THE DYNAMICS OF INDONESIAN BANKING COMPETITION 2006 – 2013

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ABSTRACT

There have been many views and hypothesis regarding the impact of competition on banking performances and stability. In order to find the optimum level of competition, we should start by measuring the level of competition in the industry. This article shows the development of competition level in Indonesian banking, measured with four different methods (Concentration ratio, Herfindahl-Hirschmann Index, H-statistic, and Lerner Index). We found that concentration in deposit and loan markets have become slightly more concentrated, with increasing market power indicated by Lerner Index. We also found that Lerner Index of Indonesian banking have a bimodal distribution, which indicates that Indonesian banking tend to be divided into two clusters based on its market power. On the other hand, development of H-statistic illustrates different tendencies where it indicates that banking market power is diminishing. The different result indicates that, even if the overall assets of Indonesian banking have become more productive, it has become more costly for them to earn new assets. Therefore we recommend Indonesian banking to do consolidations in order to gain economies of scale and scope in earning new assets.

Keywords: Competition measurement, Indonesian banking.

ABSTRAK

Terdapat banyak pandangan dan hipotesis mengenai dampak kompetisi terhadap kinerja dan stabilitas perbankan. Untuk mencari tingkat kompetisi optimum, pengukuran tingkat kompetisi menjadi hal awal yang wajib dilakukan. Artikel ini menunjukkan dinamika perkembangan tingkat kompetisi perbankan di Indonesia, menggunakan empat metode pengukuran yang berbeda (Concentration Ratio, Herfindahl-Hirschmann Index, H-statistic, dan Lerner Index). Kami menemukan bahwa tingkat konsentrasi pada pasar DPK dan kredit mengalami sedikit peningkatan, diiringi dengan peningkatan kekuatan pasar yang diindikasikan oleh Lerner Index. Kami juga menemukan bahwa Lerner Index pada perbankan Indonesia memiliki distribusi bimodal, yang menunjukkan bahwa perbankan Indonesia cenderung terbagi menjadi dua kelompok berdasarkan kekuatan pasarnya. Di sisi lain, perkembangan H-statistik menunjukkan hal yang berbeda, yaitu bahwa kekuatan pasar perbankan cenderung menurun. Hasil yang berbeda ini mengindikasikan bahwa, walau asset perbankan secara keseluruhan semakin produktif, biaya yang dibutuhkan perbankan untuk mendapatkan asset baru semakin tinggi. Oleh karena itu, kami merekomendasikan perbankan Indonesia untuk melakukan konsolidasi agar memperoleh economies of scale *dan* scope *dalam usaha memperoleh asset baru.*

***Kata kunci**: Pengukuran kompetisi, perbankan Indonesia.*

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1. INTRODUCTION

Banking industry has a pivotal role in promoting economic growth and development. It provides funding for productive activities and nurture innovative projects throughout the nation. Considering its' vital role, it is natural that sound and superb banking industries needed to support an economy. An essential factor which has tremendous influence to banking soundness and performances is the degree of competition.

Competition is the act of rivalry between economic actors in seeking to gain the same object, in the same time, and at relatively equal standing and circumstances (William G. Shepherd, 1990). Effective competition will bring about mutual exertion of pressure between competitors to perform at their optimum point. This condition will provide opportunities, stimulate diversity, as well as encourage firms to operate efficiently and initiate favorable innovations. Monopoly on the other hand tends to reduce the firm's diligence, undermine efficiency, broaden inequality, and limit the freedom of choice. Since Adam Smith's era, this view had become the reason underlying the urge of competition in industries. But since the year of 1970, new theories regarding competition have arisen. Controvert with the mainstream view, Chicago-UCLA school argued that monopoly speaks for greater efficiency. They argue that monopoly conditions are earned by a party because of their exquisite attainment. Hence, the drawbacks of monopoly conditions are offset by superior performance of the dominant firm or the large scale of economies in production, innovation, or other activities. Supported by empirical studies, those two views are relevant in different circumstances. So considering the benefits and drawbacks of each competition level, what is the best degree of competition for Indonesian banking industry?

Focusing on banking industry, literatures have shown variety of relationships between structure, conduct, and performance of banking. A generally known paradigm is structure conduct performance (SCP) hypothesis. This view claims that banking market structure – including size distribution of banks, market share, barrier to entry– strongly influence banking conducts, which will determine their performances. Concentrated market tend to ease and cheapen collusion which may harm consumers interests and undercut efficiency, while competitive market leads banks to strive for the best strategy in overcoming their competitors and yield exceptional performances (Matthews and Thompson, 2008). Other view from Demsetz (1973) argues that concentration is the result of strong competition. Banks with superior performances are rewarded with higher market share, hence the changes in market structure should not be interfered because it represents the most efficient structure possible. This view is referred to as efficient structure hypothesis (ESH). Other view comes from behaviorists who argue that behavior is the critical determinant of performance. They argue that market structure matters a little, because no matter what the market structure is, if firms behave in their best capabilities they will produce their finest performance. Some literature also stress on the contestability of market. Potential competition which may enter without any barrier (or low barrier) may force the firms to perform at optimum level to secure their market share and profitability[2].

Aside from figuring the relationship between competition and performance, many studies on banking industry also stress the effect of competition on banking stability[3]. It is true that banking has a unique circumstances compared to other kind of businesses. Banks can leverage their assets with outstanding amplification rate, with debt to equity ratio sometimes

[2] See Shepherd, W.G. (1990).

[3] See Berger, Klapper, and Turk-Ariss (2009), Ariyanto (2004), Jimenez *et al.* (2007), Boyd and De Nicolo (2005).

reach the point of 9 while other business commonly kept at 0.5 – 0.6 (Matthews and Thompson, 2008). In addition, failure of a banking system may promptly deteriorate the whole economic condition of a nation, and even spread to the regional economy. These have become one of the reasons that banking has been one of the most regulated industries. Research have specifically acknowledged the impact of competition to stability, especially on the implementations of prudential policy in banking industry. The results can be divided into two vast paradigms, the "competition fragility" and "competition stability".

Described by its' name, "competition fragility" view sees competitive process as a harmful factor to banking stability. Berger, Klapper, and Turk-Ariss (2009) stated that high degree of competition depletes market power, narrows profit margin, and reduces franchise value of the bank. Ariyanto (2004) stated that over-competition may lead to excessive risk taking –in input market as well as output market– by the banks in order to gain profit. An empirical research of banking in Spain by Jimenez *et al*. (2007) also found that an increase in the degree of competition leads tohigher-risk loan portfolio in Spain banking.

