1 INTRODUCTION

Background

The role of banking sector to sustain economic growth is critical. Banking provides support in the form of facilitating financial services/transactions and as one source of funding to finance productive or consumptive activities of economic actors. The economic actors include government, company and individual, hereafter these economic actors are referred to as households. Productive activities are activities undertaken by households to provide added value such as investment, trade and so forth. Consumptive activities are activities undertaken by households to meet their own needs, or activities that do not provide any added value. The support provided by banks will promote economic growth, as Hsueh, Hu and Tu (2013) showed that the development of Indonesian financial sector encourages economic growth, the conclusion is drawn based on the finding that there is a one-way causality from the development of financial sector to economic growth in Indonesia. Further, Mankiw and Ball (2010) also stated that the general conclusion that can be drawn from studies on the relationship between financial sector development and economic growth is that financial development is more likely to cause economic growth than otherwise.

The support of banking sector in promoting economic growth is not without limit. Support from banking can be maximized if the sector is in good condition in terms of stability and soundness. The banking stability and soundness is influenced by the resilience and soundness of each individual bank. If condition of each bank is good then we can expect that banking sector is also in good condition. A number of factors can have an impact on the condition of a bank, either positive or negative impact. A positive impact means the factor will strengthen the stability and soundness of a bank, while a negative impact will weaken the bank's condition. The factors can come from internal or external of the bank. Internal factors such as quality of managerial decision, asset quality, liquidity quality, capitalization, governance, risk management, system and procedure, etc. While external factors such as regulation, business competition, condition of real sector, condition of financial systems, events occurring abroad etc.

In conducting their function and role, banks are subject to various rules or regulation issued by the government bodies or authorized institutions, in the form of laws, provisions or policies. The arrangement of bank's function and role by an authority is in line with the purpose of permitting a bank to operate, in which the purpose is explicitly stated in the definition of a bank stipulated in *undang-undang (UU)*. The *UU* no. 10/1998 on banking defines the bank as a business entity that collects funds in the form of savings and distributes it in the form of loans and/or in other forms in order to improve the standard of living of the people. This definition states the two main functions of a bank which are to raise funds and to distribute funds. These functions put the bank in a position between the owners of the funds and households who need the funds to support their economic activities. The function conducted to bridge the needs of these two groups of society is called an intermediary function, thus the bank is called an intermediary institution.

In line with definition of the bank according to the said *UU*, the support of Indonesian banking to promote economic growth is mainly in the form of bank lending or credit. It is confirmed from the composition of banking assets which is dominated by productive assets in the form of lending and its ratio to gross domestic product (GDP). The ratio between banking assets and GDP reached 56.4% in 2016 and this ratio tend to increase over period 2006-2016. Meanwhile, if we look from lending side, the ratio of bank lending to GDP also shows an increase during the period 2006-2016, where in 2016 the ratio reached 36.4%.

The increasing in asset to GDP ratio over time as shown in Figure 1.1 indicates the increasing role of banking sector to promote Indonesian economic growth. Due to bank assets are dominated by loan, then increasing in that ratio also means an increasing in bank lending activities. In Indonesia, bank loan is one of the external funding sources to finance economic activities in addition to funding from capital market. This is in line with Boyd and Jalal (2012) which found that *marginal utilization of debt* (MUD) for Indonesia is 0.8385 (the maximum value of MUD is 1). The MUD indicates the importance of external funding sources in the form of debt to finance business activities, the greater the value of MUD means the greater the role of debt to finance the business. The continued dependability on bank lending as an external funding source will have important implication. That is, if banking system is disturbed which causes intermediation role is not functioning well then it will disrupt the activities of bank lending, will hamper economic activities and slow down economic growth as a consequence.

