

Income Diversification Strategy on Bank Stability: International Banks Evidence

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Abstract

This study aims to analyze the implementation of the income diversification strategy on bank stability carried out by international banks. This study uses panel data from 32 international banking companies from 2010-2019 with a total of 320 firm years of observation. The generalized method of moments is used as a statistical analysis tool for panel data. The study results show that the implementation of the income diversification strategy carried out by international banks was convincingly able to increase bank stability. This indicates that international banks were able to perform cost diversification efficiency to achieve better stability. Furthermore, the use of high leverage could reduce bank stability. This study shows robust results in the measurement of income diversification using either the Herfindahl Hirschman Index (HHI) or the ratio of non-interest income to total income. This is a premier formal assessment of the nexus between income diversification strategies and risk management among the largest commercial banks in the world context. This research is expected to be useful for banking management, regulators, and investors in the banking sector.

Keywords : income diversification, non-interest income, bank stability, bank z-score, GMM.

JEL Classification : G32, G21

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1. INTRODUCTION

As an intermediary financial institution, banks are vulnerable to financial risks in carrying out their activities. Ghenimi, Chaibi, and Omri (2017) stated that financial risks could be in the form of liquidity risk where the depositor suddenly withdraws his funds, credit risk where the borrower does not make his loan payments on time, changes in interest rates (interest rate risk), and operational risk. Thus, banks should have a strong system to identify various sources of financial fragility commonly experienced. Diamond and Rajan (2000) argue that all policies and decisions taken by banks will have implications for bank liquidity, credit risk, and bank stability. Banks with good financial stability will be more flexible in carrying out their operational activities. In other words, stability makes banks more flexible in determining and managing their liabilities to provide sustainable performance.

Banks have a “dilemma” condition, either maintaining solvency or performance. When a bank decides to maintain its solvency, it must “hold” high liquidity, while banks with too high a liquidity level tend to have counterproductive conditions (Acharya, Afonso, & Kovner, 2017). On the contrary, banks that focus on financial performance tend to face high insolvency risk, a decrease in the stability (Durand & Le Quang, 2021). Based on this argument, there is a logical relevance between the high leverage in banking nature to bank’s stability. Bank Leverage is the main source of liquidity creation to generate cash flow for the bank (i.e., interest income) but will ultimately affect the stability of the bank (Ramlall, 2018)

Considering that the bank's main source of income is interest income which is the result of funding and lending activities, it carries a very high risk. In line with Markowitz's portfolio theory, banks need to diversify their income sources (Wang & Lin, 2021). Furthermore, along with increasing competition in the banking sector as well as tight regulations governing funding and lending activities, banks are conditioned to diversify their activities (Wang & Lin, 2021). The banks take the diversification strategy for different reasons but mainly for performance improvement, risk reduction, and competition between banks. However, on the other hand, the diversification strategy can reduce bank stability through a decrease in efficiency due to the breakdown of focus on the bank’s main activity as an intermediary financial institution Wu, Chen, Chen, and Jeon (2020). Thus, it is important to know and analyze how the effect of income diversification on bank stability. Some researchers argue that the income diversification strategy has positive implications for bank stability by reducing insolvency risk and financial distress costs (Ghenimi et al., 2017; Hunjra, Hanif, Mehmood, & Nguyen, 2020; Liu, Norden, & Spargoli, 2020; Moudud-Ul-Huq, 2019; Sissy, Amidu, & Abor, 2017; Tan & Anchor, 2017; Wang & Lin, 2021). However, some researchers show that the income diversification strategy is not able to increase bank stability (irrelevant), even in some cases, it shows that income diversification increases agency problems, increases systemic risk in banks, and leads to a decrease in bank stability (Abuzayed, Al-Fayoumi, & Molyneux, 2018; Amoah, Bokpin, Ohene-Asare, & Aboagye, 2021; Gupta & Kashiramka, 2020; Ozili, 2018; Paltrinieri, Dreassi, Rossi, & Khan, 2020).

