ABSTRACT
As a country hard-hit by the crisis, Indonesian banking industry underwent banking reform with changes in its bank ownership structures. The changes may have impacted the loan portfolio compositions of banks. However, there is no study to date that has empirically tested the impact of the ownership structures on loan portfolio composition and performance in Indonesia, albeit the facts that credit risk is a major bank risk.

The objective of this research is to examine the loan portfolio composition of Indonesian banks in the post crisis period and to determine whether bank ownership plays a role in the composition and performance of the portfolios. This study use secondary data from the Indonesian Banking Directory of the Indonesian Central Bank and all commercial bank annual reports provided by Infobank magazine. The research sample consists of 109 commercial banks in the year 2011. The data is analysed using multiple regression methods. It is envisaged that the research will give insight on how different bank ownership types select their loan portfolio strategies when composing their loan portfolios.

Key words: banks, loan portfolio composition, performance, bank ownership types, Indonesia

1 BACKGROUND

Banks perform many roles in the economy. Basically, banks act as intermediaries between savers and borrowers (Patrick, 2001). Other roles performed by banks are providing funds to firms, facilitating the payment system, underwriting securities, ameliorating the asymmetric information problem, providing inter-temporal smoothing of risks and finally contributing to the economic growth (Tandelilin et al., 2007, Allen and Carletti, 2008). However, the excessive risk taking of banks affects economic fragility, business-sector fluctuation and economic growth (Laeven and Levine, 2009).

For Indonesia, the collapse of its banking system during the Asian financial crisis has been devastating (Batunanggar, 2002). According to Pangestu (2003), the crisis was largely caused by weak domestic economic and financial structures, which implied weaknesses in the corporate governance of the underlying banks. Alijoyo et al. (2004), mentions that the two major corporate governance problems in the banking sector were the weak supervision from the central bank and the violations of banking regulations by the banks.

The financial crises led to a massive bank restructuring with the assistance of the International Monetary Fund and the World Bank. The restructuring consisted of the closing down of insolvent institutions, providing overdraft facilities as liquidity support for commercial banks, the establishment of the Indonesian Bank Restructuring Agency (IBRA), merging and privatisation of state-owned banks, relaxation of limitations on private ownership of banks, and external auditing by overseas auditors (Harada and Ito, 2006, Hadad et al., 2011). As a result, the number of commercial banks in Indonesia reduced from 229 before the crises to 152 in 1999, and continued to decrease to 120 banks in December 2011 (Kameyama et al., 2005). The declining trend in the number of commercial banks over the period of 1996-2011 is reflected in the figure 1.1 below:

Figure1.1: Number of Indonesian Commercial Banks: 1996-2011

Source: www.bi.go.id

1 The author would like to thank Indonesian government for providing the DIKTI scholarship to undertake PhD program.
The massive restructuring of the Indonesian banking industry not only reduced the number of banks but also changed bank-ownership structures since government ownership decreased and private ownership (mostly foreign) increased. After privatisation of government-owned banks, the market share of remaining government-owned banks decreased to 36.4 percent in December 2011 from 45 percent in December 2003 (Indonesian Banking Statistics, 2003 and 2011). Foreign bank market share increased especially after the abolition of foreign bank branch limits and relaxation of ownership limits that occurred in 1999 through the enactment of Bank Law (BL) 10/1998. The relaxation of limitations enabled foreign investors to obtain ownership in Indonesian banks of up to 99 percent, either through the capital market or by ways of mergers and acquisitions. The formerly called private domestic banks which were to be nationalised by the government under the Indonesian Bank Restructuring Agency (IBRA) had the ownership transferred to foreigners because many Indonesian banks were not financially able to participate in their recapitalisation program. As such, the ownership share of foreign investors in the Indonesian banking sector increased, as can be seen in figure 1.2 and 1.3 below.

Figure 1.2 Total Assets of Different Bank Ownership Types: 1999 and 2007

Source: Prastomiyono, 2008

The figure shows that over the period 1999-2007, the total assets of foreign banks and joint venture banks have increased tremendously, Regional Development banks also showed a similar trend, but their asset growth was far less than that of the former group. On the contrary, private domestic and government-owned banks experienced a decline in total assets, with a significant decrease in the case of private banks. It indicates the transition of market share from the private domestic and government-owned banks to foreign and joint venture banks. It implies the bigger role played by foreign and joint venture banks in the Indonesian banking industry. Loan disbursements, as measured by total loans in figure 1.3, provides similar information.

Figure 1.3 Total Loans of Different Bank Ownership Types: 1999 and 2007

Source: Prastomiyono, 2008

The nationalisation of banks after the Asian Financial Crisis was an intense restructuring effort undertaken by the government. The de-liberalisation of the banking sector was not limited to bank consolidation, but also included numerous prudential policies. Limitations instituted on bank lending exposures to single borrowers, borrower groups and related parties, known as legal lending limits are some of the prudential policies imposed by Bank Indonesia to manage bank concentration risk in lending. The latest regulation (PBI No 8/13/PBI/2006) sets 20 percent of bank capital as a maximum threshold for exposure to non-related single borrowers, 25 percent for non-related group borrowers and 10 percent for related party borrowers. This forms part of the new banking architecture which was designed to enhance financial stability and contains prudential regulations to limit the risky lending practices while at the same time fostering the implementation of good bank governance.

The increasing role performed by foreign and private-domestic banks in the Indonesian banking industry in the post crisis, together with the prudential regulations introduced by Bank Indonesia for lending practice could have made definite differences to loan portfolio compositions of different bank ownership types.

Consists of locally owned subsidiaries, joint venture banks and foreign bank branches
As intermediary institutions, banks play an important role in providing funds to borrowers. Bank ownership types have affect bank loan portfolios since it may imply a focus on different customer types. This is confirmed by De-Haas et al. (2010) that bank loan portfolios are determined by bank characteristics such as ownership and size. According to Berger et al. (2005a), loan portfolio composition changes can be associated with ownership changes. As indicated by Laeven and Levine (2009), the extent of bank loan portfolio risk taking has to be linked with the ownership structure of a bank.

Based on the aforementioned statements of researchers about the relationship between loan portfolio composition and bank ownership, it is assumed that the major reform in the banking sector that consisted of changes in bank ownership structures may have resulted in substantial changes to loan portfolio compositions of banks. However, there is no study to date that has empirically tested the impact of the ownership structures on loan portfolio composition in Indonesia albeit the fact that loan risk is a major bank risk (Hammes and Shapiro, 2001). Although Micco and Panizza (2006) have done a comprehensive study regarding the ownership impact on performance, they did not consider the role of loan portfolio compositions. This research expands the study of the ownership impact on bank performance by incorporating loan portfolios. It aims to examine the loan portfolio composition of Indonesian banks and determine whether government-, domestic-, and foreign-owned banks differ in terms of loan portfolio composition, risk and return. Accordingly, this research contributes to the academic literature by using bank-level information about loan portfolio composition, risk and performance, and relates it to bank ownership structures.