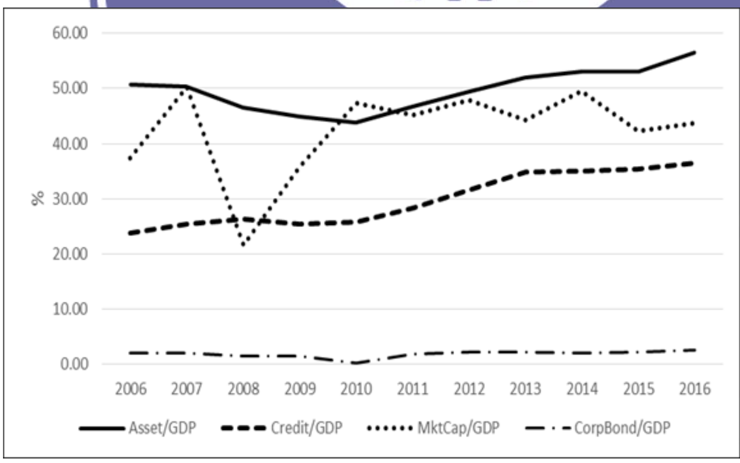

Figure 1.1 Ratio of asset and credit to GDP

Figure 1.1 also indicates the role of capital market sector in promoting Indonesian economic growth. The figure showed the movement of market capitalization for stock market relative to GDP (MktCap/GDP) and the movement of corporate bond outstanding relative to GDP (CorpBond/GDP). The ratio between market capitalization and GDP reached 43.70% in 2016. The movement of market capitalization is relatively more volatile and generally still below the movement of bank assets. It indicates the role of banking sector in promoting economic growth still exceeds the role of the stock market. Meanwhile, contribution of debt instrument in the form of corporate bond is smaller when compared with bank lending when viewed their respective ratios to GDP. In the period 2002-2016, the average ratio of corporate bond to GDP is still less than 2%, but by 2016 the ratio has reached 2.57%. Thus, the contribution of capital market activity is still lower than banking sector activity in promoting economic growth, however, the capital market contribution should be encouraged to increase in the future.

Changes in Business Environment

In the last two decades there are two major crises that severely hit Indonesian banking sector. The first crisis occurred in 1997/1998 known as Asian Financial Crisis (AFC) triggered by regional currency turmoil and the second crisis is Global Financial Crisis (GFC) triggered by sub-prime mortgage issues in the United States that occurred in 2007/2008. Both crises have negative impacts on Indonesian economy and banking sector with different severity. The AFC has caused real GDP contraction of 15.4%, fiscal cost of recovery amounted for 50-55% of GDP and non-performing loan ratio was 65-75% of total credit (Caprio and Klingebiel 2002; Claessens, Klingebiel and Laeven 2002). The severe impact of the AFC that hit Indonesian banking sector as a consequence of fragility of banking fundamental prior the crisis.

Sheng (2009) identified three features of the Indonesian banking system stood out prior the AFC. First, the deregulation allowed the establishment of new private domestic banks, and together with foreign and joint venture banks, they compete against the state-owned banks. Second, competition in the banking system changed the incentive structure. Following the regulation, both state and private banks competed actively for household deposits and commercial loans that resulted in deterioration in credit and governance standards. Third, the inefficiency of the state-owned banks and poor governance in the private banks. Therefore, there was a vulnerability in banking sector prior the AFC, thus the crisis caused a disruption of the banking intermediary function which had an impact on occurrence of financial crisis in which economic growth contracted. Meanwhile, Mankiw and Ball (2010) stated that the financial crisis was triggered by the decline in asset price and failure of financial institution.

Improvement of the fundamental of banking system post the AFC contributed to limited impact of the GFC to the Indonesian banking sector (Basri 2013). A number of corrective actions have been taken by regulator to strengthen the banking sector, such as revoking license of several troubled banks, encouraging merger and acquisition (M&A) transaction, issuing new regulations, improving supervisory mechanism and adopting international standards. Revocation of licenses and realization of M&A transactions have led to decreasing in number of banks, thus banking sector become more concentrated. There were 151 banks in 2000 and reduced to 116 banks in 2016, where the decreasing in number of banks as a result of several revocation of bank licenses and M&A transactions during previous years. Table 1.1 presents several M&A transactions during 2000-2016. Decreasing in number of banks means number of rivals for a bank reduced.

