

Brokerage

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The Effect of Broker–Borrower Interaction on Mortgage Defaults

Abstract

This research proxy is the use of the distance between broker and borrowers with the aim of exploring the interaction between brokers who provide consulting services to prospective property buyers. Meanwhile, the view from the banking side is the assessment of the risk profile of prospective mortgage borrowers. The research data collection is information on mortgage borrowers from Private Banks in Surabaya branches from the period 2015 - 2020 who used the help of real estate agents when buying a house and collected 1295 transactions. Data processing using probit regression. The test results show that the interaction between brokers and borrowers using distance as a proxy has no significant impact on mortgage defaults. Borrower interest rates raised by the company showed a substantial negative relationship with mortgage default. The study also reveals that borrower income has no impact on mortgage default. The managerial implication for banks is to determine the strategy of cooperation with property brokers to increase mortgage funding.

Keywords: Broker dan Borrower Interaction; Borrower Income; Borrower Interest Rates; Mortgage Default

1. Introduction

Property agents or broker in Indonesia have a direct connection to the real estate sector. Broker property plays a crucial role in helping to market these assets to the public. Residential properties, including homes, apartments, and other kinds of property products, are offered (Harjono, 2016). Property brokers must be familiar with several fundamental concepts, such as the laws governing the purchase and sale of real estate and the need of bank financing references for potential clients (Agarwal, Amromin, Chomsisengphet, & Evanoff, 2009; Harjono, 2016). Agents also serve as financial advisors to potential purchasers, particularly when the two parties interact in person (face-to-face). The brokers-borrowers interaction can be done either directly face-to-face through other communication media, such as using a mobile phone or social media such as WhatsApp.

Numerous past studies have illustrated how face-to-face contacts could affect borrowers' mortgage credit performance. Consumers prefer in-person interaction while preparing for a mortgage and purchasing a property (Lee, 2002). While self-directed learning or counseling conducted on mobile devices or other gadgets has no impact on borrowers' usage of the expedited repayment option, face-to-face encounters increase the possibility that borrowers will make early repayments (Ding, Quercia, & Ratcliffe, 2008). Hirad & Zorn (2001) noted that interactions with other communication medium and social media had no discernible impact on the credit performance of mortgage borrowers, whereas those who had previously had face-to-face interactions had a lower risk of default.

Interest rates have become a crucial factor for potential mortgage borrowers to think about. With the specified interest rate, both the total amount of debt due by the borrower and the monthly installment payments rise. With greater payments, the borrowers' net income will be lower after subtracting their monthly loans. These can affect the borrowers' credit status and raise the risk of default (Syaleh, 2018). To lessen the impact of default risk, the internal bank policy uses two types of interest rates: fixed interest rates and floating interest rates. Furthermore, interest rates affect the Non-Performing Loans (NPL) levels in Indonesian banks (Soebagio, 2005; Fakhrunnas, Nugrohowati, Haron, & Anto, 2022).

Another factor, Itoo et al (2013) stated that income influences the risk of mortgage default. A considerable danger of default exists for those with low income (Firestone, Order, & Zorn, 2007). Itoo et al (2013) added that a high loan amount or value of mortgage debt increases the likelihood of default. Due to this, the bank that offers mortgage facilities usually limits the distribution of mortgages based on the potential borrowers' income (Rojas, 2021). The value of the asset used as collateral will be considered on par with the debt's or the mortgage financing's values (McDonald & Thornton, 2008). According to Kim & Lim (2021), the bank considers a higher risk of default, the higher the value of the assets pledged as security.

For the bank to consider reducing the risk of credit failure, the existence of collateral or a guarantee from the borrowers is required (Chakrabarty, 2012). The type of credit guarantee is used as collateral for mortgage facilities, one of which is in the form of residential property or property for residential use, according to the explanation from Harjono (2016). Only consumptive guarantees, like homes and apartments, are permitted for mortgages that contain consumer loans. Credit with consumable and solely used collateral will have a lower chance of default (Conklin, 2016). This is because of the psychological impact that the guarantee has on the borrowers; if they default on their payments, the collateral will be seized, leaving them without a place to live.