The findings show that loan portfolios of government-owned banks are more concentrated on sectors not directly related to economic development, such as consumption, whereas domestic and foreign-owned banks have more diversified loan portfolios. Domestic-owned banks are mostly involved in lending to enterprises in trade, hotels and restaurants. Foreign-owned banks are the major player in lending to business services and several other sectors such as manufacturing. Differences in the loan portfolio composition and concentration risk of government-, domestic- and foreign-owned banks result in different loan portfolio returns. Government-owned banks show the highest loan portfolio return compared to the other bank ownership types. Focusing on segments with low intrinsic risk provides government-owned banks with a better return. The findings support the corporate finance theory according to which banks should implement focus strategies to reduce agency problems and exploit their management expertise in certain sectors. Their findings do not support the traditional banking and portfolio theory according to which banks should diversify their loan portfolio to reduce risk (Hayden et al., 2006).

2 LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Different bank ownership types may focus on different borrower types, as reflected in their loan portfolio compositions (De-Haas et al., 2010). The different loan portfolio compositions result from inter alia differences in organisational structure, access to liquidity, exposure to asymmetric information (Degryse et al., 2012), motives, technology and innovation capability (Berger et al., 2005a).

The composition of loan portfolios reflects to what extent banks apply focus or diversification strategies. The diversification strategy is based on the modern portfolio theory of Markowitz (1952), and largely followed by experts in financial institutions (Winton, 1999). According to idiosyncratic risk hypothesis, diversification eliminate the specific (idiosyncratic) risk which enable banks to reduce their monitoring efforts and therefore lowering their operating costs, which ceteris paribus should lead to higher cost efficiency (Rossi et al., 2009). Furthermore, the benefit of diversification stems from employing economies of scope across different categories such as economic sectors and geographical areas (Laeven and Levine, 2007). Numerous benefits and costs of diversification were identified as indicated in Attachment1.

Although the authors did not have similar research objectives regarding diversification, Attachment 1 shows that most of them indicate risk reduction as the benefit of diversification and agency problems as the associated cost. However, many researchers found that diversification do not always result in reducing risks and improving return. It increases the risk in the Brazil and Italian banking sectors and reduces the performance of the banks in China, Germany and small European countries (Tabak et al., 2011).

Some governing rules like the legal lending limits that are placed on banks by the central banks are diversification favourable, whilst other regulations regarding branching, entry, and asset investment restrictions often encourage focus strategies (Berger et al., 2010). However, the existence of regulatory guidelines instigating

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3 The construction should take into account some factors such as asset mix, loan types, diversification, geographic limits, expertise, policy formulation and environmental issues. (SATHYE, M., BARTLE, J., VINCENT, M. & BOFFEY, R. 2003. Credit Analysis and Lending Management. Australia: John Wiley & Sons)

4 Among others are Winton (1999), Acharya (2002), and Hayden (2006)
diversification that result in a large number of individual clients and industries may increase monitoring cost and reduce cost efficiency (Rossi et al., 2009). Furthermore, due to the fact that managers are risk averse, they may incur additional cost in search for high quality loans to apply diversification. Those factors may reduce diversification risk-return effectiveness.

A focus strategy opposed to a loan portfolio diversification strategy, suggests concentration on specific segments where a bank has superior knowledge and monitoring ability. Focusing on a specific segment is effective when banks face information asymmetry (Acharya et al., 2002), Kamp et al. (2005), Berger et al. (2010), Tabak et al. (2011)). Due to different degrees of asymmetric information about borrowers, the composition of bank loans across sectors may differ (Dell'Ariccia and Marquez, 2004). Re-allocation of loans (commonly known as flight to captivity5), to sectors where greater adverse selection problems exist may happen when banks face mere intrinsic overall competition from other outside lenders entering the market. It means that more lenders may attract borrowers in sectors subject to low information asymmetries. The existing informed lenders may have to deal with more captured (but also higher risk) borrowers in sectors not previously forming part of their market (Dell'Ariccia and Marquez, 2004).

Degryse et al. (2012) found the differences in loan portfolio composition of different bank ownership types based on data from 110 Polish banks. Their findings show that foreign banks charge lower lending rates and have lower interest spreads. The lending rate difference is caused by their loan portfolio composition relating to differences in transparent, short-term and foreign-exchange borrowers.

Using ordinary least square regression, De-Haas et al. (2010) confirmed differences in the loan portfolio composition of bank ownership types by their research of 220 banks in 20 transition countries. They used several loan type variables such as mortgages and other consumer lending; small and medium enterprises; lending to large entrepreneurs; and lending to state-owned entrepreneurs. The results show that State-owned banks still lend more to state-owned enterprises than domestic and foreign banks. Foreign banks focus on mortgage lending and lending to subsidiaries of international firms, but their focus on foreign clients is limited to the corporate segment. The research did not include economic sector category analysis, but this may be due to the inexistence of micro-level data to conduct such analysis. Also, other previous research about loan portfolio composition using economic sector categories and bank ownership types, could not be retrieved.

Research that only considered loan portfolio composition, generally examined the effect of diversification on bank return and risk.6 Unlike loan portfolio composition, research about concentration risk is limited. Düllmann and Masschelein (2006), Dietsch and Petey (2009), and Bandyopadhyay (2010) are among the few authors who measured the impact of concentration risk on bank capital. Düllmann and Masschelein (2006) examined the relationship between business-sector concentration and economic capital for loan portfolios. Dietsch and Petey (2009) focused on the measurement of risk under Pilar 2 of the Basel II regulation. They extended a one factor credit default model to measure the concentration potential within large portfolios of small and medium businesses. Bandyopadhyay (2010) demonstrated that the regional, industry and individual loan portfolio concentration may be assessed using the economic capital approach.

Researchers such as Berger et al. (2005a) and Iannotta et al. (2007) investigated banks performance difference between bank ownership types. Their unit of analysis was bank performance although loan portfolio performance formed part of it. Berger et al. (2005a) used portfolio reallocations after changes in bank ownership types to test the significance thereof. The findings indicate that the performance of government-owned banks that were privatised are better in terms of capital allocation efficiency since more credit is provided to industries that contribute more to the GDP. Iannotta et al. (2007) investigated the performance and risk of European banks with different bank ownership structures. They found significant differences in the performance and risk of different ownership types. Private banks appear to be more profitable than both mutual and public sector banks with higher profit from net returns on their earning assets. On the risk side, public sector banks have poorer loan quality and higher insolvency risk than other types of banks, while mutual banks have better loan quality and lower asset risk than both private and public sector banks.