Apart from the controversy over the positive and negative effects of income diversification on bank stability, the researcher agrees that the effect of income diversification on bank stability may vary depending on the size of the bank, the type of bank, whether conventional or Islamic, observations on banks located in developed or developing countries, and the influence of normal or crisis economic conditions (Abuzayed et al., 2018; AlKhouri & Arouri, 2019; Ozili, 2018; Wang & Lin, 2021). Considering that the effect of income diversification on bank stability can be different under certain conditions, this study aims to examine the effect of income diversification on stability in banks that have been established and recognized as the largest commercial banks in the world (Forbes, 2019). So can be drawn a question behind this research as follows, can income diversification strategy increase bank stability in established banks? This question is based on some common understanding that an established bank should have the ability to overcome and accommodate various diversification problems that may arise as a result of the implementation of the income diversification strategy, and its stability (Lee, Chen, & Zeng, 2020; Wang & Lin, 2021).

This study shows that increased income diversification significantly increases bank stability. Meanwhile, the use of high leverage tends to lower bank stability. Furthermore,

this research proves that increasing the bank size will increase its stability. This study uses the generalized method of moment (GMM) as a statistical tool to address potential endogeneity problems between income diversification and bank stability. This study also includes a robustness test using random effects testing and income diversification measurement using the ratio of non-interest income to total operating income. This research is expected to contribute to the body of knowledge, especially in the literature on banking management. In particular, the results of this study shed light on the debate about the effect of implementing income diversification in the banking sector. Suppose the implementation of non-interest income in the world's largest banks is able to have a positive effect on stability. In that case, there should be things that can be learned and applied to the banking sector in general. Furthermore, in Section 2, a literature review is presented. Section 3 presents the data and methodology used in this study. Section 4 presents the results and discussion, and section 5 presents the robustness test. Finally, Section 6 discusses the conclusions of the study.

2. HYPOTHESES DEVELOPMENT

Income diversification on bank stability

Changes in the global economic climate have significantly increased competition in the banking world. Deregulation has implications for easing bank interest rates so that competition among banks has increased drastically, causing a decline in bank profitability. Non-interest income becomes a solution to mitigate this risk and finally boost bank financial performance (Wang & Lin, 2021). This condition becomes one of the main triggers for implementing the banking business diversification strategy, which was originally in the form of funding and lending activities, diversifying into non-interest income activities (Ramlall, 2018).

The modern view of portfolio theory by Markowitz (1952) suggests that efficient diversification can reduce unsystematic risks. Thus, the main operational activity of banking, i.e., interest income, can be diversified into non-interest income. This diversification aims to reduce the risks that may arise as a result of bank activities as an intermediary financial institution. Therefore, the traditional view shows that diversification can reduce the level of risk becomes important when discussing and analyzing the effects of diversification on bank stability.

The results of empirical research show that the effect of income diversification strategy on bank stability is not the same in every bank condition. In emerging economic countries of Asia Pacific, Wang and Lin (2021) show that banks implementing income diversification strategies appear to benefit more from the reduced risk. However, for banks in developed countries, the income diversification strategy has no effect on the level of bank risk. Hunjra et al. (2020) conducted research in Asian countries, revealing that banks in Asian countries tend to be successful in utilizing income diversification strategies to minimize bank financial risk. Sissy et al. (2017) conducted research on banking in African countries, showing a decrease in the risk of bankruptcy due to the application of income diversification strategies both cross-border and operational activities.

However, Abbas and Ali (2021) show that in banking in developed countries such as the USA, the income diversification strategy has a negative effect on bank stability. However, for banks that have strong capital resilience, the income diversification strategy has a positive effect on stability. While Ali, Khattak, and Alam (2021) show that income diversification has no effect on small banks, but on large banks, the diversification strategy

has a positive effect on bank stability. Tan and Anchor (2017) in their research on banking in China, shows that non-interest income also has implications for reducing insolvency risk, thereby increasing bank stability. Abuzayed et al. (2018) found that the diversification strategy carried out by banks in GCC countries, both income and asset diversification, did not increase bank stability. However, in Islamic banks, the diversification strategy is seen to be more capable of minimizing risk than conventional banks. This finding is supported by research conducted by Paltrinieri et al. (2020) who conducted research on banking in OIC (Organization of Islamic Cooperation) countries, did not find the effect of income diversification on bank stability in both Islamic and conventional banks.

