The Effect of Internal and External Factors on Bank Investment Credit's Demands
(Kesan Faktor Dalaman dan Luaran ke atas Permintaan Pelaburan Kredit Perbankan)

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ABSTRACT

This paper examines the impression of internal and external factors on the demand for credit investment than trading banks in West Sumatra, Indonesia. Data were sourced from the quarterly data of 2000.1 to 2017.4. This study uses the Autoregressive Distributed Lag (ARDL) model through the Bounds testing approach. The change that is used is the demand for investment credit (CI), credit interest rate (SBK), third party funds (DPK), non-performing loans (NPL), exports (EXP), inflation (INF) and economic growth (PDRB). The findings indicate, in the short- show that third-party funds, exports, inflation and non-performing loans will cause the credit investment demand constraint to occur. This paper indicates that in order to increase the stability of the demand for credit investments of commercial banks, the government should encourage more investment in the farming sector and real estate/housing, including for small and medium enterprises Micro-Enterprises so that inter-regional trade can systematically stimulate regional economies. Additionally, there should be the investment interest rate and credit checks on the state of the creditors through the supervision of financial services in order to avoid greater credit risk in the future. Bank Indonesia is expected to increase control over inflation mainly related to investment credit demand.

Keywords: Demand of investment credit; bank; internal factor; external factor; Dynamic *ARDL Bounds Test.*

ABSTRAK

Kertas ini mengkaji kesan faktor dalaman dan luaran kepada permintaan pelaburan kredit daripada Bank-bank perdagangan di Sumatera Barat, Indonesia. Data telah dikumpulkan daripada data siri masa suku tahunan 2000.1 hingga 2017.4. Kajian ini menggunakan model auto regresif lat tertabur (ARDL) melalui pendekatan ujian sempadan. Pemboleh ubah yang digunakan ialah permintaan kredit pelaburan (CI), kadar faedah kredit (SBK), dana pihak ketiga (DPK), pinjaman bukan prestasi (NPL), eksport (EXP), inflasi (INF) dan pertumbuhan ekonomi serantau (PDRB). Dapatan kajian menunjukkan, dana pihak ketiga, ekspor, inflasi dan pinjam bukan prestasi akan menyebabkan terjadi kekangan permintaan kredit pelaburan dalam jangka pendek. Kertas kerja ini mencadangkan bahawa untuk meningkatkan kestabilan permintaan pelaburan kredit daripada Bank-bank komersil, kerajaan perlu menggalakkan lebih banyak pelaburan dalam sektor perladangan dan hartanah/perumahan, termasuk perusahaan kecil dan sederhana Micro-Enterpris, sehingga perdagangan antara rantau boleh merangsang ekonomi serantau secara sistematik. Seterusnya, perlu ada kadar faedah pelaburan dan kredit menyemak keadaan pemiutang bagi mengelakkan lebih banyak risiko kredit di masa hadapan melalui peranan penyeliaan perkhidmatan kewangan. Bank Indonesia dijangka meningkatkan kawalan ke atas inflasi terutamanya yang berkaitan dengan permintaan kredit pelaburan.

Kata kunci : Permintaan kredit pelaburan; bank; faktor dalaman; faktor luaran; Ujian Sempadan ARDL.

INTRODUCTION

Recent developments in the Indonesian economy have seen economic growth decline in the first quarter of 2015 at 4.7 percent down from 6.2 percent in the previous period (Word Bank 2015). Economic growth in West Sumatra over the same time was 3.95 percent to 3.80 percent in the first quarter of 2000-2014 (World Data Atlas 2017). The decline was mainly attributed to a disruption in the stability of demand for investment loans. For example, the decline of 0.90 percent and 0.60 percent in 2014.2, was recorded but with the average growth rate of 3.72 percent from 2000 to 2014 (Bank Indonesia 2015).

The fluctuations in regional economic growth are due to shocks from external factors such as weakening export conditions and high inflation (Moussa & Chedia 2016; Subhan et al. 2017). Based on previous research by Ali 2015; Darby 1982; Danziger and Kreiner 2002; Ni et al. 2009; Gul et al. 2011; Moussa & Chedia 2016; Subhan et al. 2017; Raza et al. 2013; Bank Indonesia 2015, two factors that affect banking performance namely internal and external factors that will have an impact on the stability of credit investment demand. The influence of internal factors is under the control of bank management such as loan interest rates, third party funds and bad credit. Whereas external factors are those that are beyond the control of bank management such as inflation and economic growth (GDP). For example, inflation in the food sector was 8.28 percent. The average inflation rate in the study period was only 6.89 percent in mid-2015. Furthermore, the average export development declined by 1.77 percent. In 2014 export declined by 7.49 percent relative to that in 2013 (Bank Indonesia 2015).