Conversely, "competition stability" view believes that higher-degree of competition will be beneficial for banking stability. Boyd and De Nicolo (2005) argue that greater market power will lead to higher interest charges to borrowers, which increases the banks' risk. Higher loan interest charges make it harder for borrowers to repay their loans (increase default risk) and may aggravate moral hazard problem by the borrowers to shift to riskier projects. Banks may also be exposed to a set of riskier borrowers because higher interest charges will only be feasible by higher-return projects, which usually adhere to riskier projects. Higher concentration of banking market may also exacerbate moral hazard problem by the banks, who believe that they are too big to fail and are protected by the government safety net.

Diverse results concluded by literatures have shown the importance of competition in determining the excellence and soundness of banking industry. Therefore, an optimum condition of competition is sought in order to accommodate the most supportive banking environment. The first essential step to advocate the finding is to thoroughly measure the degree of banking competition. This article is made to show the dynamic development of competition in Indonesian banking industry. Various approaches and methods to measure banking competition are explained to identify their difference, advantages, and drawbacks. Those methods are then employed to measure and identify the changing degree of competition in Indonesian banking.

2. DATA AND METHODS

In order to measure the degree of competition, we uses panel data (firm-level data) representing approximately 90% of Indonesia's commercial banks in the period of 2006 to 2013 quarterly (ranging from 107 banks to 127 banks each year). Differences of total banks observed are caused by incomplete reports of the banks to central bank. All possible objects are included in order to comprehensively identify the degree of competition on each period (this way, the impact of banking consolidations, newcomers, and exits will be captured). Data are earned from Otoritas Jasa Keuangan (financial stability board in Indonesia), in form of quarterly banking reports. To measure the degree of competition, structural and non-structural approaches are employed. On the structural approach –which emphasizes the market structure of banking–we measure concentration ratio (CR) and Herfindahl-Hirschmann Index (HHI) to capture the degree of competition. On non-structural approach –which emphasize on revenue, production cost, and market power– Panzar Rosse's H-statistic and Lerner Index (LI) are calculated. Different from non-structural approach, which measures competition based on the market share (market

concentration) of firms within the industry, structural approach measures competition based on the ability of firms to set price higher than the production cost.

2.1 Concentration Ratio

Concentration ratio measures total market share controlled by the most dominant firms in industry. It will show if the market is equally shared on a large number of small firms, or if it is dominated by only a few firms with large market share. CR can be calculated using this formula:

$$CR_n = \sum_{i=1}^{n} S_i$$

Where:
n= Total dominant banks observed
S_i = Market share of bank i

The advantage of using CR is the limited data it requires and the simplicity of the measurement. On the other hand, it can't capture the market structure as a whole nor the contribution of small banks in the market. The value of CR is ranging from 0 to 100. The hypothesis states that more concentrated market (CR_8 approaches 100) tend to be less competitive, vice versa. We measure CR_8 (the market share of 8 most dominant commercial banks in Indonesia) to depict the concentration of loans, deposits, and assets in Indonesian banking. CR_8 is used in this research because top 8 biggest banks in Indonesia consistently dominate nearly 60% of total market share in input, output, and productive resource market.

2.2 Herfindahl-Hirschmann Index

Herfindahl-Hirschmann Index has been commonly used to measure thecompetition in banking industry. HHI can be defined as the sum of squared market shares of the banks in the market. Bikker and Haaf (2002) stated that HHI measurement has its advantages because it considers all banks in the industry into account and is sensitive to entrance of new banks. The value of HHI may range from 0 to 10000 where the upper bound indicates extreme monopoly and the lower bound indicates perfect competition. Iveta (2012) stated that HHI indices in the range below 1000 indicate a very low concentration, while HHI of 1000-1800 indicate moderate concentration and HHI above 1800 indicate a very high concentration. HHI is measured using this formula:

$$HHI = \sum_{i=1}^{N} S_i^2$$

Where:
N = Number of banks
S_i = Market share of bank i

The movement of CR_8 and HHI are expected to be in accordance, where they measure the same indicator (market share) with different method. The result of CR_8 and HHI are usually referred to as "market concentration". Higher market concentration indicates lesser degree of competition, while lower market concentration indicates higher competition level.

2.3 H-statistic

Panzar-Rosse model's H-statistic measurement is based on comparative static properties of the reduced-form revenue function (Bikker and Haaf, 2002). Using firm data of revenue and cost, this model evaluate banking competitive behavior to determine its' degree of competition. The model assumes that banks are operating in optimum condition where marginal revenue equals marginal cost. Therefore, the changing value between marginal revenue and marginal cost reflects changes of market power, hence degree of competitiveness. In this model, we use interest revenue as the proxy of total revenue. Interest expenses represent the cost of deposits, while personnel expenses represent labor cost. Administration and general expenses represent fixed capital cost. Control variables are also included in the equation, including banking equity, total loans, total assets, and other income. The first step which is applied in order to acquire H-statistic is estimating this equation using ordinary least square (OLS) estimation technique:

$$\ln(P_i) = \alpha + \beta_1 \ln(w_{1,i}) + \beta_2 \ln(w_{2,i}) + \beta_3 \ln(w_{3,i}) + \gamma_1 \ln(C_{1,i}) + \gamma_2 \ln(C_{2,i}) + \gamma_3 \ln(C_{3,i}) + \gamma_4 \ln(C_{4,i}) + \varepsilon_1$$

Where:
P_i = Ratio of interest revenue to total assets in bank$_i$
W_1 = Ratio of interest expenses to total assets in bank$_i$
W_2 = Ratio of administration and general expenses to total assets in bank$_i$
W_3 = Ratio of personnel expenses to total assets in bank$_i$
C_1 = Ratio of equity to total assets in bank$_i$
C_2 = Ratio of total credit to total assets in bank$_i$
C_3 = Total assets of bank$_i$
C_4 = Ratio of other income to total assets in bank$_i$

Natural logarithm is applied on every variable to capture the elasticity of dependent variables subjected to independent variables. H-statistic, which is represents the degree of competition, is earned through adding the elasticity of revenue subjected to input costs.

$$H = \beta_1 + \beta_2 + \beta_3$$

Where:
$H \leq 0$ indicates monopoly;
$H = 1$ indicates perfect competition;
$0 < H < 1$indicates monopolistic competition

2.4 Lerner Index

Lerner Index is a non-structural approach measurement which emphasizes in market power to illustrate the degree of competition. Based on microeconomics, LI estimates market power by subtracting market price with marginal cost.

$$LI_{it} = \frac{(P_{it} - MC_{it})}{P_{it}}$$

Where:
LI_{it} = Lerner Index of *bank i* at time *t*
P_{it} = Price for the output of bank *i* at time *t*
MC_{it}= marginal cost for bank *i* at time *t*