The closure of several banks by revoking their operational licenses was intended to convince and increase public trust on banking sector that banks which serving them are sound banks and each bank is able to meet their obligation well, moreover bank closure will prevent troubled banks to transmit the problem to other banks. While, encouraging M&A transaction is intended to establish a stronger bank that operating in better economic scale and a merged bank is expected to have a better balance sheet structure which exhibits healthier composition of asset and liability, and strong capital structure.

Post the AFC to date, regulator has issued a number of new regulations to replace and revise previous regulations. The issued regulation is adaptive in which the issuance refers to current condition of economic and financial system as well as complexity of products and business activities run by banks. Issues regulated including risk management, bank capital, ownership, liquidity, good corporate governance, restriction on business activities and networks based on capital, implementation of international standards namely Basel 2 and Basel 3 etc. Table 1.2 presents some regulations for commercial banks issued during 2002-2016. Some regulations are with immediate effect and others are gradual. Gradual effect is in particular for regulation on the implementation of international standards. The regulations are also intended to realize *Arsitektur Perbankan Indonesia* (API) in which the design was launched in early 2004.

Table 1.1 merger and acquisition transactions during 2000-2016

Merging Banks	Year	Name of New Bank
Bank Dai-Ichi Kanggo, Bank IBJ Indonesia	2000	Bank Mizuho Indonesia
Bank Bali, Bank Artha Media, Bank Universal, Bank Prima Express, Bank Patriot	2001	Bank Permata
Bank Sumitomo Mitsuo Indonesia, Sakura Swadarma Bank	2001	Bank Sumitomo Mitsuo Indonesia
UFJ Indonesia Bank, Tokai Lippo Bank	2001	UFJ Indonesia Bank
Bank Pikko; Bank CIC, Bank Danpac	2004	Bank Mutiara
Bank ArthaGraha, Bank Inter-pacific	2005	Bank ArthaGraha International
UFJ Indonesia, Bank of Tokyo Mitsubishi	2006	Bank of Tokyo Mitsubishi UFJ Ltd
Commonwealth Indonesia, Bank Artha Niaga Kencana	2007	Bank Commonwealth
Bank Multicor, Bank Windu Kentjana	2007	Bank Windu Kentjana International
Bank OCBC, Bank NISP	2007	Bank OCBC-NISP
Bank Niaga, Bank Lippo	2008	Bank CIMB Niaga
Bank Harmoni International, Bank Index Selindo	2008	Bank Index Selindo
Bank Hagakita, Bank Haga, Bank Rabobank Duta	2008	Bank Rabobank International Indonesia Bank
Bank Buana, Bank UOB Indonesia	2010	Bank UOB Buana

Source: Mulyaningsih (2014)

The purpose of issuing the regulations is of course positive to strengthen the fundamental of banking sector. However, for each bank, the implementation of regulation is certainly full of challenge in accordance with the condition of the bank. Some banks can immediately comply with the regulations but others can not immediately comply with them. Regulations that can not immediately be complied with are primarily concerned with rules that require substantial costs. Banks with large budget may not face significant problems in implementing the issued regulations, but not for banks with limited budget. For instance, in implementing risk management of technology information, it is undeniable that technology is at the heart of banking operation and its business activity. Several banks implement the advanced technology system, but others implement technology that is still in standard version. In order to fully comply with related regulation, a bank must improve its technology system and expenses substantial costs as a consequence.