The biggest obstacle in implementing the income diversification strategy in banking lies in the increasing agency problem, which is marked by an increase in diversification costs that lead to inefficient conditions for the bank. However, banks that have an international scale and have the title of the largest bank category in the world should have an innovative mechanism to prevent inefficiency in implementing diversification strategies (Wu et al., 2020). Thus, these banks can better take advantage of the income diversification strategy to increase bank stability (Hunjra et al., 2020; Wang & Lin, 2021). Therefore, this study draws a hypothesis (H1) that implementing the income diversification strategy in the world's largest banks will bring them to a better level of stability.

Bank leverage on bank stability

The term leverage in banking refers to using external funds (funding activity), including deposits, long-term debt, and bonds, to fund lending activities. The implication of this funding-lending activity is that it provides profits from interest income (Ramlall, 2018). However, the use of high and excessive leverage will place the company in an unstable condition as a result of increased insolvency risk (Fachrudin, 2021). Thus, since banking companies are intermediary financial institutions where the "nature" of the bank's business is a company with high leverage, the increase in banking will affect the banking stability (Hoque & Pour, 2018). Diamond and Rajan (2000) argue that banking capital decisions will influence the level of liquidity, credit risk, and bank stability. It is alleged that international banking companies already have a high reputation in the eyes of investors, thus it will be easier for these banks to access the capital market and obtain funds at a lower cost. Furthermore, using high leverage for international banks will reduce their stability (Bleck, 2018; Ghosh & Chatterjee, 2018). Thus, the second hypothesis (H2) of this study is that increasing leverage in international banking companies with the most extensive banking category in the world will reduce bank stability.

Bank size on bank stability

When uncertain conditions occur, large banks will have a better survival ability than small banks. In this case, large banks have a higher level of efficiency (Dang & Dang, 2021) and a higher level of trust from investors or the public (Guizani, 2020). Abbas and Ali (2021); Abuzayed et al. (2018); Moudud-Ul-Huq (2019); Sissy et al. (2017) show that bank size affects the level of bank stability. The larger the size of the bank, the more stable the bank will be (Al-Hunnayan, 2020; Gafrej & Boujelbéne, 2021). Thus, the third hypothesis (H3) of this study is that in large international-scale banks and the largest banking category in the world, an increase in bank size will increase bank stability.

3. METHOD, DATA, AND ANALYSIS

Data

This study uses the largest commercial banking population in the world (Forbes, 2019), which is determined by company assets. This selection is based on the unique character of the world's banking system, which should already have effectiveness and efficiency in its banking system. Thus, the implementation of the income diversification strategy will have a realtangible impact on the level of stability of the bank. From 50 banking companies indexed by Forbes in 2019, the sampling criteria were carried out through purposive sampling, obtained 32 banking companies that met the criteria to be used as research samples. The criteria for selecting the research sample include (1) the company has complete published financial statements from 2010 to 2019, (2) the company does not have negative profits, (3) and the company has diversified income. The type of data used is secondary data, the unit of analysis is the company's financial statements from 2010 to 2019, which were obtained from the websites of each bank. The financial statements have been published on the stock exchanges of their respective countries. Thus, this study uses panel data with 320 firm years of observation.

Definition of Operational and Measurement of Variables

Definition of operational variables is explained based on relevant concepts and theories so as not to create a different understanding. The variable referred to in this study is bank stability (BSTAB) as the dependent variable. At the same time, the independent variables in this study are income diversification (IDIV), bank size (SIZE), and bank leverage (BLEV).

Bank stability (BSTAB) is proxied by the bank z-s,core which shows the position of a bank against bankruptcy conditions. An increase in the z-score indicates a decrease in the bankruptcy risk (Abuzayed et al., 2018; Ghenimi et al., 2017; Wang & Lin, 2021). In this condition, the ability of banks to create profits, use of capital, and return volatility is an indicator that shows the soundness of the bank (Gupta & Kashiramka, 2020). Thus, the formulation of the level of bank stability in this study follows the formula used by Abbas and Ali (2021); Wang and Lin (2021) ,which is stated in the following equation:

$$Bank\ Stability = zscore = BSTAB = \frac{ROA + \frac{Equity}{Assets}}{SDROA} \quad (1)$$

Where, ROA is the return on assets of the bank, equity is the total equity of the bank, assets are the total assets of the bank, and SDROA is the standard deviation of ROA.