LI ranges from 0 to 1, where the higher LI implies higher market power and therefore lower competition. LI with a value of 0 indicates a perfect competition, while LI with a value of 1 indicates a monopoly condition. In accordance with Panzar-Rosse H-statistic model, LI assume that market is in optimum profit condition where marginal cost equals marginal revenue. The difference between LI and H-statistic is that LI emphasize the difference between price and marginal cost, while H-statistic tries to find the elasticity of total revenue subject to various kinds of expenses. Another difference is that H-statistic also takes into account various control variables, while LI uses trans-log total cost function to estimate the dynamic relationship of total cost with assets and expenses. LI has a superior advantage where it can capture the market power of each bank in the whole periods, while H-statistic can only capture the market power of banking industry as a whole. To estimate LI, we adapt the method which Iveta (2012) employed on measuring market power in Czech banking sector. The total cost trans-log function stated as below:

$$\ln TC = \alpha_0 + \alpha_1 \ln y + \frac{1}{2}\alpha_2 (\ln y)^2 + \sum_{j=1}^{3} \beta_j \ln w_j + \sum_{j=1}^{3}\sum_{k=1}^{3} \beta_{jk} \ln w_j \ln w_k + \sum_{j=1}^{3} \gamma_j \ln y \ln w_j + \varepsilon$$

Where:
TC = Total costs
y = Total assets
w_{jk} (w_1, w_1, w_2) = input prices (cost of fund, cost of labor, cost of capital)

In the model, we use the ratio of total interest revenue to total assets as the proxy of P_{it}. Interest expenses stand as the proxy of total costs to emphasize bank as an intermediary firm. Cost of fund, cost of labor, and cost of capital are represented by ratio of interest expense to total assets, ratio of personnel expenses to total assets, and ratio of administration and general expenses to total assets consecutively. After estimation results are acquired, we calculate marginal cost using reduced form of total cost formula.

$$MC = \frac{TC}{Y} \times (\alpha_1 + \alpha_2 \ln y + \sum_{j=1}^{3} \gamma_j \ln w_j)$$

After earning the value of price and marginal cost, we can calculate the Lerner Index of each bank in every periods. Lerner Index can capture the market power of each bank, therefore we can analyze the market power of banking in different aspects with different point of views. The average of Lerner Indexes in each period can also represents the development of market power in banking industry as a whole.

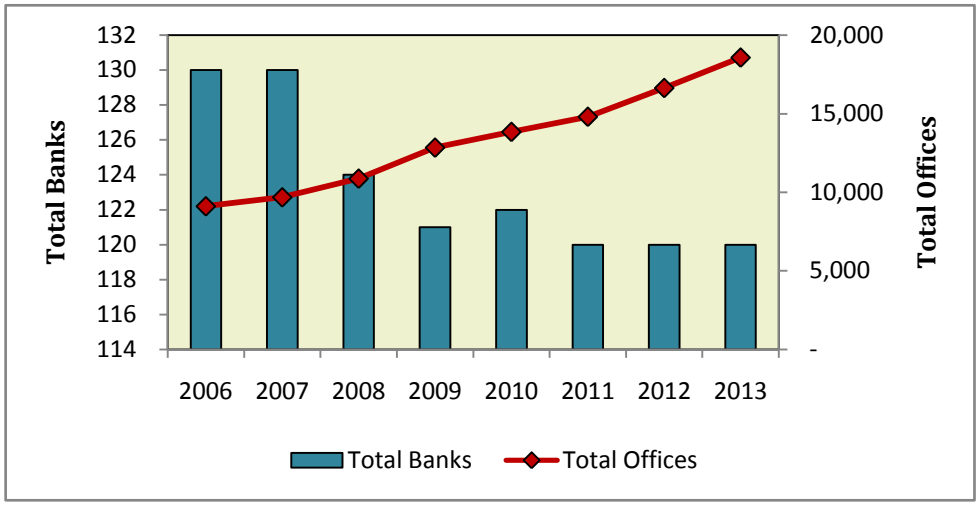
Different from CR_8 and HHI, the result of H-statistic and Lerner Index usually referred to as "market power". The movement of H-statistic and Lerner Index is expected to be contradictory because higher Lerner Index indicates higher market power while higher H-statistic indicates lower market power.

3. RESULT AND DISCUSSION

3.1. Development of Indonesian banking Condition

In the period of 2006 to 2013, Indonesia commercial banks faced a monopolistic competition (a degree of competition between perfect competition and monopoly competition) with a decrease of players from 130 banks to approximately 120 banks (see Figure 1.). On the other side, the number of offices they have increased from 9680 offices to 18558 offices, indicating the expansion of services they offer and the widening scope they have grasped.

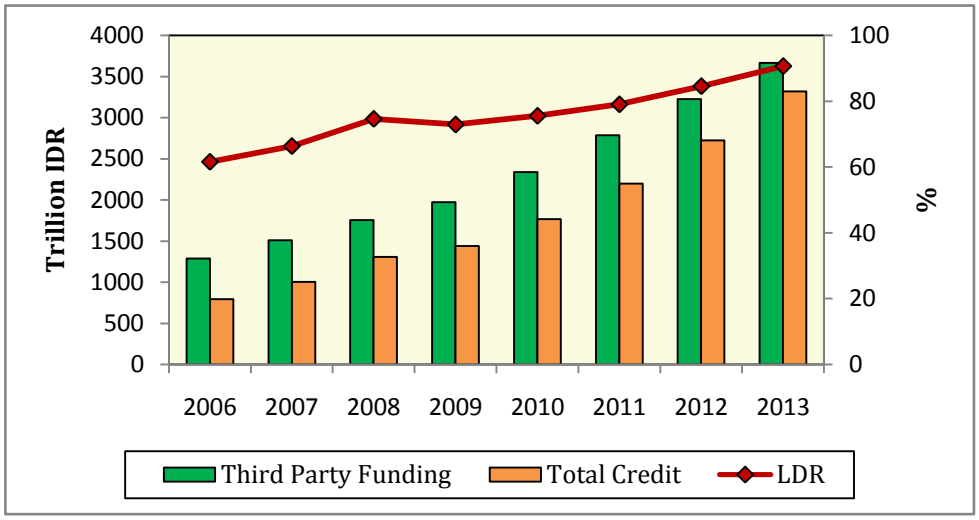
Figure 1. Development of Total Banks and Offices, 2006 - 2013



Source: Statistik Perbankan Indonesia, various years.