The implementation of international standards will increase credibility of Indonesian banking sector in the international arena, but the established standards may limit the activity of Indonesian banks to serve their domestic market. Issues governed by international standards are mainly concerning on the implementation of risk management based on best principles or best practices, bank capital and liquidity management. For instance, regulation on minimum capital ratio. This rule promotes the criteria of eligible capital in addition to the approach to calculate the ratio itself. Banks that have capital ratio close to minimum ratio will not be free to run their activities or to grow their business compared to banks that have large capital ratio. Even banks with such small capital ratio will be under strict supervision by regulator, meanwhile raising eligible capital is also not easy to do.

Table 1.2 Some regulations for commercial bank 2002-2016

Year	No	Subject
2003	5/8/PBI	Risk management implementation
2004	6/15/PBI	Statutory reserve at Bank Indonesia in IDR and FX
2005	7/2/PBI	Asset quality assessment
2005	7/3/PBI	Legal lending limit
2005	7/15/PBI	Minimum core capital
2005	7/50/PBI	Financial condition transparency
2006	8/4/PBI	Good corporate governance implementation
2006	8/6/PBI	Consolidated risk management implementation for banks that exercise control over subsidiaries
2006	8/16/PBI	Single presence policy on bank ownership
2006	8/17/PBI	Incentives for banking consolidation
2007	9/13/PBI	Minimum capital requirement by taking into account market risk
2007	9/15/PBI	Implementation of information technology risk management
2010	12/21/PBI	Bank business plan
2011	13/1/PBI	Assessment of bank soundness
2012	14/26/PBI	Business activities and office network based on core capital
2013	15/11/PBI	Prudential principles in capital participation activities
2014	18/POJK.03	Implementation of integrated governance for conglomeration
2015	6/POJK.03	Transparency and publication of bank statements
2015	42/POJK.03	Obligation to fulfill liquidity coverage ratio
2015	46/POJK.03	Stipulation of systemically important bank and capital surcharge

Source: BI, OJK (2017)

In general, corrective actions taken by regulator have succeeded in strengthening the fundamental of Indonesian banking sector. A number of indicators confirm it, such as capital ratio was above 15%, NPL ratio was below 4% and market liquidity was well managed, prior and post the GFC. Although the fundamental of banking sector have been more solid in general, some banks face challenges to strengthen their fundamentals. The challenges are as a result of changes in the business environment impacted by some policies related to corrective actions taken by regulator in order to strengthen the fundamental of banking sector on an ongoing basis. Some banks can immediately adapt to business environment changes, but others take longer time due to their internal issues. Hereinafter, regulations or policies that issued to make the fundamental of banking sector stronger are called consolidation policy.

In addition to the above matters, the enactment of dual banking system also contributes to the changing in business environment of Indonesian banking sector. In dual banking system, as stipulated in UU no. 7/1992 and amended by UU no. 10/1998 concerning banking, commercial banking consists of banks that conduct conventional and/or sharia-based business operations. Bank Muamalat Indonesia is the first sharia bank established in response to UU no. 7/1992. In its development, banks that conduct business activities based on sharia principle can be either an entity as a bank or a business unit of a conventional bank called *unit usaha sharia* (UUS). To accommodate the development of Islamic banking business, UU no. 21/2008 concerning sharia banking was issued. The UU no. 21/2008 is more specific than UU no. 7/1992 in regulating the sharia banking sector.

Various parties acknowledge that the potential of sharia financial business is enormous. Sharia banks are not exclusive banks for Muslim societies, but also open to non-Muslim communities as an alternative financial service that they can use. The large potential of sharia bank business has become the main attraction for investors in the banking sector, however until now the market share controlled by sharia banking is still relatively small, less than 5% of the total assets of national banking. Government and banking regulator continue to encourage the growth of the Islamic financial sector, including sharia banking by issuing rules that enable sharia banking to grow faster. The drive given by the government and regulator will certainly contribute significantly to the changing business environment of the Indonesia banking sector.