The significant characteristic differences between the major bank ownership types (government-, domestic-, and foreign-owned banks) based on research findings are summarised in Attachment 2. In this regard it is evident that many research findings indicate that:

5 Flight to captivity implies that banks re-allocate their portfolio towards more captive borrowers when shocks to their balance sheet, or from their competitive environment, force them to alter their lending patterns.
6 Among others are: Rossi et al. (2009), Tabak et al. (2011), Kamp et al. (2005), Langrin and Roach (2009), Kamp et al. (2007), Mencia (2012), Acharya et al. (2002), Hayden et al. (2006). For details, see Table 2.4.
a) Government-owned banks apply low credit availability due to connected lending; provide loans that the private sector would not grant; have high risk exposure due to its Non Performing Loans (NPLs); and show low profit and cost efficiency, have different loan portfolio composition and performance compared to that of other types of ownership.

b) Domestic-owned banks apply more aggressive lending and have higher portfolio risks than foreign banks; have limited access to external liquidity; but better local market knowledge.

c) Foreign-owned banks apply better credit availability due to less connected lending, and advanced risk management technology and superior access to capital markets and technologies; may result in different composition and performance.

In view of the performance related characteristics of the different bank ownership types, it is hypothesized that there exists loan portfolio composition and risk differences among different types of bank ownership. As a result their performance may also differ.

3 RESEARCH METHOD

3.1 Sample, Types and Sources of Data

The sample for this research consists of 109 commercial banks in Indonesia for the year 2011. The population is 120 commercial banks that were actively operating in that year. By design, 11 Islamic commercial banks are excluded from the sample due to different accounting/financial reporting standards compared to that of the conventional banks.

This research uses secondary data from The Indonesian Central Bank Library, Infobank magazine and the library of The Indonesian Banking Development Institute (LPPI). The central bank library provides individual bank ownership data and financial statements whereas Infobank magazine supply notes of financial statements for each individual bank from which information regarding loan allocation, based on loan types and economic sectors, can be retrieved. The data regarding the comparative exposures of individual Indonesian banks to all the different economic sectors and different finance types will make the results more accurate in comparison to other studies about this topic. Finally, LPPI supplement the loan allocation data which are not provided by Infobank magazine.

3.2 Variable Definition and Measurement

The dependent variable in this research is loan portfolio return as measured by the ratio of net interest income to total loans. There are three independent variables in this research: bank ownership types, concentration risk and intrinsic risk. For analysis purposes banks are categorised into three types of ownership (government, domestic and foreign) according to the criteria of Mian (2003) and Magalhaes et al. (2010), by first calculating the total ownership percentage of government-, foreign- and domestic-owners for each bank. This research uses 20% threshold which is consistent with the previous research conducted by La-Porta et al. (2002), Dinc (2005), Haw et al. (2010) and Taboada (2011). This research uses two dummy variables to identify the three types of bank ownership. Table 3.1 shows the detail of these dummy variables (government-owned banks are treated as the omitted variable).

Table 3.1 Dummy Variables of Bank Ownership Types

| Dummy Variables | Bank Ownership Types |
|-----------------|----------------------|
| D1              | 1=Domestic-owned Banks; 0=Others |
| D2              | 1=Foreign-owned Banks; 0=Others |

The concentration risk is measured using a Hirschman Herfindahl Index (HHI) as done by Winton (1999), Acharya et al. (2002) and Hayden et al. (2006). For this research, there will be two types of HHI’s, namely Economic Sector7 HHI (E-HHI) and Loan Type HHI (T-HHI). Loan concentration means high exposure to one or a few of these sectors, whilst diversification means a more equal loan portfolio distribution (Tabak et al., 2011). The intrinsic risk is measured by using the ratio of non-performing loans (NPLs) to total loans. Bank size in addition to bank ownership is used as a control variable and is expressed as the logarithm of total assets. Attachment 3 reflects all the variables, their definitions and how they are measured.

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7 The Indonesian economic sectors to which banks can lend are equal to 10 according to central bank classification as follows: Agriculture, hunting and agricultural facilities; Mining; Manufacturing; Electricity gas and water; Construction; Trade, restaurants and hotels; Transportation, warehousing and communications; Business Services; Social Services; Others. The loan types are equal to three, namely: working capital, investment, and consumption.
3.3 Method of Analysis

This research is based on quantitative data analysis since it deals with numerical data with ratio data types. The descriptive statistics of the variables: mean, median, maximum, minimum and standard deviation are calculated to obtain a brief understanding of data tendency and deviations. To determine the impact of different ownership types on the composition, risk and performance, this research employs multiple regressions, with the equation in attachment 4.

4 RESULT AND DISCUSSIONS

Prior to analyzing the data, the test of classical assumptions: normality, linearity, homoscedasticity and multicollinearity was conducted since the usage of multiple regressions requires several assumptions (attached are the SPSS results). The testing of normality, linearity and homoscedasticity assumptions were done by examining the residual scatterplots (Tabachnick and Fidell, 2007). The results showed the assumptions of normality, linearity and homoscedasticity are satisfactory. The same result was found for multicollinearity. Based on the results, it could be concluded that the regression model used in this research satisfied the underlying assumptions.

4.1 Descriptive Statistics

Table 4.1 contains the summary statistics of the variables in the model. The first part presents the descriptive statistics regarding loan allocation based on economic sectors and loan types. The variation for loans allocated to each sector is higher than that for loan types. The deviation between the mean and median for loan allocation to each sector is also higher than that of loan types. Observing the skewness statistics and standard error provides evidence of the skewness in the distribution of loans allocated to each sector and type of finance. Only loans allocated as working capital show normal distribution since the skewness falls within the range between -2 and +2. The positive skewness for all variables indicate the tendency of scores to be clustered to the left – representing low values. On the other hand, the majority positive kurtosis statistics indicate that some distributions are relatively peak (clustered in the centre). The non-normal distribution due to positive skewness for loan allocation to each sector and type of finance indicates the need for transformation. Therefore those values were all transformed to natural logarithm (ln) as the appropriate methods for the positively skewed distribution (Tabachnick and Fidell, 2007). The values of other variables (concentration risk, intrinsic risk, and return) were not transformed since the residual scatterplot of regression involving these variables indicate a normal distribution.