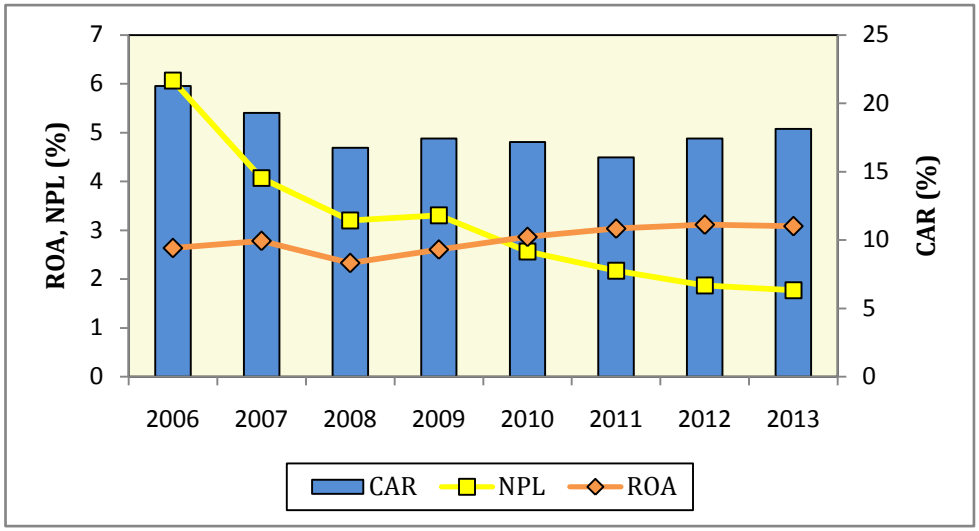
This last decade has become an expanding period of Indonesian banking business activities, depicted by the rapid growth of third party funding and credit (Figure 2.). The growth pace of credit outstand the growth pace of third party funding (with the average growth per year of 22.86% and 16.14% consecutively) and result a narrowing difference between their values. It is shown by the increasing loan to deposit ratio (LDR) from 61.56% in 2006 to 90.61% in 2013. In a point of view, this condition shows the increasing efficiency of banking activities where merely all of the deposits are successfully transformed into loans. The condition is also supported by declining non-performing loans (NPL) and steadily increasing return on assets (ROA) (see Figure 3.). Although Indonesian banking solvency is consistently supported by decent capital adequacy ratio (CAR), increasing LDR should still be put into concern since it may cause liquidity issues on Indonesian banking industry.

Figure 2. Development of Third Party Funding, Total Credit, and LDR, 2006 - 2013



Source: Statistik Perbankan Indonesia, various years.

Figure 3. Development of CAR, NPL, and ROA, 2006 - 2013



Source: Statistik Perbankan Indonesia, various years.

3.2. Result of Structural Approach Measurement

Competition may occur either in input or output market. Competition between banks especially arises in the effort of seizing productive resources, such as deposits, loans, and assets. Deposit represents the input market, while loan represents the output market and asset represent the productive resources market[4]. Measuring the $CR_8$and HHI in three aspects (third party funding, credit, and asset), we find that in 2006 – 2013 the degree of concentration in Indonesian banking fluctuates in a fairly stable range of medium concentrated, competitive environment (see Table 1. And 2.). Deposit market stands as the most concentrated market, while assets and loan market follow with slightly less degree.

Table 1. CR_8 and HHI, 2006 - 2013

$HHI_{Deposit}$	HHI_{Loan}	HHI_{Asset}	$CR_{8\ Deposit}$	$CR_{8\ Loan}$	$CR_{8\ Asset}$
706.3351	588.7686	667.7724	61.1062	58.1450	59.4740
680.5169	583.8708	646.0361	60.2679	57.6297	58.5942
726.8479	612.8978	684.5323	62.6669	59.1706	60.8250
723.5898	611.0125	670.5889	62.5460	58.9508	54.8514
666.2259	558.0876	613.0904	59.8647	56.1712	52.6873
659.2707	552.3081	605.5415	59.6194	56.0431	57.3206
643.1669	544.8717	594.8971	58.6233	55.8745	56.7505
739.3297	585.5273	675.3159	62.3495	58.2467	60.2257
659.4961	538.1665	614.9539	59.5499	56.0157	57.9021
665.6442	545.8830	610.7233	60.0849	56.2068	57.9631
655.0899	552.9673	599.4976	60.0724	56.3785	57.4883
713.5061	583.9123	645.1676	61.9081	57.5874	59.1347
659.8871	582.1734	606.6980	59.8118	57.1656	57.6629
704.7078	628.9973	653.5382	62.6238	60.0041	60.5475

[4] See Berg, S. A., & Kim, M. (1994).

$HHI_{Deposit}$	HHI_{Loan}	HHI_{Asset}	$CR_{8\ Deposit}$	$CR_{8\ Loan}$	$CR_{8\ Asset}$
719.5450	631.9264	663.6980	63.1443	60.2384	60.9829
763.8673	643.8623	702.1172	64.9815	60.9183	62.4803
706.2029	634.4435	636.3527	62.4781	60.3072	59.5919
707.7123	633.7788	651.2096	62.9322	60.2536	60.6817
682.7030	619.9911	628.8057	62.1021	59.7656	59.8208
741.0799	626.1027	666.6069	64.4144	60.3348	61.6259
679.6412	621.4234	633.5519	62.2489	60.1498	60.3313
667.0293	623.5197	617.5867	61.6938	60.1507	59.5530
665.8876	617.9734	615.8401	61.4272	59.8596	59.3486
707.3600	614.0479	642.6834	62.9228	59.5703	60.2665
644.5597	607.1078	606.0446	60.2912	59.3154	58.7013
654.1394	602.2990	611.5819	60.7188	59.1215	59.0180
646.1852	602.9131	607.0767	60.2659	59.0028	58.6682
704.2874	621.9907	612.7229	62.4878	59.6568	56.8356
654.8372	621.0174	610.0745	60.7788	59.4452	58.8213
677.0350	632.3352	632.3352	61.2022	59.7405	58.7549
667.4620	622.1957	607.1086	61.2183	59.1374	58.3330
701.0533	625.3304	625.3304	62.6262	59.0465	58.4779

Table 2. Descriptive Statistics for CR_8 and HHI

Descriptive Statistic	$CR_{8\ Deposit}$	$CR_{8\ Loan}$	$CR_{8\ Asset}$	$HHI_{Deposit}$	HHI_{Loan}	HHI_{Asset}
Mean	61.53	58.69	58.91	687.34	602.22	633.19
Median	61.56	59.15	58.92	680.08	613.47	627.07
Maximum	64.98	60.92	62.48	763.87	643.86	702.12
Minimum	58.62	55.87	52.69	643.17	538.17	594.90
Std. Dev.	1.44	1.55	1.91	32.05	30.69	28.09