The next question is whether the bank's internal factors do not contribute to the stability of the demand for investment credit in Commercial Banks in West Sumatra? In connection with that, it shows that the growth of third party funds (DPK) was 3.25 percent but the growth of similar funds in commercial banks grew by 4.01 percent in Sumatra, at the end of 2014 (Otoriti Jasa Keuangan 2015). Non-Performing Loans (NPL) grew by 0.69 percent and on average showed an increase of 1.91 percent (Wirayani 2017). This suggests that there is an overall reduction in credit risk in West Sumatra.

The influence of inflation on bank's profitability depends on whether it is anticipated or otherwise (Rao & Lakew 2012). If the expected inflation equals the actual rate, there will be no negative effect on banking performance. If otherwise, profitability will be negatively affected if actions are taken to mitigate it since adjustment of interest rates will be slower, and the rise in costs tend to be faster than that for revenues. According to Duraj and Moci (2015), inflation could undermine the stability of the financial system and the ability of regulators to control the solvency of financial institutions. Athanasoglou et al. (2006), Gul et al. (2011), Sastrosuwito and Suzuki (2012) suggested that bank's profitability is determined by internal factors (internal determinant), known also as specific factors of the bank (bank-specific factors), and by external factors (external determinant) that constitutes environmental factors of the industry (industry-specific factors) together with the macro-economic environment (macro-economic factors).

Figure 1 shows general investment banking and credit demand in West Sumatra as impacted by external factors, (namely, the credit interest rate, third party fund and non-performing loan) and internal factors (namely, the export of domestic products, inflation and regional income) for the period 2000 until 2017. In that period flux on request for credit investment was also recorded due to impact from the external and internal factors. For example, a positive relationship occurred between the internal factors of interest rate and third party credit funds triggering an increase in demand for credit in the year 2000.4 until 2003.4. The external sector recorded increased export and inflation as well as economic growth in 2000.1 -2002.2 while the internal sector documented the decline of non-performing loans. Figure 1 also illustrates the post-2003-2017 period when internal factors, namely third-party funds, experienced an increase in credit while interest rates simultaneously declined. However, the external sector recorded a non-significant increase in export and inflation rate, while the gross regional domestic product increased significantly.

The third internal factor is the investment credit interest rate, which in this study recorded 13.46 percent in the observation period and later declined to 12.00 percent at the end of 2014. This suggests that loan interest rates at the end of 2014 were below average. The pertinent question to elucidate here is whether bank internal factors are able to disrupt the balance or stability of demand for investment credit in commercial banks in West Sumatra? The answer to this will be the main goal of this paper.
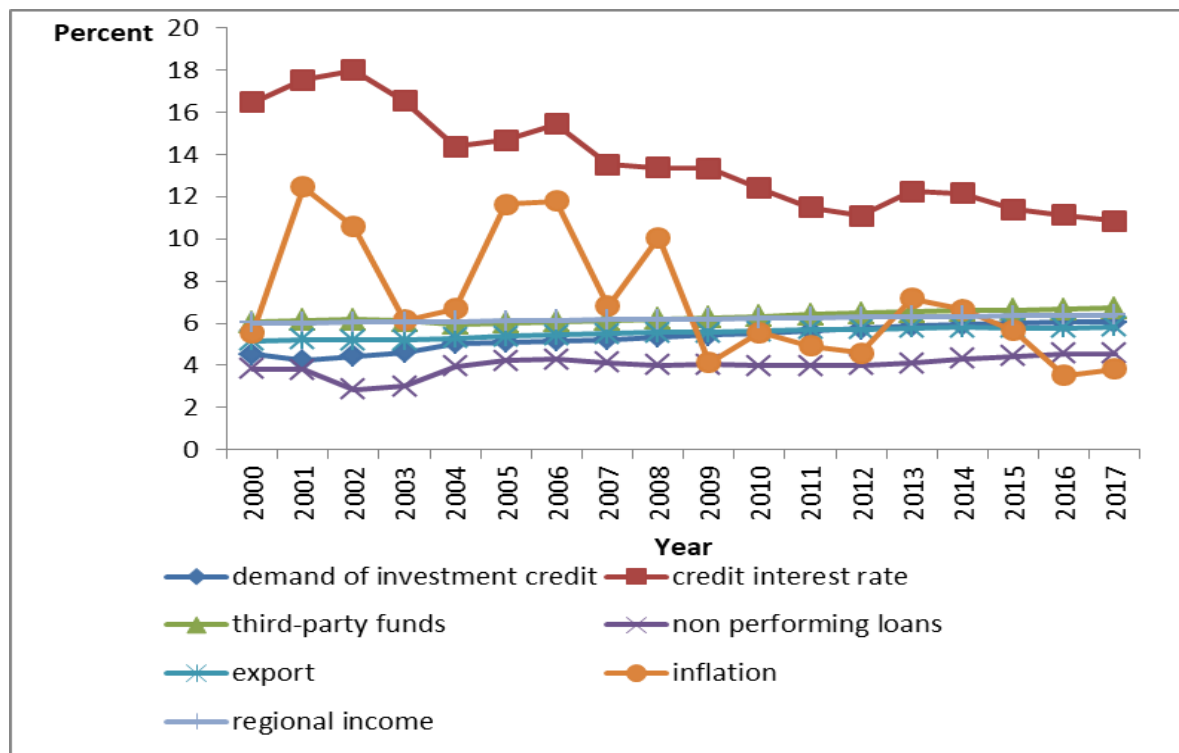
FIGURE 1. The trend of internal and external factors on Bank Investment Credit's Demands (data in percentage)
Source: Regional Report of West Sumatra and Central Bureau of Statistics,2016