Income diversification (IDIV) is bank income excluding interest income, usually referred to as non-interest income. Non-interest income is generally divided into fee-based income and trading income (Ramlall, 2018). The measurement of income diversification follows the measurements made by Hunjra et al. (2020); Wang and Lin (2021) used a modified Herfindahl-Hirschman Index (HHI) to obtain a diversification effect. Thus, the following equation is used to measure income diversification:

$$HHI_{income} = IDIV = 1 - \left[\left(\frac{INC}{TI} \right)^2 + \left(\frac{NIC}{TI} \right)^2 \right] \quad (2)$$

where, INC is interest income, NIC is non-interest income, and TI is total income. The IDIV value will range from 0 to 0.5. In the event of full diversification (interest income = non-interest income), the IDIV value is equal to 0.5. Meanwhile, if there is no diversification, the IDIV value equals zero (Vidyarthi, 2019; Yang, Liu, & Yeutien Chou, 2020).

Bank leverage (BLEV) indicates the bank's debt position, which generally consists of long-term liabilities (wholesale funds) and short-term liabilities (deposits) to total assets (Haq, Hu, Faff, & Pathan, 2018; Hoque & Pour, 2018). Thus, the BLEV measurement can be calculated using the following equation:

$$\text{Bank Leverage} = BLEV = 1 - \left(\frac{\text{Equity}}{\text{Total Asset}} \right) \quad (3)$$

Where, equity is the total equity of the bank while total assets are the total assets owned by the bank.

Bank Size (SIZE) is one of the central bank specific variables (Smaoui, Mimouni, Miniaoui, & Temimi, 2020). Bank size is one indicator that shows the reputation of a bank (Abbas & Ali, 2021). In many studies, large banks can better survive when conditions of uncertainty occur (Dang & Dang, 2021). Bank size measurement uses the natural logarithm of total assets, mathematically written as follows:

$$\text{Bank Size} = SIZE = \text{Ln}(\text{total assets}) \quad (4)$$

Method

This study uses the generalized method of moments (GMM) as a statistical test tool (Bolarinwa & Adegboye, 2020; Etudaiye-Muhtar & Abdul-Baki, 2020) to address endogeneity issues commonly arising in financial management research, i.e., a condition where the dependent variable can be an independent variable and vice versa. For example, in this study, the dependent variable is bank stability (BSTAB), while the independent variables are income diversification (IDIV), bank size (SIZE) and bank leverage (BLEV). There may be a reciprocal relationship between the independent and dependent (bidirectional) variables, maybe BSTAB can affect BLEV or IDIV. The case of endogeneity can bias the prediction of the relationship between variables. Thus, the use of GMM is expected to be able to overcome the problem of endogeneity.

The problem of endogeneity in this study was tested using a wald-test between IDIV and BSTAB, SIZE with BSTAB and BLEV with BSTAB. If there is a rejection of the null hypothesis ($p\text{-value} = 0$), it indicates that there is a problem of endogeneity between the independent variables and the dependent variable. Furthermore, the autoregression test (Arellano & Bond, 1991) was used to test the validation of using GMM in this study. Thus, the model built in this study uses the following formula:

$$BSTAB = f(IDIV, SIZE, BLEV) \quad (5)$$

Table 1 shows the definition and formulation of the variables used in this study.

Table 1. Definition of operational and measurement of variables

| Variable | Measurement | Reference | Expected Sign |
|-------------------------------|--|--|---------------|
| Dependent Variable | | | |
| Bank Stability (BSTAB) | Natural logarithm of the Z-score | Wang and Lin (2021) | |
| Independent Variables | | | |
| Income diversification (IDIV) | $1 - \left[\left(\frac{INC}{TI} \right)^2 + \left(\frac{NIC}{TI} \right)^2 \right]$ | Ghenimi et al. (2017); Wang and Lin (2021) | Positive |
| Bank leverage (BLEV) | $1 - \left(\frac{Equity}{Total Asset} \right)$ | Haq et al (2018) | Negative |
| Bank Size (SIZE) | Natural logarithm of total assets | Dang and Dang (2021) | Positive |

4. RESULTS

The results of descriptive statistical processing can be seen in Table 2. The average value of the largest bank stability in the world is 1.7593, with the maximum value reaching 2.2482 while the minimum value is 1.1207. Income diversification (IDIV) is seen as a maximum at 0.4999, this shows that the bank's non-interest income has almost the same portion as its interest income. The average of the largest banks in the world is 0.4190, meaning that the largest banks have implemented a strategy of diversifying their income. Although some banks have not implemented this strategy, it can be seen that the minimum IDIV is 0.1547 (IDIV value of 0.5 means that the bank has been fully diversified, where interest income is the same as non-interest income).

