven years and the highest value was found to be 3,200 indicating high level of market concentration. Such a high range of values of HHI indicates relatively low level of business competitiveness. (Figure 5a).

The number of equivalent equal size of firms was a fraction of the total number of firms in operation. It averages close to one, 1.4 to be precise, during the last eleven years while the average number of life insurance companies in operation was more than 11. Such a low figure suggests a low level of market competitiveness. Additionally, the 3-firm concentration ratio supports findings from other measures. The highest value of CR3 during the analysis period, i.e., 2009-2019 was found to be as high as 77% while the lowest was 48% with an average of 63%. All these findings suggest that the market was highly concentrated among few top players in the sector diminishing the overall market competitiveness in this sector. (Figure 5b)



(a)



(b)

Figure 5: Level of market concentration in life insurance sector (listed companies only) (2009-19)

**Mutual Funds:** Mutual funds are an important part of the financial sector especially when it is considered in the context of listed companies. The total market share of closed-end mutual fund had been pretty low in

Bangladesh – it hovered near 2 % during 2010-2019.

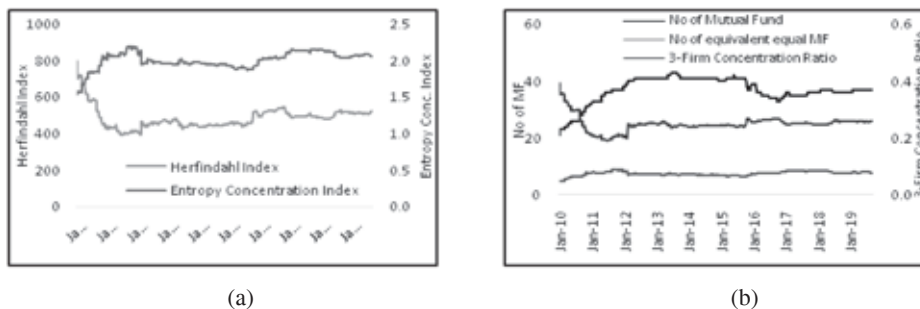


Figure 6: Level of market concentration among different mutual funds (closed-end only) (2010-2018)

Market concentration in mutual fund industries could be analyzed from two perspectives – mutual funds and asset managers. The mutual fund industry from the perspective of individual funds, was found to be less concentrated (Figure 6a) with the HHI never exceeding 900 mark since January 2010 with an overall average less than 500. Moreover, number of funds back then was 21 which stood at 37 as of October 2019 with an overall average of 37 that indicates presence of competitiveness among the different funds. The average CR3 during that period was about 25% that also supports the presence relatively less market concentration. (Figure 6b).

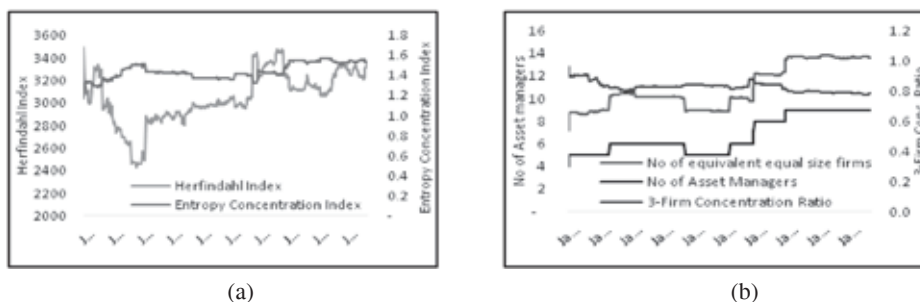


Figure 7: Level of market concentration among mutual fund asset managers (closed-end only) (2010-2018)

However, mutual funds should better be analyzed from the perspective of asset managers whose number was only 4 in January 2010 and stood at 9 in October 2019 that is also the highest number of asset managers listed in DSE during the period. The market concentration has been found to be pretty high resulting in a lack of competitiveness among the asset managers. The HHI value hardly fell below the 2,500 mark while the overall average exceeded 3,000 and the highest value was found to be 3,492. (Figure 7a) Furthermore, the market was found to be highly concentrated among the top three managers with the CR3 value exceeding 95% in early 2010 and stood at almost 80% in October 2019. During the analysis period, the average CR3 value was found to have exceeded 82% indicating that market was highly concentrated among the top asset managers. (Figure 7b).