The changes in business environment lead to changes in forces affecting bank activities and its business, such forces can be categorized as market or non-market components. The market components include interactions between firm, suppliers, and customers that are governed by market and a contract, while non-market components are composed of the social, political and legal arrangements that structure interactions outside of, but in conjunction with, market and a contract (Baron 2013). Therefore, corrective actions taken by regulator are a non-market component which affects market component in terms of interaction between bank and its stakeholders and interaction among banks themselves.

Research Problems

There are two issues underlying this study, the first issue is the behavior of a bank in realizing its business targets in the midst of changing business environment can increase bank risks or lessen the bank soundness and have negative impact on banking system stability due to there is interconnectedness between banks. Each bank has business objective to be achieved in accordance with annual business plan that has been set. Annual business plan is drawn up with reference to potential changes in business environment to be faced during next year and to the realization of previous year business plan. Business plan is not static, the plan between years is not the same, so should take different strategy to realize it. A business plan could be expansive or moderate. Expansive business plan is a plan with high target for business growth, while moderate plan is a plan with lower target for business growth. If a business plan is very expansive then it can encourage a bank to have aggressive behavior. The aggressiveness of bank behavior can be reflected in the growth of portfolio managed, whether it is on asset side such as loans and securities, as well as on liabilities side such as third party's funds, thereby increasing bank risks if the portfolio is not properly managed. Such behavior will further endanger bank soundness if the bank does not have sufficient capital to absorb the risks.

The risks faced by banks are mainly due to the process of conversion of third party funds into earning assets, both of which have different characteristics. Two main characteristics of third party funds are short-term and variable price. Short term means the funds can be withdrawn by the owner at any time or within an agreed period. Variable price means the price of funds will vary and will be adjusted to follow economic or market condition. On the other hand, three main characteristics of earning assets are illiquid, long-term and its price is not easy to be adjusted to respond changes in economic or market condition. Illiquid means the asset cannot be immediately converted into cash as needed. The differences in characteristics between third party funds and earning assets lead to a mismatch between source and use of funds that must be managed properly.

The second issue is analysis of bank risks emphasizes on balance sheet data, whereas there are transactions conducted by banks but booked in off-balance sheet which also have significant risks. The emphasis of risk analysis only on the balance sheet data may result biased conclusions. Transactions booked in balance sheet and income statement are balance sheet transactions. The balance sheet transactions consist of transactions which the bank has effectively had claim rights and liabilities to be fulfilled. Withdrawn loan facilities, savings, demand deposits and time deposits are some balance sheet transactions. Transactions booked in commitment and contingency report are off-balance sheet transactions. The off-balance transactions consist of not yet effective transactions being rights and liabilities of the bank. The off-balance sheet transactions will be booked in the balance sheet if the transactions already meet certain conditions. Undrawn or undisbursed loan facility, bank guarantee and derivative transaction are some off-balance sheet transactions.

In particular derivative transactions, in general Indonesian banks conduct derivative transactions for hedging purpose with relatively small volumes, it is different when compared to derivative transactions conducted by banks in developed countries in which the purpose is to generate fee-based income. In Indonesian banking sector, the off-balance sheet transactions are still dominated by transactions related to bank lending, such as undisbursed loan, bank guarantee and letter of credit (L/C). Given that the off-balance sheet transactions conducted by Indonesian banks are dominated by transactions related to bank lending, thus if an analysis of bank risks exploits the off-balance sheet data in order to measure the impact of derivative transactions or non-conventional banking activities on bank risks then the analysis is not correct.

Studies on behavior of banks in Indonesian banking sector as a theme are still rare. The behavior includes managing efficiency, exploiting competitive position and risk-taking decision. In addition, the studies on Indonesian banks that have been carried out still emphasizes on the use of the balance sheet data. We argue that bank behavior in managing efficiency, exploiting competitive position and risk-taking decision will affect bank performance, stability of banking system and also affect banking in promoting economic growth. The effect is of course positive in general and to a certain degree may turn into negative effect. Analysis of the behavior should take into account the off-balance sheet transactions booked in the commitment and contingency report. However, the use of off-balance sheet data is not intended to analyze the impact of derivative transactions or non-conventional banking activities conducted by banks on the behavior, but intended to capture additional input, output and risks that may affect measurement of efficiency, competitive position and bank soundness.