From this description, the slowdown in national economic growth in the first quarter of 2015 also affected the economy of West Sumatra. Based on the shock of stability from investment loans at commercial banks due to the weakening of the regional economy, it will have an impact on the agricultural, property, micro, small and medium enterprises sectors in West Sumatra. Therefore, this research needs to be examined for any factors that influence the demand for investment loans, especially variables related to internal factors (export, inflation and regional income) and external (credit interest rates, third party funds and non-performing loans) in Sumatra West. Therefore, countries that have a banking system play an important role in financial system stability and can easily overcome regional financial difficulties (Bilal et al. 2013). In this study, all the factors that affect bank performance will be carefully considered, especially regarding the distribution of investment loans that are influenced by both internal and external factors (Gul et al. 2011; Raza et al. 2013).

LITERATURE REVIEW

According to Teng (2002) and Hubbard (2007) interest rates are the value that must be paid if you exchange currencies at present and in the future. Unreasonable or high-interest rate increases will make it difficult for businessmen to pay interest charges, thus burdening the public in their economic activities with steep cuts in profits borne by business companies.

In the allocation of bank credit in the business sector, the credit interest rate has a significant impact on the allocation of credit, which means that high rates will pose a burden for creditors to pay. Some researchers posited that an increase in lending rates greatly influences the distribution of credit (Holmstrom & Tirole 1997; Crouhy et al. 2000; Bellini 2013). Increasing lending rates, especially in the investment sector, will cause a decrease in credit demand (Hubbard 2007). Mishkin (2015) suggested that higher expectations of future interest rates will reduce credit demand. Similarly, higher lending rates will increase the burden on the public in repaying loans thus inducing credit demand to decrease (Frankel & Rose 1996; Hubbard 2007; Bellini 2013).

Bank credit management also affects the management of third party funds. Such funds are collected by banks from the community who have excess wealth to be channeled to people in need. Since third party funds are actual income for banks they are thus easily managed and disbursed. Therefore, the larger the third party funds managed by the banks, the more the funds that will be channeled to the public (Said & Ali 2016; Purba et al. 2014).

A number of studies had analyzed the relationship between demand for credit and some selected variables (Calza et al. 2001; Calza et al. 2003; Hofmann 2001; Kiss et al. 2006; Guo & Stepanyan 2011). The key determinants of private sector credit were found to be GDP, inflation, both short and long term interest rates, and exchange rates. Kholisudin (2012) discovered that credit interest rates had a negative and significant effect on credit demand in commercial banks. This would suggest that high or low credit interest rates will constrain the public from applying for credit from the banks.

The influential variable, which is an internal banking factor, is the non-performing loan (NPL), a loan that cannot be paid by the debtor who owed it to the bank and which can affect banking liquidity (Kauko 2012; Ghosh, 2015). When the NPL volume held is excessive, it will impose a barrier to banking performance (bank liquidity) which would subsequently reduce credit offerings (Nursiana 2017; Brahmana et al. 2016).

Ali (2015) investigated the impact of internal and external factors against the Pakistan banking profitability in the financial crisis post-2008, using 26 data bank panels from the 2009-2013 period. External factors (real GDP and inflation) did not exert a significant effect on banking performance. Real GDP was in the positive while inflation in the negative. The internal factors (variable functional efficiency ratio, debt ratio, asset management and liquidity ratio) had positive and significant effects on banking performance. Conversely, total assets and non-performing loan ratio exerted a negative and significant effect, whereas down payment ratio and loan ratio were not influential.