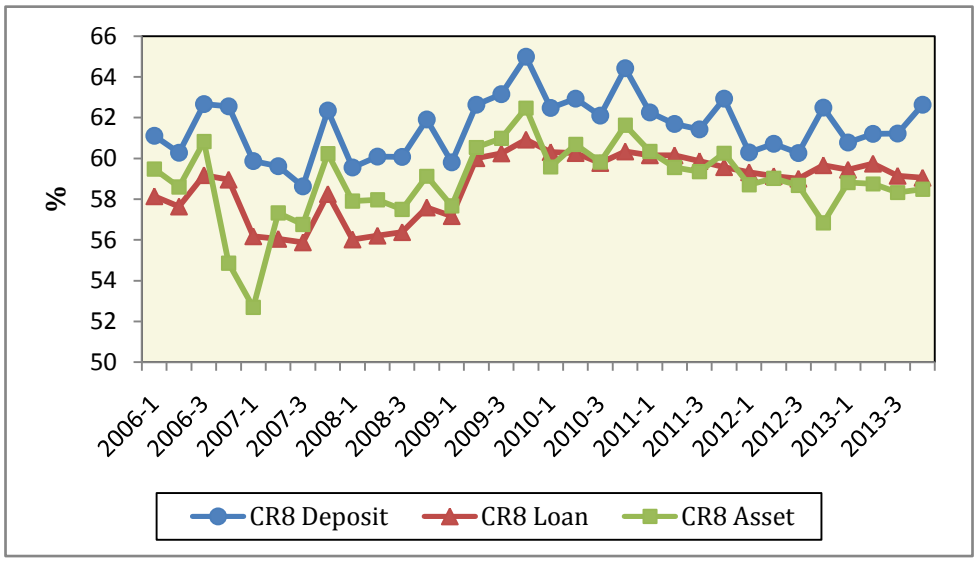
This condition indicates that there is less competition in input market. Dominant banks can easily capture more funding, while smaller banks need to struggle with more efforts to get deposits. This condition may arise because larger banks tend to have superior capability in providing better services (either in the context of quality or availability), accommodate advanced payment system, and in giving better rates. Another important reason why input market is more concentrated than output market is because people tend to be more careful in finding the place to put their important things –in this case money–, than when they try to find a place to borrow. In Indonesia, those dominant banks have clearly gained better societies' trust than smaller banks, as the outcome of their publicity, professional services, and performance records.

Analyzing the measurement result, we classify the finding into three periods:

(1) Since the first quarter of 2006 to the third quarter of 2007, concentration in Indonesian banking –in the aspect of third party funding, credit, and total assets– tend to be lessen (each of the CR_8 decreases by approximately 2%);

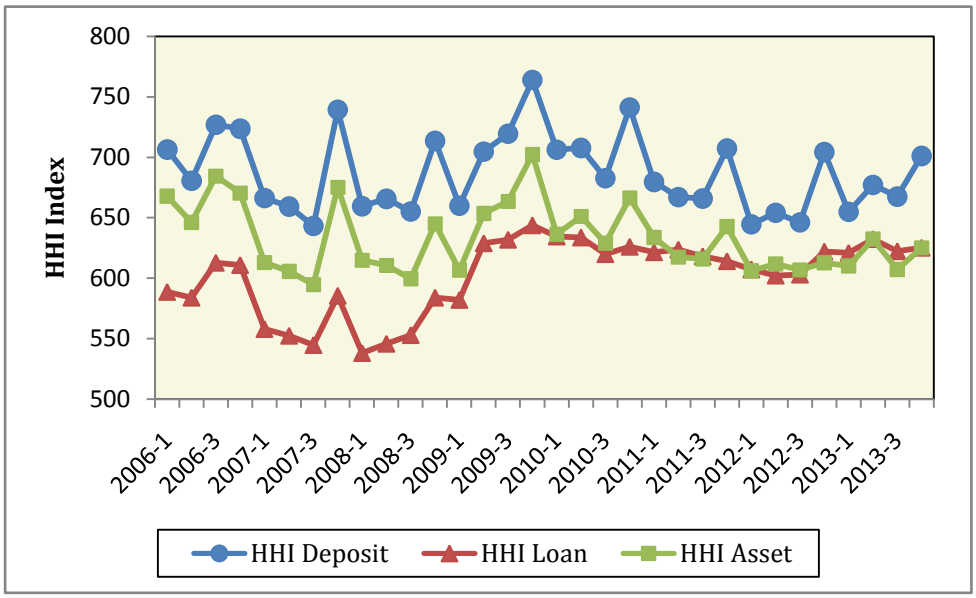
(2) The third quarter of 2007 until the end of 2009 colored with rapidly increasing domination of larger banks (all CR_8 increased with approximately 5 to 6 % in 9 quarters). This may be caused by the declining number of total banks;
(3) On the next period (early 2010) till the end of 2013, concentration in assets, input market, and output market steadily decreased, but with a very slow pace.

Figure 4. Development of CR_8, 2006 - 2013



Source: Indonesia Commercial Banking Report, various years. (Processed)

Figure 5. Development of HHI, 2006 - 2013



Source: Indonesia Commercial Banking Report, various years. (Processed)

Since quarter one of 2006 till quarter four of 2011, HHI in banking assets tend to be higher than concentration in loan markets. This indicates that on those periods, larger banks tend to dominate banking fixed assets and non-loan assets (such as securities) in a higher degree. But after the end of 2011, HHI of total assets diminishes and have similar score with the

HHI of loan market. It indicates the growing power of smaller banks in Indonesia (starting from increasing contribution in fixed assets and non-loan assets).

In general, the development of CR and HHI indicate that concentration in loan and deposit market of Indonesian banking tend to be stable, although in 2013 the concentration of those two aspects are slightly higher than in 2006 (see Figure 4. & 5.). This data indicate that competition in earning deposits and creating loans have become slightly looser. On the other hand, the concentration degree of total assets in 2013 tends to be lower than in 2006, indicating a higher competitiveness in seizing overall banking assets.

3.3. Result of Non-Structural Approach Measurement

The result of data processing shows that H-statistic and Lerner Index provide different indication regarding the development of competition in Indonesian banking. H-statistic gives an indication that in the period of observation, the condition of Indonesian banking has become more competitive (H-stat moves from 0.38 in early 2006 to 0.66 in the end of 2013). On the other hand, Lerner Index turn from 0.48 in quarter one of 2006 to 0.56 in quarter four of 2013 showing higher market power owned by Indonesian banking and indicating a loosened degree of competition (Table 3. & 4.). Analyzing the model, we find that this difference is caused by the different variables (which are included in the model) and method in processing data.

While H-statistic tries to identify the changes of total cost in every increase of total revenue (by estimating the increase of various expenses subject to an increase in interest revenue), Lerner Index tries to explain the gap between price and marginal cost. The difference lies in the aspect of cost. H-statistic uses interest expenses, personnel expenses, and administration and general expenses (all relative to assets) as factors determining total revenue. This method emphasizes on cost which are created to produce revenue. On the other hand, Lerner Index uses trans-log model to estimate marginal cost, where this model emphasizes on cost which are created to produce per unit of asset. In addition, H-statistic also takes into account control variables, while Lerner Index does not.