General Research Objective

The contribution of banking sector to promote economic growth is increasingly important on one side, and very serious negative impact on the economy if banking sector experiences a shock on the other side. Therefore, the study on banking is very important and should be intensified in order to complement previous results of the studies. In general, previous studies examined behavior of managing efficiency and exploiting competitive position which were associated with risk-taking decision separately. Until now still few studies examine the relationship between efficiency, competitive position and risk-taking decision in the context of Indonesian banking sector, and in the changing of business environment post the AFC by using transaction data booked in the balance sheet and the off-balance sheet.

This study aims to provide valuable input in the formulation of policies to continually strengthen the stability of Indonesian banking sector. This study will examine the relationship between managing efficiency, exploiting competitive position and risk-taking decision in the context of Indonesian banking sector during period 2002-2016 and evaluate the impact of the GFC that occurred in 2007/2008 on the efficiency. The results of this study will provide important information on banks' response to changes in the business environment with the enactment of a number of regulations and their response to the GFC by drawing lessons from defaulted banks due to the AFC. The relationship between efficiency, competitive position and risk-taking decision will be analyzed by taking into account relevant information related to macroeconomic data and bank specific data.

Research Questions

The consolidation policy implemented to respond the AFC have changed the business environment faced by banks. Changes in business environment will affect bank behavior in their efforts to realize its business targets, thus some questions require answers based on the results of this study concerning bank's behavior in managing efficiency, exploiting competitive position and risk-taking decision, as well as its impact on bank soundness in general:

1. Does consolidation policy that affects changes in the business environment has a positive impact such that level of efficiency of banks continues to show an increasing trend and not significantly affected by the GFC?
2. How does the pattern of relationship between level of efficiency and competitive position, is it a one way or two-way relationship, and does the relationship support quite-life hypothesis (QLH) or efficiency-structure hypothesis (ESH)?
3. Will stronger competitive position or higher level of efficiency lessen bank soundness?
4. Do off-balance sheet transactions significantly change the pattern of the relationship between level of efficiency and competitive position or alter their effect on bank soundness?

Specific Research Objectives

This dissertation consists of four essays with each essay has specific research objective (SRO) related to the answer of each research question:

SRO 1: Evaluate bank behavior in managing efficiency in the context of changes in business environment and the impact of the GFC on the efficiency level.

The condition of Indonesian banking prior to the AFC was vulnerable caused many banks operated with low level of capital hence could not absorb the risks and weakness in risk management. The condition caused a number of banks failed to meet their obligations or defaulted, such that their licenses were revoked by regulator. Revocation of licenses resulted in increasing public distrust to banking sector at that time. Post the AFC, regulator ran banking restructuring program followed by issuing a number of regulations and implementing *Arsitektur Perbankan Indonesia* (API) framework to increase public trust on banking sector. Restructuring program, issuing new regulations and implementation of the API aim to create a sound banking structure. The process of changing the banking structure will change business environment. Programs run and regulations issued certainly expected to have a positive impact on banks, including encouraging sustained efficiency improvement, enabling the bank to be more robust in facing any future disruption.

SRO 2: Evaluate relationship between level of efficiency and competitive position and examine whether banks support the QLH or the ESH.