Borrowers may face default credit risk if they fail to meet their obligations to pay principal and interest installments in accordance with the terms of the credit agreement, which can jeopardize their creditworthiness (Indrawan, 2013; McDonald & Thornton, 2008; Syaleh, 2018). A condition in which borrowers are unable to repay in accordance with the original agreement, allowing banks to seize the guaranteed collateral (Itoo, Mutharasu, & Filipe, 2013). Otoritas Jasa Keuangan Republik Indonesia (2019) provides a borrowers classification status so that banks can provide a different approach based on the quality of borrowers repayments, through an assessment of the quality of loan disbursement, which has been set into five qualities, including “Adequate”, “Under Special Consideration”, “Substandard”, “Doubtful”, and “Non-performing”.

The purpose of this study is to take into account the distance between the real estate agent's office and the property purchased by the borrower, extending research on broker-borrower interactions (Conklin, 2016). The impact of distance in obtaining information from potential borrowers, which is useful for banks to assess before lending, is also extended in this study by Agarwal & Hauswald (2010). In addition, this study refers to Agarwal et al. (2009), which shows how contact between real estate agents who provide real estate advice to potential borrowers can reduce the likelihood of mortgage default. We also contribute to mortgage finance from several previous studies, including Agarwal et al. (2009), Ambrose & Conklin (2014), Conklin (2016), Kim & Lim (2021), Hirad et al. (2001), and Rojas (2021).

2. Literature review

Credit on the one hand is a creditor or lender who makes a transfer of money or resources to another party, called a debtor or borrower, where ² the second party does not immediately pay the first party, but promises to return it later. ² The second party does not pay the first party immediately, but rather promises to return it later date (Prem, 2020). Both parties build a mutually beneficial working relationship. Granting credit by the bank to prospective borrowers through a process known as 5C (character, capacity, capital, collateral, and condition of economy) (Wasiuzzaman, Nurdin, Abdullah, & Vinayan, 2020).

Default risk or credit risk is the risk that arises if the borrower fails to fulfil its obligation to pay principal and interest instalments as agreed in the credit agreement (Syaleh, 2018). The possibility of default can be caused by several factors such as inaccuracy when analyzing credit applications so that they cannot predict the risk of default and the existence of deliberate or accidental elements from borrowers so that they cannot fulfil their obligations. The view of banks in dealing with defaults is to rescue bad debts in ways such as rescheduling (extending the credit period to reduce the number of installments that must be paid every month), reconditioning

(capitalization of interest, postponement of interest and principal payments, lowering interest rates, or waiving interest), restructuring (increasing the amount of credit or equity), combination (combination of the three previous methods), confiscation of collateral, if the borrower does not have good faith to repay the debt (Ratnasari, 2012).

a. Broker-borrowers Interaction

According to Mulya & Japariato (2014) and Rafitas (2006), a property agent or broker is a legal entity with a permanent residence and a property brokerage business license. The Minister of Trade Regulation of the Republic of Indonesia has regulated the sustainability of property trade intermediary companies as well as parties referred to as property trade intermediary experts or known as Broker (Menteri Perdagangan Republik Indonesia, 2017). Broker can act as financial consultants because prospective buyers frequently inquire about issues other than the property itself, such as legality management, the availability of financing from various financial institutions, and so on (Conklin, 2016). Broker should arm themselves with knowledge such as the legal basis for buying and selling property, which can help and speed up the negotiation and transaction process with buyers (Harjono, 2016).