Banking performance is also influenced by external factors of the bank itself, such as the country's Gross Domestic Product (GDP). GDP is the total amount of goods and services produced by all business units in a country through economic activities. An increase in regional GDP will reflect positively on the country's economy (Barro 1991; King & Levine 1993). A sound economy will increase credit demand because more people will withdraw money from banks (De Jager 2014; Rosengard & Prasetyantoko 2011). The higher the savings in banks the greater the demand for credit. In lieu of this, some experts suggest that a positive correlation exists between economic development (income per capita) and the financial sector (Rao & Lakew 2012). According to Zhang and Dong (2011) GDP growth largely exerts a positive impact.

It is not less important that the variable inflation has an impact on the price of goods in certain sectors (Darby 1982). High inflation will increase the company's production costs and become an obstacle to its growth. As such, investors will be induced to switch to other sectors more amenable to national production growth. For example, speculators may seek profit opportunities when the economy is unstable with increased inflation and invest more in the real sector, whilst investment in products decreased. The increased inflation will affect the domestic business world, especially the trade sector (Danziger & Kreiner 2002; Ni et al. 2009). The decline in production in the trade sector is due to the inability to produce domestic goods to compete with foreign products and this will, in turn, impact the export growth.

Experts on international trade, especially the classical economists, prefer to promote a free market system, which together with market expansion and technological progress, will create economic efficiency and thus boost economic growth. (Schneider 2005; Singh 2010). Increasing market expansion will escalate inter-regional trade, and in turn, will increase exports and further enhance economic growth. Increasing export activity will indirectly expand the production markets through being more productive and with more efficient sources and allocations thus accruing direct benefits from the trade. (Singh 2010).

The trading activity of a country is defined by the activities of its exporters which is contingent on various factors, particularly the quality of goods produced domestically which should be in accordance with the standards of the desired foreign market. The higher the quality of goods produced, the greater the export potential (Mankiw 2003: 113). According to Schneider (2005), the quality and price of products made locally must be the same as those sold in foreign markets. This will depend on the country's ability to create commodities that are competitive in foreign markets. Increased exports should mirror the country's economic strength in relation to external market conditions. The higher the export commodity of a country, the greater will be its income. Conversely, a low-level export commodity reflects on a weak economic system.

However, there are also several studies that only recognize the influence of internal and external factors on investment credit demand. For example, studies conducted by Gul et al. (2011) and Raza et al. (2013) showed that one of the external factors influential on bank performance is GDP. Other external factors, namely inflation and market capitalization (MC), similarly exert significant positive effects. Nevertheless, the long-term and short-term relationships with bank financial performance were not examined, especially the investment credit distribution in West Sumatra.

Studies related to demand for investment credit were well covered such as those by Teng (2002), (Holmstrom & Tirole 1997; Crouhy et al. 2000; Bellini 2013), Mishkin (2015), (Said & Ali 2016), (Kauko 2012; Ghosh 2015), (Nursiana 2017; Brahmana et al. 2016), (Calza et al. 2001, Kiss et al. 2006, Guo & Stepanyan 2011), Ali (2015), (Danziger & Kreiner 2002) and (De Jager 2014; Rosengard & Prasetyantoko 2011). Conversely, little attention was given on the impact of internal and external factors on the demand for investment loans in the short and long term.

The banking sector has an important role in strengthening economic activity and growth (Khan et al. 2011). Countries that have a favorable banking system play an important role in the stability of the financial system and can easily overcome financial difficulties (Bilal et al. 2013). It is therefore important to identify all the factors that influence the bank's performance. These can be categorized as internal and external factors. Internal actors are within the control of bank management but not the external ones (Raza et al., 2013). Internal factors discussed in this study include credit interest rates, third party funds and Non-Performing Loans. External factors comprise exports, inflation and gross regional domestic products.

METHODOLOGY

MODEL SPECIFICATIONS

The cointegration approach used in this study is using the ARDL 'Bound test' approach which aims to determine the relationship between the variables studied. Advantages of using the ARDL Bounds test (ARDL Bounds test) approach such as studies conducted by Pesaran and Shin (1999), Pesaran et al. (1996) developed a cointegration technique known as Autoregressive Distributed Lag (ARDL) boundary test (Bound test). The ARDL boundary test approach has several advantages over Johansen & Jusellius (1990) cointegration methods and Narayan and Smyth (2005). First, ARDL is very easy to determine the cointegration relationship in the size of the sample without having to take into account the variable's magnitude whether it is stationary at the level I (0) or stationary level at the differentiation levels of I(1) (Ghatak & Siddiki 2001; Tang 2003).