Table 4.1 Descriptive Statistics of Research Variables

| Variables                                      | Aggregate Sample (N=109) | Skewness | Kurtosis |
|-----------------------------------------------|--------------------------|----------|----------|
|                                               | Min  | Max  | Median  | Mean  | Std. Dev | Stat. | Std. Error | Stat. | Std. Error |
| I. COMPOSITION of LOAN PORTFOLIOS             |      |      |         |       |          |       |            |       |            |
| • Based on Economic Sectors:                  |      |      |         |       |          |       |            |       |            |
| 1. Agriculture                                | 0.918| 0.111| 0.401   | 0.991| 6.903    | 0.231 | 58.147     | 0.459 |            |
| 2. Mining                                     | 0.197| 0.002| 0.196   | 0.033| 2.470    | 0.231 | 8.092      | 0.459 |            |
| 3. Manufacture                                | 0.981| 0.010| 0.153   | 0.177| 2.054    | 0.231 | 5.413      | 0.459 |            |
| 4. Electricity, Gas and Water                 | 0.470| 0.001| 0.012   | 0.048| 8.242    | 0.231 | 76.166     | 0.459 |            |
| 5. Construction                               | 0.441| 0.026| 0.047   | 0.065| 2.953    | 0.231 | 12.283     | 0.459 |            |
| 6. Trade, hotel and restaurants               | 0.696| 0.167| 0.198   | 0.156| 1.021    | 0.231 | 0.636      | 0.459 |            |
| 7. Transportation and Communication           | 0.297| 0.017| 0.037   | 0.052| 2.499    | 0.231 | 8.003      | 0.459 |            |
| 8. Business Services                          | 0.471| 0.055| 0.091   | 0.106| 1.594    | 0.231 | 2.425      | 0.459 |            |
| 9. Social Services                            | 0.979| 0.006| 0.030   | 0.101| 8.072    | 0.231 | 73.078     | 0.459 |            |
| 10. Others                                    | 0    | 1    | 0.334   | 0.371| 0.301    | 0.231 | -0.986     | 0.459 |            |
| • Based on Loan Types:                        |      |      |         |       |          |       |            |       |            |
| 1. Working Capital                            | 0.998| 0.495| 0.477   | 0.291| 0.06     | 0.231 | -1.073     | 0.459 |            |
| 2. Investment                                 | 0.996| 0.177| 0.194   | 0.168| 1.484    | 0.231 | 4.306      | 0.459 |            |
| 3. Consumption                                | 0    | 1    | 0.254   | 0.329| 0.314    | 0.231 | -0.807     | 0.459 |            |

*The normality assumption is satisfied since the residual scatterplot reveals a pileup of residuals in the centre of the plot at each value of predicted score and a normal distribution of residual trailing off symmetrically from the centre, the linearity assumption also satisfied since the overall shape of the scatterplot is rectangular, the heteroscedasticity assumption is satisfied since the residual scatterplot do not form a pattern, but randomly distributed, multicollinearity assumption is satisfied since VIF value less than 10 and the corresponding tolerance value more than 0.1
By analyzing the mean and the standard deviation of HHI as concentration measure, it can be seen that loan portfolios based on economic sectors are less diversified than portfolios based on loan types. It implies more diversified loan portfolios in terms of economic sectors rather than loan types. However, both measures show that overall the Indonesian bank loan portfolios seem to be moderately concentrated. This is similar with the case of Brazilian banks which also falls in the range of moderate HHI with HHI 0.316 and only more diversified than Argentina with HHI 0.55 (Tabak et al., 2011).

Table 4.2 shows that government-owned banks have the highest concentration risk based on sectors, however they have the lowest intrinsic risk and highest return. As stated by Deutsche Bundesbank (2006), focusing on specific segments may create concentration risk but as long as the targeted sector consists of high quality borrowers with low intrinsic risk, it may result in high return. As government-owned banks focus on consumer loans with direct salary deduction, the associated intrinsic risk is low. Consumer loans provide government-owned banks with high return since the interest rate earned from this segment is high compared to that of other types of financing. Based on data from Indonesian Statistics Bureau (www.bps.go.id), the average consumer loan interest rate is approximately 1.5-2% higher than that of other types of financing. Moreover, since managers of government banks are mostly government bureaucrats, their risk averse profile may affect their decision to focus on specific segments since applying diversification will incur additional cost for searching high quality borrowers in other segments (Rossi et al., 2009).

Table 4.2 Descriptive Statistics of Research Variables By Types of Bank Ownership

| Variables | Government Banks (N=30) | Domestic Banks (N=42) | Foreign Banks (N=37) |
|-----------|------------------------|-----------------------|----------------------|
|           | Mean | Std. Dev | Mean | Std. Dev | Mean | Std. Dev |
| I. COMPOSITION of LOAN PORTFOLIOS | | | | | |
| • Based on Economic Sectors: | | | | | |
| 1. Agriculture | 0.670 | 0.165 | 0.028 | 0.059 | 0.033 | 0.054 |
| 2. Mining | 0.008 | 0.018 | 0.016 | 0.025 | 0.033 | 0.043 |
| 3. Manufacture | 0.026 | 0.049 | 0.117 | 0.090 | 0.298 | 0.217 |
| 4. Electricity, Gas and Water | 0.011 | 0.015 | 0.009 | 0.028 | 0.016 | 0.077 |
| 5. Construction | 0.044 | 0.045 | 0.070 | 0.088 | 0.024 | 0.037 |
| 6. Trade, hotel and restaurants | 0.106 | 0.080 | 0.275 | 0.175 | 0.185 | 0.138 |
| 7. Transportation and Communication | 0.017 | 0.031 | 0.053 | 0.063 | 0.036 | 0.045 |
| 8. Business Services | 0.030 | 0.034 | 0.109 | 0.107 | 0.120 | 0.125 |
| 9. Social Services | 0.013 | 0.016 | 0.043 | 0.150 | 0.028 | 0.067 |
| 10. Others | 0.677 | 0.247 | 0.278 | 0.226 | 0.228 | 0.234 |
| • Based on Loan Types: | | | | | |
| 1. Working Capital | 0.185 | 0.157 | 0.522 | 0.222 | 0.662 | 0.262 |
| 2. Investment | 0.123 | 0.124 | 0.248 | 0.162 | 0.190 | 0.187 |
| 3. Consumption | 0.692 | 0.236 | 0.230 | 0.207 | 0.148 | 0.215 |
| II. RISKS | | | | | |
| • Concentration Risks (CONRISK) | | | | | |
| 1. By Economic Sector (EHHI) | 0.577 | 0.243 | 0.327 | 0.166 | 0.345 | 0.187 |
| 2. By Loan Types (THHI) | 0.521 | 0.220 | 0.459 | 0.147 | 0.618 | 0.255 |
| • Intrinsic Risks (ITRISK) | 0.653 | 0.829 | 1.183 | 1.190 | 0.934 | 0.980 |
| III. RETURN (RETR) | | | | | |
| • Net Interest Income Ratio | 0.108 | 0.037 | 0.075 | 0.036 | 0.070 | 0.033 |
| IV. CONTROL | | | | | |
| • Total Assets (Ln TA) | 16.354 | 1.518 | 14.997 | 1.781 | 16.263 | 1.488 |