Prospective borrowers will understand more complex mortgage information if they receive it directly, and this will affect the performance of the borrowers' mortgage payments in the future (Conklin, 2016). Borrowers who interact with brokers learn more quickly and are less likely to default (Agarwal, Amromin, Chomsisengphet, & Evanoff, 2009; Agarwal & Hauswald, 2010). Face-to-face interactions between brokers and borrowers have a greater impact (Conklin, 2016). Buyers can see, feel, and be interested in the details explained to them in person (Lee, 2002). Consultations that begin with broker-borrower interactions can help banks reduce risky defaults (Agarwal, Amromin, Chomsisengphet, & Evanoff, 2009; Conklin, 2016). In addition, Agarwal et al. (2009) added that prospective buyers who use consulting services with real estate agents have a low default rate. Based on studies from Conklin (2016) and Agarwal et al (2009), this study examines the brokers-borrowers interaction, which indicates the effect of distance on mortgage facilities from borrowers. The distance factor also influences information gathering for banks to make credit facility decisions to prospective borrowers (Agarwal & Hauswald, 2007; Alessandrini, Presbitero, & Zazzaro, 2009; Degryse & Ongena, 2005).

H₁: Broker-borrower interaction affects mortgage default.

b. Interest Rates

The Indonesia's Central Bank's interest rate policies have resulted in an increase in non-performing loans in several Indonesian banks (Soebagio, 2005). Recent study from Kösem (2021), a decrease in the central interest rate can increase housing prices and mortgage loans via mortgage interest rates. Meanwhile, Conklin (2016) claims that borrowers with higher interest rate loan facilities are more likely to default. The higher the interest rate offered, the less borrowers' ability to pay credit installments, resulting in a higher risk of mortgage default (Morgan & Pontines, 2014). The bank compensates for the increased risk of lending by charging a higher interest rate (McDonald & Thornton, 2008).

H₂: Credit characteristics (interest rate) affect mortgage default.

c. Type Of Credit Collateral

Borrowers who have assets as collateral will find it easier to obtain credit (Hanedar, Broccardo, & Bazzana, 2014). Study from Teo & Ong (2005), found that the type of credit collateral has a significant positive effect on mortgage defaults. The lower the interest rate, the higher the collateral value (Comeig, Fernández-Blanco, & Ramírez, 2015). In practice, consumptive property such as houses, shop houses, apartments, small office-home offices (SOHO), and vacant land that have high values can be used as collateral for a mortgage application (Harjono, 2016). According to Conklin (2016), borrowers with investment-oriented collateral are more likely to default, whereas borrowers with consumer property guarantees are less likely to default. The collateral's value influences the borrower's default risk. The greater the value of the mortgage guarantee, the greater the borrower's sense of obligation to repay the debt. Borrowers will experience fear or loss if they fail to pay and the bank seizes high-value collateral (Nainggolan, Hasan, & Kamaliah, 2018). The bank, on either hand, will regulate how much credit facilities can be disbursed to borrowers depending on the Loan-To-Value (LTV) ratio and type of credit. The higher the LTV ratio, the greater the value of the type of property collateral pledged to the bank (McDonald & Thornton, 2008). A higher LTV ratio increases the possibility of a higher default (Campbell & Cocco, 2015; Itoo, Mutharasu, & Filipe, 2013; McDonald & Thornton, 2008).

H₃: Type of Credit Collateral affects mortgage default.

d. Borrower Income

Borrowers' income is another factor that can be considered before providing mortgage financing (Campbell & Cocco, 2015; Fout, Li, Palim, & Pan, 2020; Goodman, Seidman, & Hu, 2014). Recent study from

Rojas (2021), stated the reason for the bank as the provider of mortgage facilities is that credit distribution than limited based on the borrower's income. According to Joo & Pauwels (2002), individuals with higher incomes are more likely to seek professional advice when making financial decisions. Meanwhile, creditors with low and middle incomes are having a more tough time obtaining loan facilities to purchase a private home (Fout, Li, Palim, & Pan, 2020). Borrowers with low or middle incomes have fewer financial reserves and a higher debt-to-income ratio, which means that if their income changes significantly, they have a high risk of default and collateral confiscation (Ding, Quercia, & Ratcliffe, 2008). Some credit risk would occur if the borrower failed to pay, and the borrower experiences an income shock, which can affect the borrower's ability to pay (Hatchondo, Martinez, & Sánchez, 2015).