Based on previous studies, the investment credit model developed using the ARDL 'Bound test' method is based on OLS estimation provided unrestricted error correction model (UECM) to see the existence of a long-term relationship and can explain the estimation of elasticity of long-term and short-term coefficients (Shrestha & Chowdhury 2005; Tang 2003). The Bannerjee et al, 1993 showed that the ARDL model, we can know that a dynamic error correction model (ECM) following a simple linear transformation, where the ECM integrates short run dynamics with long run equilibrium without losing long run information (Shrestha & Chowdhury 2005). To explain the ARDL model approach, the model specifications that show the relationship between investment credit, credit interest rate, third party fund, non-performing loans, export, inflation and regional income are formed as below:

$$CI_t = \alpha_0 + \alpha_1 SBK_t + \alpha_2 DPK_t + \alpha_3 NPL_t + \alpha_4 EXP_t + \alpha_5 INF_t + \alpha_6 PDRB_t + \varepsilon_t \tag{1}$$

Where, CI is investment credit, SBK is the credit interest rate, DPK is third party fund, NPL is non-performing loans, EXP is export, INF is inflation and PDRB is regional income. All variables in the form of logarithms except inflation, credit interest rates. Furthermore, to estimate the effect of investment credit, credit interest rate, third party fund, non performing loans, export, inflation and regional income in the long run is used by the ARDL model as done by Pesaran et al. (2001), which we adopted to examine the existence of short and long-run relationships between investment credit. Following Pesaran et al. (2001) we constructed the vector autoregression (VAR) of order p, denoted VAR(p), for the following investment credit function:

$$z_t = \mu + \sum_{i=1}^{p} \beta_i z_{t-i} + \varepsilon_t \tag{2}$$

where z_t is the vector of both x_t and y_t, where y_t is the dependent variable defined as real CI and x_t = (SBK, DPK_t, NPL_t, EXP_t, INF_t, $PDRB_t$) is the vector-matrix which represents a set of explanatory variables. There are four explanatory variables in this model, namely: demand for investment credit (CI), credit interest rate (SBK), third party funds (DPK), non-performing loans (NPL), exports (EXP), inflation (INF) and economic growth (PDRB). $\mu = [\mu_y, \mu_x]$, t is a time or trend variable, β_i is a matrix of VAR parameters for lag i. According to Pesaran et al. (2001), y_t must be I(1) variable, but the regressor x_t can be either I(0) or I(1). The further developed a vector error correction model (VECM) as follows:

$$\Delta Z_t = \mu + \varphi t + \theta Z_{t-1} + \sum_{i=1}^{p-1} \delta \Delta y_{t-1} + \sum_{i=0}^{p-1} \gamma_i \Delta x_{t-1} + \varepsilon_t \tag{3}$$

where Δ is the first-difference operator. We then partitioned the long-run multiplier matrix. θ as:

$$\theta = \begin{bmatrix} \theta yy & \theta yx \\ \theta xy & \theta xx \end{bmatrix}$$

The diagonal elements of the matrix are unrestricted, so the selected series can be either I(0) or I(1). If $\theta_{yy} = 0$, then y is I(1). In contrast, if $\theta_{yy} < 0$, then y is I(0). To derive our preferred model, we followed the assumptions made by Pesaran et al. (2001) in Case III, that is, unrestricted intercepts and no trends. After imposing the restrictions $\theta_{xy} = 0$, $\mu \neq 0$ and $\varphi = 0$, based on equation (1) investment credit function can be stated as the following unrestricted error correction model (UECM) as follows:

$$\Delta CI_t = \beta_0 + \beta_1 CI_{t-1} + \beta_2 SBK_{t-1} + \beta_3 DPK_{t-1} + \beta_4 NPL_{t-1} + \beta_5 EXP_{t-1} + \beta_6 INF_{t-1} + \beta_7 PDRB_{t-1}$$

$$+ \sum_{i=1}^{p} \beta_8 \Delta CI_{t-i} + \sum_{i=0}^{q} \beta_9 \Delta SBK_{t-i} + \sum_{i=0}^{r} \beta_{10} \Delta DPK_{t-i} + \sum_{i=0}^{s} \beta_{11} \Delta NPL_{t-i} + \sum_{i=0}^{t} \beta_{12} \Delta EXP_{t-i} + \sum_{i=10}^{u} \beta_{13} \Delta INF_{t-i}$$

$$+ \sum_{i=0}^{v} \beta_{14} \Delta PDRB_{t-i} + V_t$$

(4)

In equation (4), where Δ is the operator of the first difference. After regression of Equation (4), the Wald test (*F*-statistic) was calculated to discern the long-run relationship between the concerned variables. The Wald test can be conducted by imposing restrictions on the estimated long-run coefficients of demand for investment credit (CI), credit interest rate (SBK), third party funds (DPK), non-performing loans (NPL), exports (EXP), inflation (INF) and economic growth (PDRB). The null and alternative hypotheses are as follows:

H_0 : $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$ (no long-run relationship)
H_1 : $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq 0$ (has long-run relationship)

Equation (4) will be estimated using the ARDL Bound Test approach. Hypothesis test of ARDL model through the bound test with the null hypothesis, namely there is no cointegration. F value The calculated statistic will be compared with the critical value in the table used by Pesaran et al. (2001). If the statistical value is calculated to exceed the upper critical value, then the null hypothesis that is no long-term relationship is rejected. This implies the existence of a long-term relationship. Similarly, if the statistical value is less than the lower critical value, then the null hypothesis will not be rejected which means that no long-run relationship. Conversely, if the F statistic value is between the lower bound and upper bound table, the decision cannot be concluded (inconclusive).