4.2 Loan Portfolio Composition of Different Bank Ownership Types

In terms of loan allocation, government-owned banks are the major players in allocating loans to agriculture and unspecified others (last category of the economic sectors that primarily refers to consumers). Domestic-owned
banks are, on the other hand, the major players in financing of the trade, hotel and restaurant sector although they also focus on the unspecified sector (primarily consumers) similar to the government-owned banks. The financing of the trade, hotel and restaurant sector is not surprising since as local players, domestic-owned banks may target the local businesses because they may have soft-information advantage. Mian (2003) referring to Stein (2002) states that domestic-owned banks are able to lead to “soft information firms” (firms with lack of credible and verifiable information that cannot be easily publicly verified by a third party). Since domestic-owned banks possess flatter organizations (close distance between local managers and top managers). By doing so, greater discretion is allowed to local managers in executing loan decisions based on soft information. Finally, foreign-owned banks are targeting the business sector and also the unspecified other sector (primarily consumers) due to their superiority in technology, risk management, better access to capital market and experience in their home country. According to Berger et al. (2005a), foreign banks possess superior ability in risk management, technology (mostly in collecting and assessing hard information) and innovation. In addition, foreign banks serve customers in the host country by relying on their home country experience in the retail market (De-Haas et al., 2010). They possess better access to capital markets (Berger et al., 2005a) and external liquidity from their parent banks, compared to domestic banks (Mian, 2003). In terms of size, government and foreign-owned banks are relatively similar in size whereas domestic-owned bank are on average smaller.

Table 4.3 Relationship between Loan Portfolio Composition by Economic Sector and Bank Ownership Types

| Variables          | 1#     | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      |
|--------------------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Constant           | -8.341 | -11.697** | -8.470** | -9.327** | -4.052** | -2.246** | -10.279** | -9.315** | -5.848** | -2.541** |
| Own_Dummy1         | -0.159 | 3.267**  | 2.644**  | 0.377   | 0.464   | 0.969**  | 2.776**  | 2.752**  | 1.196**  | -1.032** |
| Own_Dummy2         | -0.075 | 3.556**  | 3.570**  | 0.037   | 0.130   | 0.840**  | 2.492**  | 2.685**  | 1.454**  | -1.708** |
| Ln TA              | 0.278** | 0.284**  | 0.216**  | 0.253   | 0.011   | -0.026** | 0.267**  | 0.279**  | 0.051**  | 0.122   |
| No of banks        | 109    | 109     | 109     | 109     | 109     | 109     | 109     | 109     | 109     | 109     |
| R2                 | 0.08   | 0.537   | 0.565   | 0.048   | 0.016   | 0.135   | 0.374   | 0.403   | 0.167   | 0.253   |
| F test             | 2.592* | 26.240** | 44.120** | 0.865   | 0.495   | 5.319** | 17.532** | 19.354** | 4.269**  | 11.855** |

# : The name of the corresponding number of economic sector refers to the previous explanation (see: footnote 6)
** : significant at α= 5%; *: significant at α= 10%

Table 4.3 shows the empirical result of equation (1): the different loan allocation focus of different bank ownership types. It is evident that government-owned banks are significantly more involved in lending to the last economic sector (others). Government-owned banks have also been more actively involved in lending to the agriculture sector, however the relationship is not significant. In fact, agriculture is the only sector where the loan exposure of the government-owned banks is not significant. In all the other sectors, the government-owned banks loan exposure are significant although the focus on these areas are comparatively small compared to the loan exposure of these banks to loans for the agricultural and unspecified (consumer) sectors. The loan exposure of domestic banks to both sectors identified in table 4.3 (trade, hotels and restaurants as well as the unspecified (consumer) sector) is significant in terms of table 4.4. The foreign-owned banks loan exposures to the manufacturing and the unspecified (consumer) sector in table 4.3 are also both significant in terms of table 4.4. The insufficiency of three sectors in terms of loan exposures for domestic and foreign banks compared with only one sector for the government-owned banks combined with the EHHI concentration risk levels confirm the fact that although the loan exposure of government-owned banks are significantly distributed amongst more sectors than in the case of domestic and foreign banks, such distribution is comparatively extremely low compared to the sectors where concentration occurs. Thus although domestic-owned and foreign-owned banks have significant loan exposures to less sectors than the government-owned banks, they are more diversified due to higher average loan exposures to the sectors that are significant in comparison to the sectors where they have levels of concentration.

It is interesting to note that government-owned banks do not have large loan exposures in sectors like electricity, gas and water; mining; transport and communication; and social services that may have large impact on country’s economic development. This findings do not line up with the social theory that government-owned banks are the agent of development. The requirement of some government-owned banks to operate as profit maximisation institutions as stated in Banking Law 1992 may contribute to this. Moreover, as the big four government-owned banks are publicly listed companies, they have to maximise their shareholder wealth. Table 4.4 confirms of the concentration risk in unspecified other (consumer) sector finance by government-owned banks since they are actively involved in consumption rather than working capital and investment types of finance. On the other hand, the domestic-owned banks and foreign-owned banks have more working capital loan exposures when considering the average in table 4.4 (0.522 and 0.662, respectively) combined with the significance indicators in table 4.4.

Table 4.4 Relationship between Loan Portfolio Composition by Loan Types and Bank Ownership Types
The s. Based on the s relating to s do fault/intrinsic risk due to a higher monitoring efficiency and ents are significant at $\alpha=5\%$.

However, there are significant negative relationship k ownership type -er which diversification may increase risk because of more diversified loan portfolios better individual loan’s quality. more concentrated loan portfolios) may reduce de

This findings is consistent with the findings of Tabak et al. (2011) but contradicts with the ideas of Diamond (1984).As already pointed out by Rossi et al. (2009), focusing on certain market segment (a more concentrated loan portfolios) may reduce default/intrinsic risk due to a higher monitoring efficiency and better individual loan’s quality. The comparative higher risk experienced by domestic-and foreign-owned banks with more diversified loan portfolios is supported the explanation by Acharya et al. (2002) that increasing diversification may increase risk because of lower monitoring efficiencies and competition with other banks which may lead to adverse selection problems, and scale inefficiencies.