## CONCLUSION

The current study focuses on the listed companies only and it was evident from data from 2009-2019 that commercial banks and general insurance companies had low market concentration that fosters competitiveness. On the other hand, market concentration remained relatively high in such as non-banking financial institutions (NBFI), life insurance, and mutual fund. This indicates a general absence of market competitiveness which

may result in downfall for the industry unless corrective measures are adopted by regulatory authorities, such as Bangladesh Bank, Insurance Development and Regulatory Authority (IDRA), and Securities and Exchange Commission (SEC). Such findings may help authorities such as Bangladesh Competition Commission (BCC) to formulate policies, i.e., anti-trust laws etc. to foster competitiveness in these segments of financial sector. Besides, potential investors will be able to better assess risk of their investment into financial companies by utilizing findings from this study.

In addition to market concentration, other measure of competitiveness could also be applied to industries in future studies to supplement findings from this study. Measuring market concentration helps, if not solely dictates in determining the presence of competitiveness. Moreover, a significant number of insurance companies, commercial banks, and open-ended mutual fund that are not listed in the stock exchange and whose data are hardly available could have supplemented the current study. Other participants in the financial sector such as rating agencies, micro finance institutions etc. could also be analyzed to get a better picture of state of market concentration in financial sector. Future research could also utilize revenue, enterprise value etc. in lieu of market capitalization data only in order to determine market share and subsequent analysis of market concentration. Finally, return data from market participants in different segments of the financial sector could be checked against respective market concentration level in order to verify possible linkage between market competitiveness and corresponding return.

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## APPENDIX

**Table I: Selected Financial Companies as of October 31, 2019**

	Ticker of Banks	Ticker of NBFIs	Ticker of General Insurance	Ticker of Life Insurance	Mutual Funds	
					AM	Ticker of MF
1.	ABBANK	BAYLEASING	AGRANINS	DELTALIFE	RACE	EBL1STMF
2.	ALARABANK	BDFINANCE	ASIAINS	FAREASTLIF		TRUSTB1MF
3.	BANKASIA	BIFC	ASIAPACINS	MEGHNALIFE		IFIC1STMF
4.	BRACBANK	DBH	BGIC	NATLIFEINS		1JANATAMF
5.	CITYBANK	FAREASTFIN	CENTRALINS	PADMALIFE		POPULAR1MF
6.	DHAKABANK	FASFIN	CITYGENINS	POPULARLIF		PHPMF1
7.	DUTCHBANGL	FIRSTFIN	CONTININS	PRAGATILIF		EBLNRBMF
8.	EBL	GSPFINANCE	DHAKAINS	PRIMELIFE		ABB1STMF
9.	EXIMBANK	ICB	EASTERNINS	PROGRESLIF		FBFIF
10.	FIRSTSBANK	IDLC	EASTLAND	RUPALILIFE		EXIM1STMF
11.	ICBIBANK	ILFSL	FEDERALINS	SANDHANINS		ICB
12.	IFIC	IPDC	GLOBALINS	SUNLIFEINS		1STPRIMFMF
13.	ISLAMIBANK	ISLAMICFIN	GREENDELTA			ICBEPMF1S1
14.	JAMUNABANK	LANKABAFIN	ISLAMIINS			PRIME1ICBA
15.	MERCANBANK	MIDASFIN	JANATAINS			PF1STMF
16.	MTB	NHFIL	KARNAPHULI			ICB3RDNRB
17.	NBL	PHOENIXFIN	MERCINS			IFILISLMF1
18.	NCCBANK	PLFSL	NITOLINS			ICBSONALI1
19.	ONEBANKLTD	PREMIERLEA	NORTHRNINS			ICBAGRANI1
20.	PREMIERBAN	PRIMEFIN	PARAMOUNT		LRGLOBAL	DBH1STMF
21.	PRIMEBANK	UNITEDFIN	PEOPLESINS			GREENDELMF
22.	PUBALIBANK	UNIONCAP	PHENIXINS			AIBL1STMF
23.	RUPALIBANK	UTTARAFIN	PIONEERINS			MBL1STMF
24.	SHAHJABANK		PRAGATIINS			LRGLOBMF1
25.	SIBL		PRIMEINSUR			NCCBLMF1
26.	SOUTHEASTB		PROVATIINS		SEML	SEMLLECMF
27.	STANDBANKL		PURABIGEN			SEMLIBLSF
28.	TRUSTBANK		RELIANCINS			SEMLFBSLGF
29.	UCB		REPUBLIC		VIPB	SEBL1STMF
30.	UTTARABANK		RUPALIINS			NLI1STMF
31.			SONARBAINS		VANGUARD	VAMLBDMF1
32.			STANDARINS			VAMLRBBF
33.			TAKAFULINS		CAPM	CAPMBDBLMF
34.			UNITEDINS			CAPMIBBLMF
35.			BNICL		AIMS	GRAMEENS2
36.			AGRANINS			RELIANCE1
37.					ASIAN TIGER	ATCSLGF

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