To get the best ARDL model and be sufficient in terms of the number of lags and variables used, a diagnostic test is needed. For example, the Lagrange multiplier serial correlation test uses the Breusch-Godfrey test, ARCH test, Jarque Bera normality test and stability test using the Cusum $_{(SQ)}$ test.

DATA AND VARIABLES

Data used in 2000-2017 in quarterly form is sourced from the regional statistics center and Bank Indonesia. The data used in this study are the demand for investment loans, lending rates, third party funds non-performing loans, exports, inflation and regional income. All data for the above modifiers were replaced for the logarithmic value except the modifier for inflation (INF) data and credit interest rate (SBK) which were retained in its original nominal value. This study only examines the influence of external factors and internal factors on investment credit demand (CI). Internal factors are variable interest rate credit (SBK), third party funds (LDPK) and non-performance loans (LNPL), while the external factors comprise export variable (LEXP), inflation (INF) and regional income (LPDRB).

Root tests for Augmented Dickey-Fuller (ADF) introduced by Said and Dickey (1984) and the Philips Persons (PP), introduced by Philips and Perron (1988) will be performed to ensure stationary data. This analysis is carried out in the Autoregressive Distributed Lag Modeling (ARDL) approach, where the Ordinary Least Square (OLS) equation method is used to estimate UECM (Unrestricted Equilibrium Correction Model). The UECM budgeting was carried out by OLS combined at the original (long-term) equation and OLS at the level of the difference in lag (short term).

RESULTS AND DISCUSSION

The results of the Augmented Dickey-Fuller (ADF) test and the Philips & Perron (PP) test are presented in Table 1. Based on the ADF test statistic, it was found that all series, except for inflation (INF) and regional economy income (PDRB), is stationary at level. Such a mixed result is also suggested by the PP test statistics, it was found non-performance loan (NPL), export (*EXP*), inflation (INF) and regional economy income (PDRB) are stationary at level, that is, they are I(0) variables but not for other series, which demonstrated a non-stationary path. Nevertheless, both tests yielded a similar conclusion after first differencing, that is, all series are stationary at I(1). Obviously, the mixture of both I(0) and I(1) variables would not be possible under the Johansen procedure. This provides a good rationale for using the bounds test approach, or ARDL model, proposed by Pesaran et al. (2001).

TABLE 1. Results of the unit root tests

Variables	ADF		PP	
	Level	1st Difference	Level	1st Difference
Demand of investment credit (CI)	-1.4639 (3)	-4.1056*(11)	-0.6824 (13)	-10.2675*(10)
Credit interest rate (SBK)	-1.1342 (1)	-4.8301* (0)	-0.9907 (4)	-4.8301*(0)
Third party fund (DPK))	-0.0143 (0)	-8.3197* (0)	0.0138 (2)	-8.3200* (2)
Non performance loan (NPL)	-2.3045 (5)	-6.3089 *(11)	-3.6513*(4)	-19.9331*(15)
Export (EXP)	-1.6848(2)	-13.8182*(1)	-3.4243**(0)	-26.0491*(26)
Inflation (INF)	-3.0749*(0)	-5.8661*(3)	-3.5073**(4)	-7.1667*(3)
Regional economy income (PDRB)	-3.1226**(0)	-7.3232*(2)	-2.9392**(8)	-20.8508*(33)

Note: (*) shows a significant level of understanding of 1 percent, (**) is significant at the level of understanding of 5 percent and (***) significant at the level of understanding of 10 percent, namely, triumphantly rejecting the null hypothesis which states that the modifier does not reach stationary (non-stationary).
The number in brackets () are the optimum lag based on Akaike Information Criterion, Akaike (1977).
Source: Estimated results.

The estimation of Equation (4) using the ARDL model is reported in Table 2. Using Hendry's general-to-specific method, the goodness of fit of the specification, that is, R-squared and adjusted R-squared remains superior (0.9458 and 0.9093, respectively). The robustness of the model has been confirmed by several diagnostic tests such as the Breusch-Godfrey serial correlation LM test, ARCH test and Jacque-Bera normality and stability test using the Cusum $_{(SQ)}$ test. All the tests revealed that the model has the desired econometric properties, namely, it has a correct functional form and the model's residuals are serially uncorrelated, normally distributed homoscedastic. Therefore, the results reported are serially uncorrelated, normally distributed and homoscedastic. Therefore, the results reported are valid for reliable interpretation.