### 4.3 Loan Portfolio Performance (Risk and Return) of Different Bank Ownership Types

Table 4.5 presents the results of the ordinary least square estimation of equation (2) and (3). The estimated coefficients of the ownership economic sector and loan type concentration risks, are all significant (column 2 and 4). These results give evidence that bank ownership types influence concentration risk. Based on the sign of the coefficients, it is clear that domestic- and foreign-owned banks have less concentrated loan portfolios relating to economic sectors than government-owned banks. However, based on loan types, foreign-owned banks tend to be more concentrated than other types of bank ownership. This is supported by the findings regarding the high mean exposure of 0.618 exposure of foreign banks in Table 4.2. On the other hand, the coefficient of bank size as the control variable is negative and significant. It means larger banks tend to have a more diversified loan portfolios than smaller banks.

Table 4.5 Relationship between Bank Ownership Types and Risk (Concentration and Intrinsic)

| VARIABLES  | CONCENTRATION RISK | INTRINSIC RISK |
|------------|--------------------|----------------|
|            | EHHI               | THHI           | NPL (Economic Sector) | NPL (Loan Types) |
|            | Coef.   t-value   | Coef.   t-value | Coef.   t-value | Coef.   t-value |
| Constant   | 1.347** 7.392   | 1.413** 7.423  | 2.703** 2.162 | 3.141** 2.546 |
| OWN_D1     | -0.314** -6.830 | -0.136** -2.826 | 0.107 0.349 | 0.296 1.132 |
| OWN_D2     | -0.236** -5.281 | 0.092* 1.974  | -0.016 -0.057 | 0.418 1.671 |
| EHII       | -1.249** -2.301 |                   | -1.501** -2.930 |
| THHI       |                   |                |                   |
| NPL        |                   |                |                   |
| LN TA      | -0.047** -4.296 | -0.055** -4.766 | -0.081 -1.230 | -0.104 -1.575 |
| No of banks| 109               | 109            | 109               | 109               |
| R²         | 0.352             | 0.258          | 0.090             | 0.116             |
| F test     | 18.995**          | 12.188**       | 2.560**           | 3.420**           |

**: significant at $\alpha=5\%$; *: significant at $\alpha=10\%$

Unlike concentration risk, bank ownership types do not show significant relationship with intrinsic risk. The coefficients are positive (meanings that domestic-and foreign-owned banks experience higher intrinsic risk than government banks) but they are not significant. However, there are significant negative relationships between both EHII and THHI concentration risk and intrinsic risk. The coefficients are significant at $\alpha=5\%$. It means that banks with higher economic sector and loan type concentration risks experience lower intrinsic risk as measured by NPLs. This findings is consistent with the findings of Tabak et al. (2011) but contradicts with the ideas of Diamond (1984). As already pointed out by Rossi et al. (2009), focusing on certain market segment (a more concentrated loan portfolios) may reduce default/intrinsic risk due to a higher monitoring efficiency and better individual loan’s quality. The comparative higher risk experienced by domestic-and foreign-owned banks with more diversified loan portfolios is supported the explanation by Acharya et al. (2002) that increasing diversification may increase risk because of lower monitoring efficiencies and competition with other banks which may lead to adverse selection problems, and scale inefficiencies.
Table 4.6 Relationship between Bank Ownership Types, Risks and Return

| VARIABLES          | DEPENDENT VARIABLES |   |   |   |   |   |   |
|--------------------|---------------------|---|---|---|---|---|---|
|                    | Constant           | OWN_D1 | OWN_D2 | EHHI | THHII | NPL | LN TA | No of banks | R²  | F test |
|                    | Coef.              | 0.204** | -0.040** | 0.011 | 0.003 | -0.006** | 0.257 | 109 | 7.126** |
|                    | t-value            | 4.715 | -3.883 | -3.873 | 0.759 | -2.809 | 0.05 | 109 | 7.105** |
|                    | Coef.              | 0.233** | -0.045** | -0.038** | 0.002 | -0.007** | 0.256 |   |   |
|                    | t-value            | 5.334 | -4.947 | -4.391 | 0.479 | -3.206 |  |   |   |

**x**: significant at α= 5%

Table 4.6 presents the results of the ordinary least square for equation (4) to check the effect of bank ownership types and loan portfolio risk on loan portfolio returns. Based on the table, bank ownership types and size significantly affect loan portfolio returns, as measured by net interest income. The negative coefficients of the bank ownership dummy regressors show that domestic- and foreign-owned banks have smaller returns compared to government-owned banks. This finding contradicts Iannotta et al. (2007) and other literature that find that government-owned banks under-perform compared to other bank ownership types (LaPorta, 2002), Barth et al. (2004), Mian (2003), Beck et al. (2004), Sapienza (2004), Berger et al. (2005a), Dinc (2005), Micco and Panizza (2006), and Taboada (2011). However, it should be noted that previous research use bank returns instead of loan portfolio returns. The finding differences may emanate from the fact that this research focuses on loan portfolios, which may not be comparable to total returns.

5 CONCLUSION

Previous research indicates that bank ownership type is one of the bank loan portfolio determinants, since different bank ownership types may focus on different customer types (market segments) according to their characteristics (De-Haas et al., 2010). However, literature dealing with the relationship between bank ownership types, loan portfolio composition, risk and return for Asian countries, such as Indonesia, is scarce. This paper attempts to examine the loan portfolio composition of Indonesian banks in the post crisis period and to determine whether bank ownership plays a role in the composition and performance of the portfolios.

The findings support the hypotheses that different bank ownership types differ with regard to loan portfolio composition, risk, and return. The loan portfolios of government-owned banks are more concentrated on sectors not directly related to economic development, such as consumption, whereas domestic- and foreign-owned banks have more diversified loan portfolios. Domestic-owned banks are mostly involved in lending to enterprises in the trade, hotels and restaurant sectors whilst foreign-owned banks are the major player in lending to the business services and several other sectors such as manufacturing.

Differences in the loan portfolio composition and concentration risk of government-, domestic- and foreign-owned banks result in different loan portfolio returns. Government-owned banks show the highest loan portfolio return compared to the other bank ownership types. Focusing on segments with low intrinsic risk provides government-owned banks with a better return. The findings support the corporate finance theory according to which banks should implement focus strategies to reduce agency problems and exploit their management expertise in certain sectors. The findings do not support the traditional banking and portfolio theory according to which banks should diversify their loan portfolio to reduce risk (Hayden et al., 2006).