Table 2. Descriptive Statistics

| Variables | Observation | Mean | Median | SD | Min | Max |
|---------------------|-------------|---------|---------|--------|---------|---------|
| BSTAB _{it} | 320 | 1.7593 | 1.7824 | 0.2460 | 1.1207 | 2.2482 |
| IDIV _{it} | 320 | 0.4190 | 0.4409 | 0.0781 | 0.1547 | 0.4999 |
| BLEV _{it} | 320 | 0.9323 | 0.9379 | 0.0193 | 0.8711 | 0.9927 |
| SIZE _{it} | 320 | 14.1048 | 14.0539 | 0.8048 | 12.5192 | 17.6695 |

The average use of leverage at the world's largest banks has reached 93.23 percent. This means that the average world bank has an equity level of only 6.77 percent of its total assets. Table 3 shows the functional relationship between variables. In general, the correlation between variables is insignificant and no correlation above 0.7. Thus, it indicates that there is no multicollinearity problem in the variables tested in the research model.

Table 3. Correlation Matrix

| Variables | BSTAB _{it} | IDIV _{it} | BLEV _{it} | SIZE _{it} |
|---------------------|---------------------|--------------------|--------------------|--------------------|
| BSTAB _{it} | 1.0000 | -0.1496 | -0.3137 | 0.1238 |
| IDIV _{it} | -0.1496 | 1.0000 | 0.1063 | 0.0914 |
| BLEV _{it} | -0.3137 | 0.1063 | 1.0000 | -0.3814 |
| SIZE _{it} | 0.1238 | 0.0914 | -0.3814 | 1.0000 |

Testing the panel data using the generalized method of moments estimation is shown in Table 4. It can be seen that the validity of the appropriate instruments indicated by the J-statistic p-value above 0.05 or in a condition that does not reject the null hypothesis.

Meanwhile, the residual consistency is maintained as shown by the p-value AR(1) and AR(2) in the condition that it does not reject the null hypothesis (Arellano & Bond, 1991).

Table 4. The results of regression test (Generalized method of moments - GMM)

| Variables | Coefficient | t-statistic | ρ -value |
|----------------------------|-------------|-------------|---------------|
| BSTAB_{t-1} | -0.0741 | -41.5025 | 0.0000*** |
| IDIV_{it} | 0.1783 | 46.0698 | 0.0000*** |
| BLEV_{it} | -6.6447 | -84.5246 | 0.0000*** |
| SIZE_{it} | 0.0034 | 2.4426 | 0.0153** |
| Observations | 256 | | |
| J-statistic | 30.6327 | | |
| Prob (J-statistic) | 0.3336 | | |
| AR(1) test (p-value) | 0.5619 | | |
| AR(2) test (p-value) | 0.3872 | | |

Notes: ***, **, * show significance at 1%, 5% and 10%. The abbreviations are BSTB (bank stability), IDIV (income diversification), BLEV (bank leverage), SIZE (bank size). While the test model is to follow the following formula: $BSTAB_{it} = \beta_0 BSTAB_{t-1} + \beta_1 (IDIV_{it}) + \beta_2 (BLEV_{it}) + \beta_3 (SIZE_{it}) + \varepsilon_{it}$

The results of statistical testing using the GMM method show that IDIV had a positive and significant effect on BSTAB at 1 percent. Meanwhile, BLEV has a negative and significant effect on BSTB at 1 percent. Finally, SIZE shows a positive and significant effect on BSTAB at 5 percent.