TABLE 2. Estimated ARDL model based on equation (4)

I. Estimates Model			
Variable	Coefficient	t-Statistic	Probability
CI_{t-1}	-0.239380	-5.004403*	0.0000
SBK_{t-1}	0.011613	4.824199**	0.0417
DPK_{t-1}	-0.303858	-3.337744**	0.0185
NPL_{t-1}	0.078261	2.412696**	0.0205
EXP_{t-1}	0.569750	2.671540**	0.0109
INF_{t-1}	0.000583	0.120717	0.9045
$PDRB_{t-1}$	0.004792	0.075050	0.9405
β_0	1.262175	1.393944	0.1710
ΔCI_t	-0.404838	-3.696341**	0.0492
ΔSBK_t	-0.085153	-4.032676**	0.0341
ΔSBK_{t-1}	0.039607	2.070957**	0.0449
ΔDPK_t	0.454996	1.849595***	0.0718
ΔDPK_{t-1}	-1.329407	-4.628903*	0.0000
ΔDPK_{t-2}	-0.839909	-2.606380**	0.0128
ΔNPL_t	0.151633	5.330429*	0.0000
ΔNPL_{t-1}	-0.095134	-1.910996***	0.0632
ΔNPL_{t-2}	-0.075577	-1.558568	0.1270
ΔNPL_{t-3}	-0.087470	-2.182952**	0.0350
ΔEXP_t	0.427317	4.145779*	0.0002
ΔEXP_{t-1}	-0.157969	-0.857689	0.3962
ΔEXP_{t-2}	-0.241521	-2.313321**	0.0259
ΔEXP_{t-3}	-0.175943	-2.948506*	0.0053
ΔINF_t	0.011190	3.074264	0.0412
ΔINF_{t-1}	-0.003440	-0.877168	0.3856
ΔINF_{t-2}	-0.001108	-0.350615	0.7277
$\Delta PDRB_t$	-0.029321	-0.604570	0.5489
$\Delta PDRB_{t-2}$	-0.005702	-0.114899	0.9091
II. Criteria Model – Goodness of fit			
R^2 = 0.9458 Adjusted R^2 = 0.9093 F-Statistic = 25.8752 [0.0000]*			

Note: * significant at the 1 percent level of significance, ** significant at 5 percent significance level,
     * * * significant at the 10 percent significance level

DIAGNOSTIC TESTING

Table 3 summarizes the results of the diagnostic tests performed on the residuals. The decision of the test for normality, heteroscedasticity and serial correlation shows that the data is normal and not the heteroscedasticity and serial correlation problems at the tier of 5 percent.

TABLE 3. Diagnostic Testing Result

Internal Factor Test Performed for	Test	Statistic test	Conclusion
Normality	Jarque-Bera	9.3203	Residuals normally distribution
Heteroscedasticity	ARCH	0.2992	
	White	1.9221	Residuals are Homoscedasticity
	Breusch-Pagan-Godfrey	1.6871	
Serial Correlation	Breusch-Godfrey	2.1569	No Serial Correlation
	Durbin Watson	1.9025	
Stability test	Cusum (SQ)		Structural Break

Note: * significant at the 1 percent significance level, ** significant at 5 percent significance level,
* * * significant at the 10 percent significance level.

In Table 4, Describe the results of the boundary cointegration test, using the hypothesis $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$, against its alternative $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq 0$ is easily rejected at the 1 percent significance level. The computed F-statistic of 3.9458 is greater than the upper critical bound value of 3.61, thus indicating the existence of a steady-state long-run relationship among demand for investment credit, credit interest rate, third party funds, non-performing loans, exports, inflation and economic growth.

TABLE 4. Bounds test for cointegration analysis Based on Equation (4)

Critical value	Lower bound value	Upper bound value
1%	3.15	4.43
5%	2.45	3.61
10%	2.12	3.23

Computed F-statistic : 3.9458 (signficant at 5 percent marginal level),
Critical value are sited from Pesaran et al (2001), Table C1(III): Unrestricted intercept and no trend.