The lack of Government-owned banks loan exposures to sectors like electricity, gas and water; mining; transport and communication; and social services that may be regarded important in the country’s economic development do not line up with the social theory that government-owned banks are the agent of development. The requirement of some government-owned banks to operate as profit maximisation institutions may contribute to this. Moreover, as the big four government-owned banks are publicly listed companies, they have to maximise their shareholder wealth. Some regulations regarding branching, entry, and asset investment restrictions which often encourage focus strategies (Berger et al., 2010) may contribute to the tendency of government-owned banks to implement focus strategy. In addition, the existence of regulatory guidelines instigating diversification that result in a large number of individual clients and industries may increase monitoring cost and reduce cost efficiency (Rossi et al., 2009), and therefore counteract diversification. The findings imply the need to implement measures to enhance required financial intermediation in sectors of the economy where inadequacies exist or where specific growth is required. Future research may focus on the relationship between bank ownership types and capital allocation to large and small-medium scale enterprises (SMEs).
| Author (Year)       | Diversification Benefits                                                                 | Diversification Costs                                                                 |
|---------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Hayden et al. (2006) | • Reduce risks of bank failure                                                            | • Agency Problems                                                                      |
|                     | • Reduce cost to achieve credibility in bank role as screeners or monitors of borrowers   | • Inefficient allocation of resources                                                   |
|                     |                                                                                         | • Loss in bank value                                                                    |
| Rossi et al. (2009) | • Reduce the cost of financial intermediation                                              | • Increased systematic risk                                                            |
|                     | • Increase the incentive to monitor                                                       |                                                                                        |
| Berger et al.(2010) | • Reduce chance of financial distress                                                     | • Dilution of management comparative advantage                                         |
|                     | • Provide cheaper way to achieve credibility of banks as monitors of borrowers             | • Inducing competition                                                                  |
|                     | • Leverage of managerial skills and abilities across products and geographic regions       | • Increased agency costs                                                                |
|                     | • Gain economies of scope and economies of scale                                          |                                                                                        |
|                     | • Provide financial supermarket ability in terms of multiple products                     |                                                                                        |
| Elsas et al. (2010) | • Economies of scope                                                                      | • Agency problems                                                                      |
|                     | • Improved resource allocation                                                            | • Inefficient internal resource allocation                                              |
|                     | • Lower tax burden due to higher financial leverage                                       | • Informational asymmetries between head office and divisional managers                 |
|                     | • Ability to use firm-specific resources to extend competitive advantage from various markets | • Increased incentive for rent-seeking behaviour by managers                              |
| Tabak et al. (2011) | • Reduce bank probability of default                                                      | • Increased competition                                                                |
|                     | • Reduce financial intermediation costs                                                  | • Unable to reap benefits from business expertise in specific sector                    |
|                     | • Reduce vulnerability to economic downturns                                             |                                                                                        |
### Attachment 2 Characteristics of Bank Ownership Type: A Comparison

| No | Characteristics | Government-owned Banks | Private-owned Banks | Foreign-owned Banks | Source |
|----|-----------------|------------------------|---------------------|---------------------|--------|
| 1  | Objective/Motives | Social welfare and political goals | Profit Maximisation | Profit Maximisation for entire international organisation | Berger et al. (2005a) |
| 2  | Organisational Design and Type of borrower information used | Hierarchical/ Hard Information | Flat/ Soft Information | Hierarchical/ Hard Information + soft information | Berger et al. (2005b), Mian (2003), Beck et al. (2011), Berger and Black (2011) |
| 3  | Agency Problem  
  - Type  
  - Degree | I (taxpayers vs bureaucrat managers) 
  Highest | II (Major/blockholders vs minor shareholders) 
  Medium | I (shareholders vs professional managers) 
  Lowest | Mian (2003), Taboada (2011) |
| 4  | Nature of Corporate Governance  
  - Cash Flow vs Control Rights  
  - Manager Incentives to achieve objective | Cash Flow Rights = taxpayers  
  Low  
  Control Rights = bureaucrats  
  High | Cash Flow Rights = Control Rights = domestic shareholders  
  High | Cash Flow Rights = Control Rights = foreign shareholders  
  High | Mian (2003) |
| 5  | Degree of monitoring by shareholders | Low | High | High | Mian (2003) |
| 6  | Degree of Information Asymmetry  
  - Moral Hazard  
  - Adverse Selection | High  
  High | Medium  
  Medium | Medium  
  Medium | Dell’ Ariccia and Marquez (2004) |
| 7  | Compliance to regulation | Low, due to its dual role as owner and regulator  
  High, due to maintaining reputation | High, due to supervision and reputation (at home and host countries)  
  Mian (2006) |
| 8  | Response to competition | Slow | Quicker, as a response to foreign bank entry | Quickest, to penetrate host country market | Dell’ Ariccia and Marquez (2004) |
| No | Characteristics                     | Government-owned Banks                                                                 | Private Domestic-owned Banks                                      | Foreign-owned Banks                                                      | Source                                                                                     |
|----|-------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| 9  | Lending Decision                    | Poor (mostly based on political motives)                                                | Better (mostly based on soft information)                        | Better (mostly based on hard information)                              | La-Porta et al. (2002), Mian (2003), Sapienza (2004), Dinc (2005), Micco and Panizza (2006), Detragiache et al. (2008), Berger et al. (2005a), De-Haas et al. (2010) |
|    | • Loan Portfolio Allocation         | Specific sectors for social welfare, government related projects and institutions       | Retail market (small domestic firms and customer for mortgage lending) | Large firms and government (corporate sector/ wholesale market), starting to serve retail as well | Berger et al. (2005a), Degryse et al. (2012)                                             |
|    | • Loan Portfolio Strategy           | Focus (on certain unprofitable industries)                                             | Focus (on opaque borrowers)                                      | Focus (on large borrowers)                                            | Sapienza (2004), Detragiache et al. (2008), Unite and Sullivan (2003), Degryse et al. (2012) |
|    | • Loan Pricing                      | Low interest rate due to government subsidy                                            | Higher interest rate but in narrowing spread due to competition pressure and increasing efficiency | Lower interest rate due to specific portfolio composition             |                                                                                           |
| 10 | Risk Taking Behaviour (for bad risk)| High                                                                                    | Higher than Foreign Bank                                         | Low                                                                     | Mian (2003)                                                                               |
|    | • Degree                            | Low                                                                                   | Medium                                                          | High                                                                    |                                                                                           |
|    | • Risk Management                   |                                                                                       |                                                                     |                                                                         |                                                                                           |
| 11 | Performance                         | Low                                                                                    | Inconclusive*                                                    | Inconclusive*                                                          | Berger et al. (2005a), Bonin et al. (2005), Micco et al. (2007), and Iannotta et al. (2007) |
|    | • Profit                            | Low                                                                                    | Inconclusive*                                                    | Inconclusive*                                                          |                                                                                           |
|    | • Efficiency                        | Low                                                                                    | Inconclusive*                                                    | Inconclusive*                                                          |                                                                                           |
| 12 | Impact on Macroeconomic Factors     | Better after privatisation                                                            | Better after foreign bank entry and privatisation                | Positive                                                               | La-Porta et al. (2002), Montgomery (2003)                                                  |
|    | • Financial Development             |                                                                                       | Better after foreign bank entry                                  | Better, start to serve soft-information borrowers                   | Berger et al. (2005a), Giannetti and Ongena (2005)                                         |
|    | • Access to credit                  | Better after privatisation                                                            | Better after foreign bank entry                                  | Better                                                                 | Unite and Sullivan (2003), Dinc (2005), Mian (2006), Micco and Panizza (2006), Detragiache et al. (2008), Taboada (2011), La-Porta et al. (2002) |
|    | • Economic growth                   | Low                                                                                    | Low (due to block-holders)                                       | Better                                                                  |                                                                                           |