Robustness Test

Measurement of income diversification in many empirical studies uses the herfindahl-Hirschman index (HHI) method. This method captures the diversified effect of the non-interest income (Abbas & Ali, 2021; Abuzayed et al., 2018; Amoah et al., 2021; Wang & Lin, 2021; Wei, Razak, & Kamarudin, 2017). Meanwhile, some researchers use the ratio of non-interest income to total income to see the portion of bank income (interest and non-interest income) (Hunjra et al., 2020; Moudud-Ul-Huq, 2019; Ozili, 2018; Tan & Anchor, 2017). This study measures the diversification effect carried out by banks using the HHI method but testing the ratio of non-interest income to total income (NII) still shows the same results as the measurement using HHI. Table 5 shows that NII positively and significantly affects 1 percent of bank stability. The results of this test are valid, as shown by the J-statistic p-value, which does not reject the null hypothesis, and AR(1) and (2) p-values are in a position not to reject the null hypothesis, which means that this model is suitable and free from autocorrelation problems.

Table 5. The results of the income diversification regression test using non-interest income to total income (NII) - GMM

| Variables | Coefficient | t-statistic | P-value |
|----------------------------|-------------|-------------|-----------|
| BSTAB_{t-1} | -0.0721 | -33.9435 | 0.0000*** |
| NII_{it} | 0.0917 | 18.6569 | 0.0000*** |
| BLEV_{it} | -6.4283 | -169.147 | 0.0000*** |
| SIZE_{it} | 0.0127 | 3.6468 | 0.0003*** |
| Observations | 256 | | |
| J-statistic | 29.1740 | | |
| Prob (J-statistic) | 0.40370 | | |
| AR(1) test (p-value) | 0.57900 | | |
| AR(2) test (p-value) | 0.42690 | | |

Notes: ***, **, * show significance at 1%, 5% and 10%. The abbreviations are BSTB (bank stability), IDIV (income diversification), BLEV (bank leverage), SIZE (bank size). While the test model is to follow the following formula: $BSTAB_{it} = \beta_0 BSTAB_{t-1} + \beta_1 (NII_{it}) + \beta_2 (BLEV_{it}) + \beta_3 (SIZE_{it}) + \varepsilon_{it}$

The statistical method used in this study is GMM to overcome endogeneity problems that may occur. However, for robust results, the Chow test was conducted to choose between OLS or fixed effect (FE). The results of the Chow test show significance at 5 percent, this means that the fixed effect prediction is better than OLS. Furthermore, the Hausman test was conducted to choose between a fixed effect or random effect (RE). Hausman test results show a significance above 5 percent, so predictions using random effects are better than fixed effects. Table 6 shows that using the random effect prediction IDIV has a positive and significant effect on 5 percent. The estimation results are strong considering that the R-squared is at a fairly high value, i.e., 84.37 percent, while the F-statistic is significant at 1 percent, which means this model is feasible. These results are robust by testing using GMM that IDIV has a positive and significant effect on bank stability.

Table 6. The results of regression test - random effect

| Variables | Coefficient | t-statistic | P-value |
|--------------------|-------------|-------------|-----------|
| C | 9.1430 | 38.3505 | 0.0000*** |
| IDIV _{it} | 0.0841 | 2.01252 | 0.0450** |
| BLEV _{it} | -7.2004 | -39.9161 | 0.0000*** |
| SIZE _{it} | -0.0490 | -6.1685 | 0.0000*** |
| R-squared | 0.8437 | | |
| Adjusted R-squared | 0.8422 | | |
| F-statistic | 568.5965 | | |
| Prob(F-statistic) | 0.0000 | | |

Notes: ***, **, * show significance at 1%, 5% and 10%. The abbreviations are BSTB (bank stability), IDIV (income diversification), BLEV (bank leverage), SIZE (bank size). While the test model is to follow the following formula: $BSTAB_{it} = C + \beta_1 (IDIV_{it}) + \beta_2 (BLEV_{it}) + \beta_3 (SIZE_{it}) + \varepsilon_{it}$

5. DISCUSSION

This research focuses on the effect of the implementation of income diversification strategy by the largest banks in the world on the creation of bank stability. This study aims to analyze the ability of the world's largest banks to accommodate and overcome diversification problems, so that the diversification strategy applied is able to bring these banks to a better level of stability. The empirical test results (Table 4) show that the income diversification strategy can provide excellent conditions for the largest banking category in the world in creating higher stability. In this case, income diversification has a positive and significant effect at 1 percent. This finding is in line with and supports the research conducted by Wang and Lin (2021) on commercial banking in the Asia Pacific region, which also found that the application of income diversification increased bank stability in the Asia Pacific. Studied banks in GCC countries and showed that banks that carry out income diversification strategies look more stable than banks that do not diversify. However, some researchers have found that the implementation of income diversification strategies creates unstable conditions for banks as a result of the emergence of diversification costs that disrupt the main function of banks as financial intermediary institutions (Abuzayed et al., 2018; Amoah et al., 2021; Paltrinieri et al., 2020). Thus, the success of implementing the

income diversification strategy entirely depends on the bank's ability to perform efficiently in terms of diversification costs.