Table 3. H-stat and Lerner Index, 2006 – 2013

Time	H-stat	Lerner Index
2006-1	0.38	0.48
2006-2	0.33	0.47
2006-3	0.42	0.47
2006-4	0.65	0.48
2007-1	0.48	0.51
2007-2	0.55	0.52
2007-3	0.24	0.52
2007-4	0.44	0.53
2008-1	0.31	0.54
2008-2	0.50	0.56
2008-3	0.39	0.53
2008-4	0.53	0.53
2009-1	0.42	0.54
2009-2	0.51	0.56
2009-3	0.46	0.58
2009-4	0.65	0.59

Time	H-stat	Lerner Index
2010-1	0.63	0.55
2010-2	0.61	0.55
2010-3	0.65	0.55
2010-4	0.64	0.55
2011-1	0.61	0.54
2011-2	0.61	0.54
2011-3	0.60	0.54
2011-4	0.65	0.54
2012-1	0.66	0.54
2012-2	0.76	0.55
2012-3	0.74	0.57
2012-4	0.86	0.57
2013-1	0.72	0.57
2013-2	0.68	0.58
2013-3	0.62	0.58
2013-4	0.66	0.56

Table 4. Descriptive Statistics for H-statistic and Lerner Index

Descriptive Statistic	H-statistic	Lerner Index
Mean	0.56	0.54
Median	0.61	0.54
Maximum	0.86	0.59
Minimum	0.24	0.47
Std. Dev.	0.14	0.03

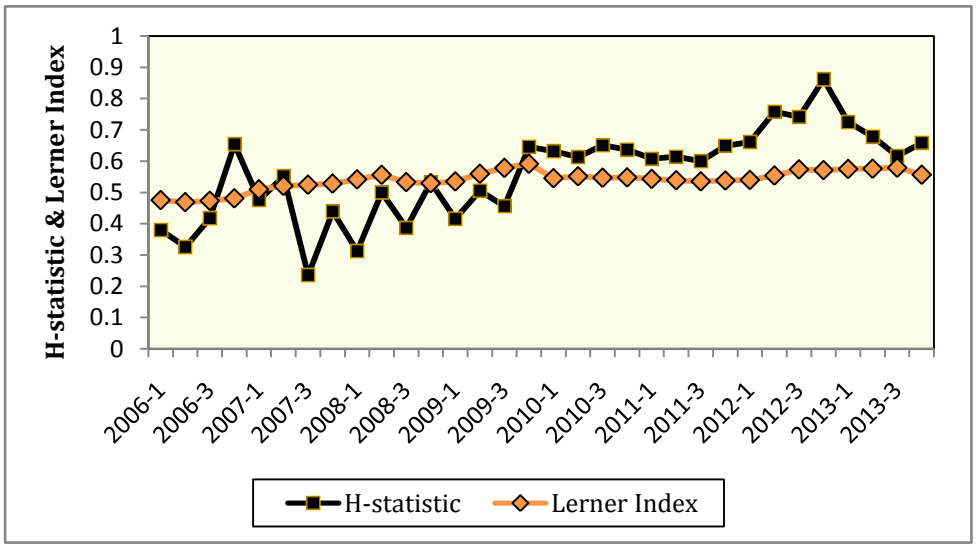
Analyzing the H-statistic and Lerner Index, we learn that:

(1) An increase of total revenue by 1% generally followed by 0.56% increase of total cost;
(2) In average, Indonesia commercial banks can set prices of 54% higher than their marginal costs;
(3) Increasing H-statistic indicate that it becomes more costly for bank to increase its' revenue;
(4) Standard deviation of Lerner Index is very low (0.03) indicating a very stable relationship between price (set by the bank) and cost per asset. Increase in Lerner Index indicates improvement in bargaining power of Indonesian banking during observation periods;
(5) Analyzing the combination of H-statistic and Lerner Index result, researchers deduct that nowadays, an increase in asset produce lesser marginal revenue than in the past (marginal productivity of asset tend to be lower). This hypothesis suggests that, provided every aspects of banking are fixed, in the future, increase in asset tend to decrease return on cost (ROC) of Indonesian banking, even if the total revenue and ROA is increased. This result indicates that it has become more costly to increase assets in Indonesian banking industry. The condition may occur because of increasing competition in earning new assets (see HHI result above), increasing fixed asset expenses (in term of technology-based services they try to provide and its' maintenance) or market penetration attempts which may be unsuccessful (indicated by increasing number of offices).

(6) The costly effort to earn new assets (as argued in no. (5) result) suggests that Indonesian banking will be better off if they implement merger or acquisition strategy to increase their assets and market share. Consolidation will give them better economies of scale and economies of scope[5] (increase their efficiency in producing more output and making product differentiations). It will then give them market power to improve their profitability. The higher profits generated is expected to further increase their performances, including efficiency, profitability, and product improvements. However, this strategy should be only done to a certain degree because in some point economies of scale and scope may turn to diseconomies. Too concentrated market may also induce moral hazard to the bank side and its' customers.

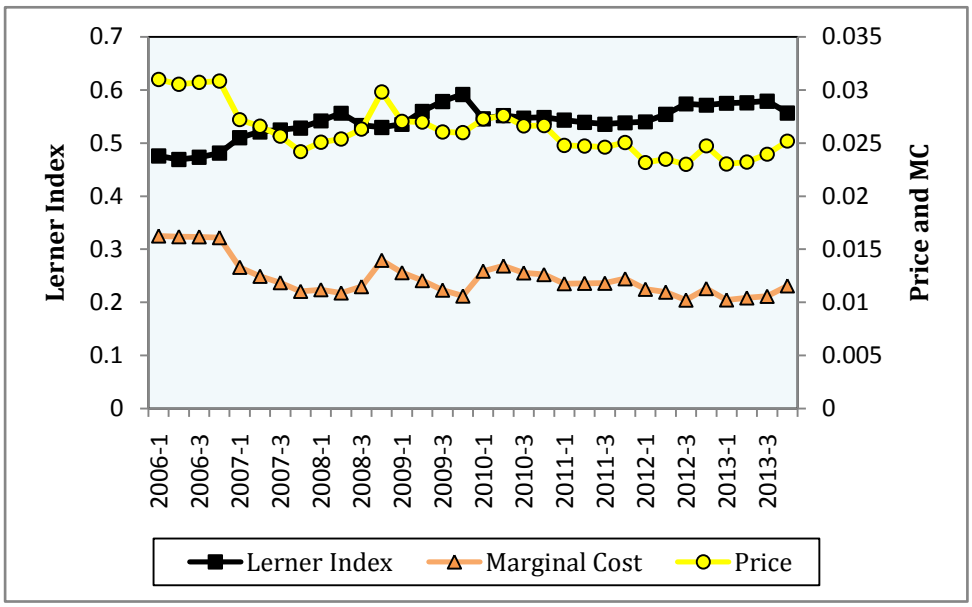
(7) The development of Lerner Index is also paralleled with decreasing marginal cost and price (see figure 7). This indicates that market power in Indonesian banking is not only earned by setting a mark-up, but also earned through improvement in efficiency.