Efficiency is one of the important components of concern to bank managers and included in annual business plan, in addition to other components. In general efficiency is understood as cost-effective and measured by ratio between operating cost and operating income. In essence, efficiency reflects the quality of managerial decision. Higher level of efficiency is of course the better which shows a bank has superiority in running its business operation than its rivals. In addition to efficiency, competitive position also shows the superiority of a bank. Competitive position reflects a position where a bank can take advantage of such position for its own benefit, for example in term of setting favorable pricing policy. Because of efficiency and competitive position indicate the superiority of a bank against its rivals, both should have a relationship. It may be that efficiency will strengthen competitive position or competitive position will provide an opportunity for efficiency improvement.

SRO 3: Evaluate the impact of competitive position or level of efficiency on bank soundness.

Soundness of a bank will be reflected in its aggressiveness in risk-taking decision. The more aggressive a bank in risk-taking means more risks that bank must manage. Additional risk occurs due to additional exposure in asset and liability. Efficiency and competitive position are fuel for banks to increase their risk exposures. A bank with high level of efficiency and better competition position has much energy to increase the risk exposure. If additional exposure can be controlled in the sense that additional risks can be well managed in a sustainable manner, then it will not jeopardize soundness of a bank and banking sector. Conversely, if additional risk exposure is out of control in the sense that additional risks cannot be well managed, then of course it will jeopardize the bank soundness. The most dangerous thing is a bank with low level of efficiency aggressively increase its risk exposure in assets and liabilities, such that beyond the limit of its ability to absorb the risks.

SRO 4: Evaluate the impact of the off-balance sheet transactions on the relationship between efficiency and competitive position, and the relationship between competitive position and risk-taking decision.

The off-balance sheet is an integral part of financial statements published by a bank. It contains administrative accounts and the accounts are classified into two groups: commitment account and contingency account. Commitment account consists of committed claim and committed obligation, while contingency account consists of contingent claim and contingent obligation. The committed obligation contains transactions between a bank and its customer whereby the bank will realize its promise when the customer has fulfilled the agreed terms. Meanwhile, contingent obligation contains transactions between a bank and its customer whereby the bank will realize its promise to appointed party when certain condition occurs on the customer, this transaction can be referred to as conditional transaction. When a bank realizes committed or contingent obligation, the transactions will be booked in the balance sheet, in the asset side, and the bank has a right to charge the customer to settle all of the outstanding, in accordance with the agreed terms. Due to some commitment and contingency accounts will be potentially booked in the balance sheet, hence the calculation of efficiency score, indicator of competitive position and bank soundness by using only transactions booked in on-balance sheet, without taking into account the transactions booked in the off-balance sheet may cause bias in estimation.

In summary, research questions, data requirements, methods and expected results for each SRO are presented in Table 1.3.

Table 1.3 Summary of each Specific Research Objective (SRO)

Specific Objective	Research Question	Data	Method	Expected Results
SRO 1	Does consolidation policy has a positive impact on the bank efficiency and the efficiency is not significantly affected by the GFC?	Credit, Securities, Third party funds, Interest expense, Personnel expense, Other expense	DEA, Convergence, PAM	Positive impact and not significantly affected by the GFC
SRO 2	Is efficiency-competitive position relationship a one way or two-way relationship? Does the relationship support the QLH or the ESH?	DEA efficiency score, Product price, Marginal cost, Profit, Market share.	Panel least square, Granger causality, Linear regression, Panel data dynamic model	A two-way relationship and support both hypotheses
SRO 3	Will stronger competitive position or higher level of efficiency lessen bank soundness?	DEA efficiency score, Lerner index, Market share, Loan growth, Asset composition, NSFR, Total asset, IDR exchange rate.	Panel data dynamic model	Directly lessen bank soundness
SRO 4	Do off-balance sheet transactions significantly change the pattern of the relationship between level of efficiency and	Off-balance sheet adjusted DEA efficiency score and Lerner index, Market share,	Panel data dynamic model	Change the pattern of the relationship or the effect.

Specific Objective	Research Question	Data	Method	Expected Results
	competitive position or alter their effect on bank soundness?	Loan growth, Asset composition, NSFR, Total asset, Rupiah exchange rate.		