*= inconclusive refers to a condition where the results are mixed; some indicate positive results whereas the others indicate the other way around
### Variables Definition and Measurement

| No | Variable | Definition | Measurement | Remarks |
|----|----------|------------|-------------|---------|
| 1a | Bank ownership Types: Government Banks (GB) | Banks with government total ownership exceed 20% of total bank shares, as measured directly | \[ GB_i = \sum_{j=1}^{J} S_{ji} \] | GB, the government’s share in bank \(i\), \(S_{ji}\) share of bank \(i\) owned by government | \(i\) = commercial banks in Indonesia, \(j\) = bank’s shareholders |
| 1b | Bank ownership Types: Domestic Banks (DB) | Banks with private-domestic total ownership exceed 20% of total bank shares, as measured directly | \[ DB_i = \sum_{j=1}^{J} S_{ji} \] | DB, the private-domestic’s share in bank \(i\), \(S_{ji}\) share of bank \(i\) owned by private-domestic | \(i\) = commercial banks in Indonesia, \(j\) = bank’s shareholders |
| 1c | Bank ownership Types: Foreign Banks (FB) | Banks with foreign total ownership exceed 20% of total bank shares, as measured directly | \[ FB_i = \sum_{j=1}^{J} S_{ji} \] | FB, the foreign’s share in bank \(i\), \(S_{ji}\) share of bank \(i\) owned by foreigners | \(i\) = commercial banks in Indonesia, \(j\) = bank’s shareholders |
| 2 | Concentration Risk (CONRISK) | The risk arising from an uneven distribution of counterparties in credit or any other business relationships or from a concentration in business sectors or geographical regions which is capable of generating losses large enough to jeopardise an institution’s solvency (Deutsche Bundesbank, 2006) | \[ HHI = \sum_{i=1}^{N} \left( \frac{p_{i}}{Q} \right)^{2} \] | HHI, Hirschman Herfindahl Index | \(Q = \sum_{i=1}^{N} p_{i}\), \(p_{i}\) = the percentage of credit to each sector, \(N = 10\) for E-HHI and 3 for THHI |
| 3 | Intrinsic Risk (ITRISK) | A different risk inherent to each industry, region or product of a bank (Cronje, 2013) | (Substandard+Doubtful+Loss) /Total Loans | | |
| 4 | Return (RETR) | The net income obtained from bank’s loan portfolio | Net Interest Income / Total Loans | | |
| 5 | Size (SIZE) | The total assets of each individual bank | Ln of Total Assets | | |
Loan Portfolio Composition
To determine whether loan portfolio composition vary significantly across different bank ownership types, the following regression model is used:

\[ \text{Composition}_i = \alpha + \beta \text{OWN}_i + \delta \text{SIZE}_i + \epsilon_i \] ……………………..(1)

Where:
- \( \text{Composition}_i \) = loan portfolio allocation on specific sector for the \( i \)th bank
- \( \text{OWN}_i \) = vector of ownership types variables;
- \( \text{SIZE}_i \) = size of bank \( i \), as control variables;
- \( \alpha, \beta, \delta \) = regression coefficients; and
- \( \epsilon_i \) = the disturbance term.

Loan Portfolio Risks
To determine whether loan portfolio concentration risk vary significantly across different bank ownership structures, the following regression model is used:

\[ \text{CONRISK}_i = \alpha + \beta \text{OWN}_i + \delta \text{SIZE}_i + \epsilon_i \] ……………………..(2)

Where:
- \( \text{CONRISK}_i \) = loan portfolio concentration risks for the \( i \)th bank
- \( \text{OWN}_i \) = vector of ownership types variables
- \( \text{SIZE}_i \) = size of bank \( i \), as control variables;
- \( \alpha, \beta, \delta \) = regression coefficients; and
- \( \epsilon_i \) = the disturbance term.

In order to find the relationship between concentration risk and intrinsic risk, this research runs regression of concentration risk (both based on economic sector and loan types) to intrinsic risk for all banks by using the following equation:

\[ \text{ITRISK}_i = \alpha + \beta \text{CONRISK}_i + \delta \text{SIZE}_i + \epsilon_i \] ……………………..(3)

Where:
- \( \text{ITRISK}_i \) = Intrinsic Risk of bank \( i \) at year \( t \)
- \( \text{SIZE}_i \) = size of bank \( i \), as control variables
- \( \alpha, \beta, \delta \) = Regression Coefficients
- \( \epsilon_i \) = Disturbance Term

Loan Portfolio Return
To determine whether loan portfolio return vary significantly across different bank ownership types, the following regression model is used:

\[ \text{RETURN}_i = \alpha + \beta \text{OWN}_i + \delta \text{CONRISK}_i + \gamma \text{ITRISK}_i + \xi \text{SIZE}_i + \epsilon_i \] ……………………..(4)

Where:
- \( \text{RETURN}_i \) = loan portfolio return for the \( i \)th bank
- \( \text{OWN}_i \) = vector of ownership structure variables
- \( \text{ITRISK}_i \) = Intrinsic Risk of bank \( i \) at year \( t \)
- \( \text{CONRISK}_i \) = loan portfolio concentration risks for the \( i \)th bank
- \( \text{SIZE}_i \) = size of bank \( i \), as control variables;
- \( \alpha, \beta, \delta, \gamma, \xi \) = regression coefficients; and
- \( \epsilon_i \) = the disturbance term.
Attachments5: Results of Assumptions Testing for Multiple Regressions for Equation 4

Multicolinearity Test Summary

| Variables            | Tolerance | VIF  |
|----------------------|-----------|------|
| OWN_DUMMY1           | .420      | 2.381|
| OWN_DUMMY2           | .535      | 1.868|
| ITRISK               | .910      | 1.098|
| CONRISK (EHHI)       | .617      | 1.621|
| CONRISK (THHI)       | .279      | 3.590|
| SIZE                 | .723      | 1.383|

Normality, Linearity and Heteroscedasticity Test Summary

Scatterplot
Dependent Variable: INC
Source: SPSS Test Result, 2013
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