Figure 6. Development of H-statistic and Lerner Index, 2006 - 2013



[5] For example: in this era, banking needs to deliver high technology-based services and payment system (which requires high investment) for their customers. By doing consolidation, two or more banks will be able to be deliver the same new services and payment system with only one investment. The thrift will also be applied as the output of bank increases. Consolidation will also make product differentiation, which uses some or overall same inputs, become cheaper.

Figure 7. Development of Lerner Index and Its' Components



Lerner Index can also be used to analyze the individual bank market power. Two histograms below compare the distribution of market power in Indonesian banking between 2006 and 2013. Reading the histogram, we can learn that in general, the distribution of market power in Indonesian banking has slightly changed. Maximum Lerner Index in 2006 was 0.86 while maximum Lerner Index in 2013 was 0.96 (see Figure 8. and 9). Analyzing the data, we learn that banks who have "small business loans" services tend to have higher Lerner Index (re: market power). Anglomas International Bank who focuses on funding small and medium enterprises have the highest Lerner Index (0.96) in the end of 2013. Since Lerner Index doesn't consider risk in its' estimation, this phenomenon may be caused by the risk premium they charge to the borrowers.

Figure 8. Histogram for Lerner Index, Quarter One of 2006

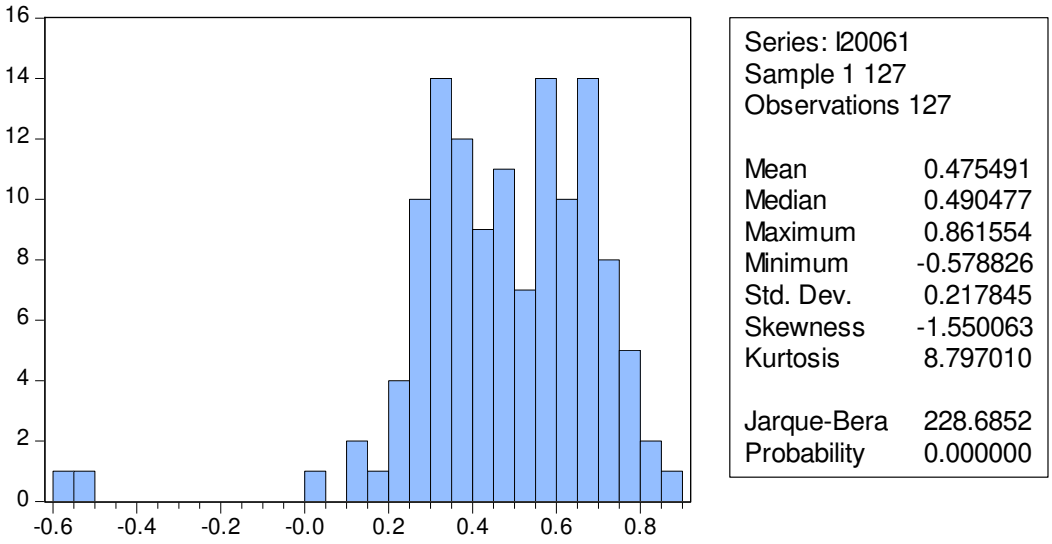
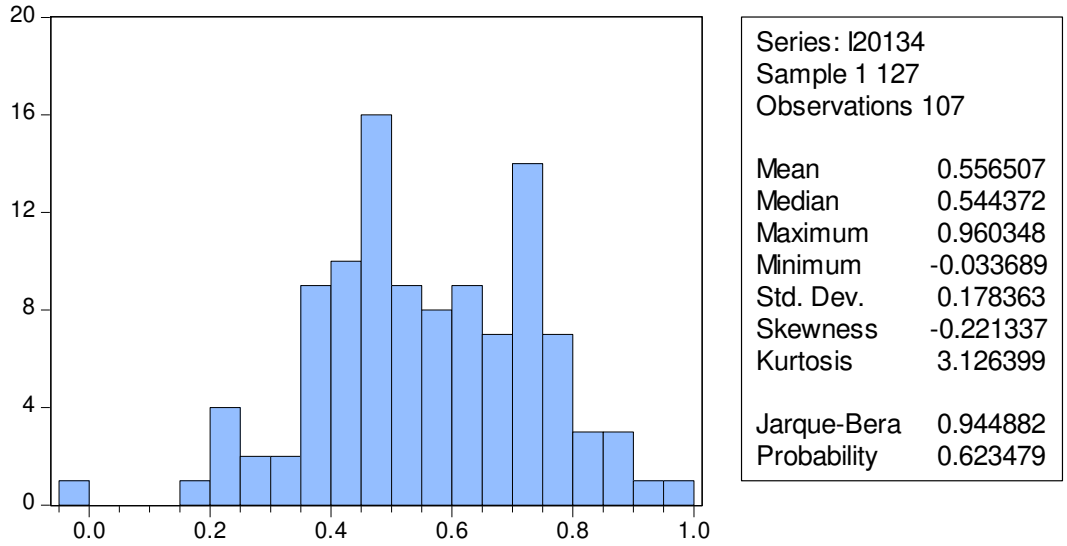


Figure 9. Histogram for Lerner Index, Quarter Four of 2013



Histograms above show us that Lerner Index in Indonesian banking have bimodal distributions. It means that there is a tendency of 2 clusters in Indonesian banking (based on Lerner Index). The distribution of LI in early 2006 peaks at 0.300 – 0.349 (14 banks) and 0.550 – 0.699 (38 banks) while the distribution of LI in the end of 2013 peaks at 0.450 – 0.499 (16 banks) and 0.700 – 0.739 (14 banks). Seeing the peaks of LI distributions in 2006 and 2013, we can interpret that there are 2 clusters of Indonesian banking, divided by their market power. In the early of 2006, cluster one (with lower market power than the other cluster) is dominated by domestic and medium-sized international affiliated banks. On the other hand, cluster two (higher market power) is dominated by regional development banks and bigger banks with international affiliation. Regional development banks tend to have bigger market power because Indonesia's government has given them the only right to manage the wage of civilian employees, therefore they hold higher bargaining power to their customers than other banks. In the end of 2013, cluster one is still dominated by medium-sized banks, while cluster two is still dominated by regional development banks. Changes occurred in the end of 2013 is that larger banks tend to leave cluster 2. Two of the biggest banks in Indonesia (PT Bank Central Asia Tbk. and PT Bank Rakyat Indonesia (Persero) Tbk.) have earned bigger market power than banks in cluster two. This result indicates that larger banks tend to be better in improving their market power. This may be caused by their capabilities to earn economies of scale and scope. It may also be caused by their capabilities to deliver better services and payment system to their customers, therefore their customers are willing to pay higher prices.