H₄: Borrower Income affects mortgage default.

3. Methods

The sample for this study was chosen using a purposive sampling method, which is a sampling technique that includes specific considerations or special selection and aids in providing data that is relevant to the research objectives. The borrowers in this study were drawn from the mortgage database of the private bank (with the biggest market capitalization listed on the Indonesian stock exchange) Surabaya branch between 2015 and 2020. The sampling criteria are the borrowers has a Mortgage facility and the mortgage process is accompanied by the services of a real estate agent or brokers.

The secondary data used in this research is from the mortgage borrowers of the private bank in Surabaya branch from 2015-2020 period. The data collection methods used are:

- Collect data on distance between broker-borrower office locations, credit characteristics data (interest rates, debt values, and property prices), data on types of credit collateral, borrower income, from internal company data. The data that has been obtained will be processed and analyzed quantitatively.
- Literature research by collecting and studying books and journals related to the research topic so that research has a theoretical basis and appropriate analytical techniques in solving problems.

The Maximum Likelihood estimation method used in research statistical analysis to find a specific point to maximize a function (George & Mallery, 2018). This estimation technique is used in the development of new test techniques to estimate the distribution parameters of the data. The Probability Unit (Probit) model was used in this study, with the following steps:

- Gathering data on the borrower's loan facility's collectability from the start of the current loan up to two years and classifying whether the borrower has ever failed to pay within two years.
- Obtaining data from the company database on the distance in kilometers between the brokerage office and the collateral.
- Conduct a ¹ model significance test to determine the effect of the independent variables on the dependent variables in the model by examining the Likelihood Ratio parameters (Harlan, 2018). If p-values are less than ¹ 5%, the independent variable has a significant effect on the dependent variable.
- Determine the goodness-of-fit from the regression model to predict the value of data observations. If the p-values > 0.05 the model can provide an appropriate description or prediction based on observational data (Harlan, 2018).
- Determine the coefficient of determination Pseudo-R² (McFadden's R-Squared) to see how the independent variables interact with ¹ the dependent variable. The coefficient of determination measures how well the independent variable explains the dependent variable.
- Logistic regression analysis uses the link between two or more independent variables in the form of interval or categorical data, with one variable having two or more categories used to predict or predict a variable value depending on the independent variable (Hosmer & Lemeshow, 2000). We used logistic regression to explain nonlinear independent and dependent variables as well as the dependent variable's anomalous distribution, which cannot be described by a standard linear regression model. The study's logistic regression equation is as follows:

$$\Pr(Y_i = 1) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$

description:

α = constant value

β = coefficient of regression

X1 = Broker-borrowers interaction using distance (*kilometers*)

X2 = Interest Rates (%)

X3 = Type of Property (0= House, Apartment, 1= Shophouse, SOHO, Homestay)

X4 = Income (*rupiah*)

- Calculate the odds ratio to compare the likelihood that an event will occur to the likelihood that it will not.

The odds ratio is thought to have a reduced likelihood of influencing the dependent variable if the probability value is 0 and a greater possibility of doing so if the probability value is 1 (Harlan, 2018).