BLEV has a negative and significant effect at 1 percent, this indicates that increasing leverage in the world's largest banks will reduce the level of bank stability. This finding is in line with the research conducted by Dahir, Mahat, and Ali (2018); Liu et al. (2020); Moudud-Ul-Huq (2019), who found that an increase in equity also increases bank stability. Capital from issuing equity is higher as a result of the presence of asymmetric information (Myers, 1984), so banks tend to use leverage compared to equity. However, this will be different for large banks, which have easier access to the market and can issue equity at a lower cost as a result of their reputation (Luu, Nguyen, Vu, & Tuan, 2019). SIZE has a positive and significant effect on 5 percent of bank stability. This finding is in line with the research conducted by Abuzayed et al. (2018); Ayadi, Ayadi, and Trabelsi (2019); Tran, Hassan, Girerd-Potin, and Louvet (2020), which argued that an increase in the size of the bank would increase the stability of the bank as an effect of increasing the banking system to be more effective and efficient.

6. CONCLUSION, LIMITATIONS, AND SUGGESTIONS

This study aims to analyze the effect of income diversification strategies on bank stability and how the use of high leverage relates to the health conditions of the world's largest banks. The problems arising from deteriorating bank health will have real implications for other sectors (Sahyouni, Zaid, & Adib, 2021). Thus it is important to analyze bank health. A diversification strategy has been recognized as one way to reduce or minimize risk. However, in the banking sector, diversification effects can cause agency problems as a result of the emergence of diversification costs (Wu et al., 2020). In various previous studies, many researchers found that the implementation of the income diversification strategy in banking resulted in a decrease in the stability (Abuzayed et al., 2018; Lee et al., 2020; Tran et al., 2020) as a result of the bank's inability to mitigate risk. Cost inefficiency and disruption become the bank's main focus as a financial intermediary institution, so they affect the bank's overall performance.

The findings of this study indicate that the income diversification strategy of the international banks is convincingly able to increase bank stability. Two arguments can be built on this finding: (1) banks with an international scale are more capable of efficiency in diversification costs that arise so that the implementation of income diversification strategy becomes effective and can increase bank stability, and (2) banks with an international scale have a higher reputation than small banks. This increases the confidence of business people so that non-interest income applied by these banks looks more stable than non-interest income at local scale banks. This second argument is logical because, in general non-interest income is more volatile than interest income (Ramlall, 2018). Furthermore, this research reveals that the two main motivations for international banks in implementing the income diversification strategy are (1) the desire to improve their performance and reduce the risks arising from interest income activities which are the nature of the banking business, and (2) the emergence of competition in the banking sector.

The use of leverage in banks with international reputations reduces the level of bank stability. In line with the above argument that large banks with international reputations have a high level of trust from investors, these banks have easier access to the market and can issue equity at a lower cost. The consequence of this fact is that increasing leverage will increase the bank's cost of capital at a higher level, so this condition causes a decrease in

bank profitability and ultimately reduces bank stability. In other words, the use of high equity in large banks will increase the stability of the bank, whereas the use of high leverage will reduce the stability of the bank. This argument is in line with the opinion expressed by (Diamond & Rajan, 2000; Gale & Gottardi, 2020).

Therefore, increasing bank stability can be achieved by the success of the bank in conducting income diversification through its ability to create a diversification cost control system and its ability to maintain a high reputation in the eyes of investors. The integration of these two things will place banks in a comfortable condition in carrying out non-interest income activities and provide access to banks to obtain funds from the market at a lower cost.

This study has limitations that need attention and guidance for future researchers. The sample used in this study generalizes the largest banks in the world without considering the character of the business in each region. Therefore, further research can classify large banks by region and finally make comparisons between regions. Further research can examine the bidirectional relationship between income diversification and bank stability.

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