The changing peaks (compare 2 figures above) also shows that Indonesian banking has stronger market power in the end of 2013 than in the early of 2006 (indicate decreasing level of competitiveness). Furthermore, in early 2006 only 62% of total banks have Lerner Index above 0.4, while in the end of 2013 there are 73% of total banks who have Lerner Index above 0.4. This clearly indicates increasing market power of Indonesian banking in the observation period.

Another finding we capture is that total deposits, total loans, and total assets nearly have no correlations with Lerner Index[6], indicating that banking in Indonesia has a very low tendency

[6] Writers deduct that price war exists only if the correlation between Lerner Index and total resources earned is strongly negative, since it indicates that lower price-cost gap conveys more productive resources to the bank.

to compete through price war in the effort of seizing productive resources[7]. Price war has truly become a conventional strategy in banking competition, but there is another type of competition which widely occurs in Indonesia. We usually call them non-price competition. Banks are competing to provide high-technology based services to ensure customers' satisfaction. Banks sometimes accommodate extravagant events to intensify customers' excitement and assure market confidence. Furthermore, lotteries are held to encourage customers in using the bank's services. Diverse products which offer initial rewards to customers are also designed. These strategies are widely employed in Indonesian banking in order to seize bigger market.

4. CONCLUSION

In the observation periods, CR_8 and HHI indicate that deposit and loan markets in Indonesian banking have become slightly more concentrated. This indicates loosened competition level, a condition where mainstream view say will cause inefficiency and equality problems. Lerner Index also shows increasing market power of Indonesian banking, which in some cases may deteriorate consumer surplus (because of higher prices Indonesian banks charge to their customers). On the other hand, H-statistic shows increasing cost per revenue of Indonesian banking. While ROA is expected to be increasing (depicted by Lerner Index) the ROC in Indonesian banking is decreasing. This condition indicates that it has become more costly for Indonesian banks in seizing new assets. It may be caused by the emerging trend, where banks compete to provide new high technology-based services and payment system which requires high initial investment (fixed asset expenses). They also compete to penetrate to new markets. These investments have bulk the costs borne by Indonesian banks, but have also increase their market power hence their asset productivity. This condition suggests that consolidation, such as merger and acquisition, become a good option for Indonesian banks to improve their economies of scale and scope. Consolidation can be an option for banks to seize new assets, which are becoming more costly but also increasingly productive.

Based on the findings, we argue that competition level in Indonesian banking is decreasing. It is true that mainstream view says that less competitive market may induce inefficiency and equality problems. But the phenomenon in Indonesia shows that larger banks tend to earn their market share and market power through high economies of scale and scope in their management and innovations. Furthermore, larger banks tend to have better services and better technology-based payment systems which promote efficiency. Superior services (in quality, diversity, and availability) and respectable reputation invites societies to use their services and willing to pay the higher price offered by the banks (consumer satisfaction and welfare are also improved along with increasing price). This condition supports Demsetz's (1973) efficient structure hypothesis (ESH) which argue that competition in the market should not be interfered because it will generate the most efficient market structure.

On the other hand, we need to put concern on the availability of financial services for remote societies. Efficient structure without equality will only promote the welfare of partial societies. Larger non-government banks tend to not reach micro, small, and medium business or fulfill the demand of remote societies because of higher costs and risks. If larger banks dominate the market, it will be harder for small and medium banks (who intend to reach SME and remote societies) to seize productive resources. For those problems, Indonesia's government has established a rule that only regional development banks have the right to manage civilian

[7] The correlations of total deposits, total loans, and total assets with Lerner Index in quarter four of 2013 are consecutively -0.0488, -0.0411, and -0.054. This result indicates that price competition in Indonesian banking exists, but only in a very low degree.

employees' wages. Incentives in form of subsidy have also issued to encourage financial intermediation to small and medium businesses and remote societies. But then, according to survey of *Otoritas Jasa Keuangan* in 2013, only 21.84% of Indonesia societies are categorized as well literate regarding financial services products. Furthermore, according to utility index by *Otoritas Jasa Keuangan*, only 59.74% of Indonesia societies have the utilized formal financial services products. It indicates that formal financial institutions have not succeeded in reaching remote societies or SME. Then, do small and medium banks which focus on funding SME need to be, in a certain way, protected from competition? Or does authority need to set the role of each bank, hence its market, in the economy?

There are still many questions regarding the influence of competition on banking, when this article is limited in measuring the level of competition in Indonesia. The grand purpose of research regarding competition is to find the optimum level of competition, which will support banking to work efficiently and provide finest services in a fair price. To analyze the optimum level of competition, further research are required, especially regarding the impact of competition on banking performances, stability, and financial inclusion in Indonesia. Thus, it is expected that banks can play their role in the best condition and encourage economic growth and social welfare.

BIBLIOGRAPHY

Ariyanto, T. (2004). Profil persaingan usaha dalam industri perbankan Indonesia. *Perbanas Finance & Banking Journal, 6*(2), 95-108.

Bank Indonesia. (various years). Statistik Perbankan Indonesia, year 2006-2013. Jakarta.

Berg, S. A., & Kim, M. (1994). Oligopolistic interdependence and the structure of production in banking: An empirical evaluation. *Journal of Money, Credit, and Banking*, 49-61.

Berger, A. N., Klapper, L. F., & Turk-Ariss, R. (2009). Bank competition and financial stability. *Journal of Financial Services Research*, *35*, 99-118.

Bikker, J. A., & Haaf, K. (2002). Measures of competition and concentration in the banking industry: A review of the literature. *Economic and Financial Modelling*, *Summer 2002*, 1-46.

Boyd, J., & De Nicolo, G. (2005). The theory of bank risk taking revisited. *Journal of Finance*, *60*, 1329-1343.

Demsetz, H. (1973). Industry structure, market rivalry, and public policy. *Journal of Law and Economics*, *16*, 1-9.

Iveta, R. (2012). Market power in the Czech banking sector. *Journal of Competitiveness*, *4*(1), 143-155.

Jimenez, G., Lopez, J., & Saurina, J. (2007). How does competition impact banking risk taking? *Federal Reserve Bank of San Fransisco Working Paper Series*.

Matthews, K., & Thompson, J. (2008). *The economics of banking* (2nd ed.). England: John Wiley & Sons, Ltd.

Otoritas Jasa Keuangan. (various years). Indonesia Commercial Banking Report, year 2006-2013. Jakarta.

Otoritas Jasa Keuangan. (2013). Strategi nasional literasi keuangan Indonesia. Jakarta.

Shepherd, W. G. (1990). *The economics of industrial organization* (3rd ed.). New Jersey: Prentice-Hall, Inc.