Note:
DEA: Data Envelopment Analysis, NSFR: Net Stable Funding Ratio, PAM: Partially Adjustment Model, QLH: Quite Life Hypothesis, ESH: Efficient Structure Hypothesis, GFC: Global Financial Crisis. Panel data dynamic model will be estimated by Generalized Method of Moment (GMM)

Research Benefits

Knowledge of bank behavior related to managing efficiency, exploiting competitive position and risk-taking decision is very important. The knowledge is beneficial for banking sector development and maintaining the continuity of banking sector contribution to promote economic growth over time. As this study examines the relationship between efficiency, competitive position, risk-taking and its impact on the soundness of a bank and banking sector, a number of benefits will be derived from results of the study:

1. Understanding bank behavior in dealing with changing in business environment in the context of efficiency, competition and risk-taking that can be used as valuable input for policy formulation to maintain the stability of banking sector in the future, both macro-prudential policy and micro-prudential policy.
2. Encouraging the development of financial sector supported by sound banks.
3. Provide a foundation the need to take into account the transactions booked in the off-balance sheet in analyzing bank behavior in view of additional risks exposed to banks from the off-balance sheet transactions.
4. Enrichment the knowledge on banking industry by filling some gaps over the results of previous studies on Indonesian banking.

Research Coverage

With the intention that the analysis in this study become more focused, the coverage of the study is:

- This study is conducted in the context of Indonesian banking sector with period of analysis starting from 2002 to 2016 based on secondary data.
- Conventional foreign exchange banks are the object of this study by considering the dominance of these banks in Indonesian banking sector, in addition these banks are directly affected by changes in the global economic condition thru exchange rate fluctuation. Meanwhile, the sharia banking market share is still quite small about 5% of total assets of national banking sector.
- Differences in bank activities by business group or *bank umum kegiatan usaha* (BUKU) according to OJK criteria are not taken into account.

- The behavior under study is individual bank behavior such that the prediction of stability of banking sector is inferred from behavior of the banks.
- The measure of systemic risk and behavior of banks categorized as Domestic Systemically Important Bank (D-SIB) banks are not examined in this study.
- The impact of the existence of the Indonesia Deposit Insurance Corporation (LPS) on the behavior of banks is not examined in this study.
- Bank soundness assessment based on risk-based bank rating methodology according to OJK regulation is not fully covered in this study.

Novelties

This study has at least five novelties, as follows:

- Evaluation of the relationship between efficiency, competitive position and bank soundness by using direct measures on each bank based on quarterly data.
- Focused on foreign exchange commercial banks which consists of domestic systemically important banks (D-SIB) that accounts for more than 80% of banking total assets.
- Analyzing the impact of global financial crisis (GFC) on bank efficiency.
- Analyzing the impact of liquidity risk on bank soundness in the context of Basel III implementation.
- The use of the off-balance sheet transactions in evaluating the relationship between efficiency, competitive position and bank soundness or risk-taking.

2 THEORY

Efficiency

In general, efficiency means cost-effective in production process such that an efficient firm will get superior performance compared to its rivals. Cost-effective in a production process can be interpreted as maximizing quantity of product produced by using a given quantity of input or combination of inputs, in other way minimizing inputs or combination of inputs used to produce given quantity of product. Sometimes efficiency is not only associated with costs, but can also be associated with profit or revenue, such that the meaning of efficiency shifts to be maximizing the profit or revenue by producing product or combination of products at a given level of quantity. In banking studies, efficiency measurement is more focused on the cost-effective.

There are two commonly used approaches for measuring level of efficiency, namely parametric and non-parametric approach. Parametric approach is more rigid than non-parametric approach because it assumes a particular functional form that links between output and input, and also assumes a certain probability distribution for error component of the function. Meanwhile, the non-parametric approach does not assume both of them. Both approaches have the same principle