4. Results

We used 1295 data from the mortgage borrowers' payment database of the private bank. The information was gathered using data from the Surabaya City branch office during 2015-2020. Additionally, based on the requirements from the Financial Services Authority's (2018) collectability status, the researcher divides the data into two categories: "Adequate" and "Default" status. The default status comprises of collectability status, which is a combination of data grouping with "Substandard", "Doubtful", and "Non-performing" status. Descriptive statistical information of mortgage borrowers is provided below:

Table 1 Descriptive Statistic of Mortgage Borrowers

Variable		Adequate		Default		Total Sample	
		Total	%	Total	%	Total	%
Broker-Borrower Interaction							
Distance (kilometer)	< 25	1217	93.98%	12	0.93%	1229	94.90%
	25 – 50	33	2.55%	-	-	33	2.55%
	> 50	31	2.39%	2	0.15%	33	2.55%
Interest Rates	< 8 %	665	51.35%	11	0.85%	676	52.20%
	8 – 10 %	608	46.95%	3	0.23%	611	47.18%
	> 10 %	8	0.62%	-	-	8	0.62%
Type of Credit Collateral							
Property Type	House	964	74.44%	12	0.93%	976	75.37%
	Apartment	52	4.02%	-	-	52	4.02%
	Shophouse	56	4.32%	1	0.08%	57	4.40%
	SOHO	203	15.68%	1	0.08%	204	15.75%
	Homestay	4	0.31%	-	-	4	0.31%
Income (Million Rupiah)	< Rp 10	28	2.16%	1	0.08%	29	2.24%
	Rp 10 - 50	1216	93.90%	13	1.00%	1229	94.90%
	> Rp 50	37	2.86%	-	-	37	2.86%

Table 1 displays the descriptive statistics of mortgage borrowers who have an "adequate" payment status of 1217 borrowers (93.98%) and the distance between the broker and the borrower is less than 25 kilometers. Meanwhile, for the same distance, 12 (twelve) borrowers have "default" status. In the credit characteristics factor, 0.85% of borrowers defaulted at interest rates below 8%, When viewed from interest rates of less than 8% - 10%, the number of borrowers with "adequate" status were 665 borrowers (51.35%) and 608 borrowers (46.95%). Borrowers with "adequate" status for home ownership loans and SOHO loans, with income between Rp. 10,000,000 - 50,000,000 per month.

Furthermore, we used probit logistic regression analysis technique with EViews software. The likelihood ratio value is used in the regression analysis step to test the independent variables on the dependent variable simultaneously. The McFadden R-Squared value is used to show the contribution of the independent variables to the dependent variable collectively. If the coefficient is the closest to 1, it can be interpreted that the independent variable has a stronger influence to explain changes to the dependent. A regression model that is fit or that takes the value of the data observation into account is predicted by testing the goodness of fit estimate with a p value > 0.05. (Harlan, 2018). We used the probit logistic regression model on all variables and interpreted the odds ratio value, which is the calculated difference between success and failure probabilities and is 0 for adequate status and 1 for default.

Table 2 Probit Regression

Variables	Coeff.	Odds Ratio
Broker-Borrowers Interaction		
Distance	0.000817	1.002
Interest Rates	-0.192115**	0.600**
Type of Credit Collateral		
Property Type	-0.421318	0.304
Income	-0.0000000000427	1.000
Probit Regression Model Information		
McFadden R ²	0.048063	0.0472
Goodness-of-Fit Prob. Chi ²	0.7492	0.7295
Prob (LR statistic)	0.115028	0.1211

Notes: ** p ≤ 0.05

The regression equation is created based on the outcomes of the probit regression as provided below:

$$Pr(Default_i = 1)$$

$$= -0.87634 + 0.000817 Distance - 0.192115 InterestRates \\ - 0.421318 TypeofProperty - 0.0000000000427 Income$$

According to the findings of the regression test conducted using the distance indicator and the broker-borrower interaction, there was no significant impact. Moreover, there is a significant relationship between the likelihood of mortgage defaults and Interest Rate. As a result of the test results demonstrating that Interest Rates have a significant impact on mortgage default, odds ratio values were used to describe the likelihood that a mortgage would be in adequate or in default. The interest rate's odds ratio value indicates a probability of 0.6 times greater to influence mortgage default.