The estimated coefficients of the long-run relationship between demand for investment credit, credit interest rate, third party funds, non-performing loans, exports, inflation and economic growth are expected to be significant, that is:

$$CI = 1.262175 + 0.0485SBK_t - 1.2693DPK_t + 0.3269NPL_t + 2.3801EXP_t + 0.0024INF_t + 0.0200PDRB_t \quad (10)$$

Equation (10) shows that variables such as credit interest rates for non-performing loans, exports, inflation and economic growth are positively correlated with demand for investment credit, with estimated elasticities of 0.0485; 0.3269; 2.3801; 0.0024 and 0.0200. This shows that a 1 percent increase in credit interest rates, non-performing loans, exports, inflation and economic growth will result in an increase in investment credit demand of 4 percent each for credit interest rates; 32.69 percent for non-performing loans; 23,801 percent for exports; 0.24 percent for inflation and 2 percent for economic growth. Accordingly, an increase in interest rates will stimulate an increase in investment but the effect is greater. Increasing investment will also impact the demand for investment credit, and therefore elevate its provision. This should suggest that if the community or companies need funds, they can still borrow from banking. This explanation is concurrent with the classical theory that interest rates are not determinants in the demand for money (Tang et al. 2015; Yol 2007). While third party funds have a negative impact on investment credit demand. The decline in demand for investment credit can reduce the absorption of investment, thus slowing economic growth.

The causality effect can be obtained by restricting the coefficient of the variables with its lags equal to zero (using a Wald test) stated in Table 5. If the null hypothesis without causality is rejected, then concludes that Granger's relevant variables cause the demand for investment credit. The results of the research obtained by increasing credit interest rates, non-performing loans, exports, inflation and regional economic growth will increase the demand for investment credit and have a positive relationship in the long run. Based on the results of the study consistent with the researchers before this. From the results of the short-term findings, it can be concluded that the variable interest rates, third party funds, non-performing loans, exports, inflation and regional economic growth have a positive and significant relationship to investment credit demand except the variable interest rates and regional economic growth are not significant in short-term. This means that third-party funds, non-performing loans, exports, inflation occur in granger relations at a significant level of 1 percent except for credit interest rates and regional economic growth.

TABLE 5. The long-run elasticities and short-run causality of credit investment in West Sumatra based on equation (4)

I. Long run estimation coefficient	
Variable	Coefficient
SBK	0.0485**[a]
DPK	-1.2693**[a]
NPL	0.3269**[a]
EXP	2.3801**[a]
INF	0.0024
PDRB	0.0200

II. Short-run Causality test (Wald test F-Statistic)					
ΔSBK	ΔDPK	ΔNPL	ΔEXP	ΔINF	$\Delta PDRB$
0.2439	8.8891	12.7188	12.6272	3.6265	0.1742
[0.7847]	[0.0001]*	[0.0000]*	[0.0000]*	[0.0209]*	[0.9132]

Note: SBK = Credit interest rate; DPK = Third party fund; NPL = Non-performance loan; EXP = Export; INF = Inflation
PDRB = Regional economy income
*,**,*** = denote significant at 1 percent, 5 percent, 10 percent level, respectively. Figures in brackets refer to marginal significant. [a] Long term elasticity coefficient is obtained by equation 8 of Bardsen (1989).

CONCLUSION AND RESEARCH IMPLICATION

This paper discusses internal and external factors at the request of investment credit in West Sumatra. Using Autoregressive Distributed Lag (ARDL), there is an influence between external and internal factors on the demand for long-term and short-term banking investment loans. From the results of the study, it can be concluded First, the impression of external factors that cause an increase in exports, inflation and regional economic growth, will lead to demand for investment credit but the increase in exports only has a significant long-term effect. While changes in exports and inflation in the short term will disrupt the resilience of banks, especially the demand for investment loans. second, the impression in internal factors of credit interest rates and non-performing loans has a positive and significant relationship, but in the short term, only an increase in third-party funds and non-performing loans causes an increase in investment credit demand and a positive and significant relationship in the short term.

Furthermore, in terms of external factors, regional economic growth does not show a significant relationship to investment credit demand, both in the long term and short term. The results of this study are in line with previous studies by Almeida et al. (2012). In addition, the two impressions of external agents that cause disruption to banking resilience are exports, rising prices, and gross regional domestic products. Macroeconomic changes, namely inflation provide a disruption to banking resilience in the short term. However, changes in exports and regional domestic products can affect long-term stability in demand for investment loans.

The results from this study provide important implications for efforts to improve the stability of investment credit demand in general banking in West Sumatra. First, the distribution of investment credit funds will encourage increased investment in small, medium and large businesses and other economic sectors. So that economic activities between regions can run well which has an impact on increasing regional economic growth. Second, the research implications are also related to the provision of investment credit rates to creditors, thereby reducing credit risk in the future. Third, supervision of fair inflation by banks, especially in economic sectors such as agriculture, plantations in other sectors for export purposes. Fourth, from the findings, it also implies that improvements need to reduce investment credit interest rates in the short term. So that exporters can provide loans to banks with the aim of investing in economic sectors such as the property sector.

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