According to the regression results, there is no discernible relationship between mortgage defaults and the type of credit collateral, which is property type. What types of guarantees can be accepted for applying for a

mortgage at the bank has been determined by the policies that have been implemented by the private bank, regarding risk mitigation from the beginning before loan disbursed. Based on the sample data gathered (see Table 1), this action can help reduce the number of defaults, which could be as low as 14 out of a total of 1295 mortgage borrowers for the private bank during 2015-2020 period. The bank interprets the prospective borrower's income as a measure of their ability to repay the loan that we used on the regression between income and mortgage defaults. As a result, income has a no impact on mortgage defaults.

5. Discussion

Regression test results on the broker-borrower interaction with distance indicator show it has not significant influence on mortgage default. Based on the numbers on mortgage loans disbursed to borrowers by private bank, 1217 borrowers were less than 25 meters away from the lender for most of their loans. This suggests that private banks take precautions when granting loans to reduce the risk of default. Close proximity makes it easier for banks to acquire data on the profile of prospective borrowers (Agarwal & Hauswald, 2007; 2010). Broker and borrower interactions based on distance need further study to determine their impact on defaults. Good brokers tend to provide good financial advice so that borrowers get products that suit their needs and provide advice as borrowers go through the loan application process and beyond. Face-to-face meetings can also be used as an indicator of the broker-borrower relationship (Conklin, 2016).

The interest rate variable that influences default reveals a negative correlation coefficient, which means that the higher the interest rate the bank charges mortgage borrowers, the greater the repayment of credit facilities will be. This is because, according to company internal policy, they must set a high interest rate and offset it with a long-fixed interest rate payment period to offer mortgage facilities to borrowers during the 2015–2020 period. Therefore, the borrower will gradually make longer payments. Based on this result, this finding is in line with McDonald & Thornton (2008) explanation that the higher the interest rate offered by the bank, the more it is made to mitigate the high credit risk associated with providing mortgage facilities to borrowers.

Banks offer longer loan terms and options for fixed or floating interest rates (floating or adjustable-rate mortgages) in response to research showing a negative correlation between interest rates and mortgage defaults (Harjono, 2016; McDonald & Thornton, 2008). The application of a low interest rate is typically paired with a shorter fixed period, according to internal regulations from the firm. This means that after the short-fixed period expires, the borrower will enter a floating interest period, with the condition of the interest being evaluated by the company every six months (McDonald & Thornton, 2008) and based on economic conditions at the time of

evaluation. This paper seeks to contribute to previous studies by Kim & Lim (2021), which explains that the bank takes into account the risk of default by implementing a policy of charging prospective borrowers higher interest rates the more valuable the assets pledged as collateral.

In contrast to earlier research by Teo & Ong (2005) which explains that the type of credit collateral has a significant positive impact on mortgage defaults, the results show that property type has no effect on mortgage defaults. Additionally, this private bank already maps out its consumer and productive goals and implements a diversified loan portfolio which complies with the Consumer Credit Manual's guidelines. Most borrowers who have residential property collateral types can secure mortgage facilities, which could connect credit risk with consumptive purposes. This has to do with the possibility of mortgage given the type of residential property's extremely broad market scope (Bian, Lin, & Liu, 2018). Moreover, according to Bian et al. (2018), bank officers who are appraisers of residential property types are also able to estimate the value of real estate using sales prices that are comparable to the current market value. Finally, income is seen by banks as the payment ability of the borrower. Low income will have difficulty obtaining mortgage facilities (Fout, Li, Palim, & Pan, 2020) and tend to default more easily (Agarwal, Green, Rosenblatt, & Yao, 2014). This illustrates that banks pay attention to high income levels that can be used to maintain a loan portfolio with current payment status. However, this study proves that there is no significant effect of income on mortgage default. The results of this study need to be tested further to understand the relationship between income and default.

6. Conclusions

The test results show that interest rates influence mortgage default, but broker-borrower interaction, type of loan collateral and income of prospective borrowers do not have a significant effect on the probability of mortgage default. This study explores broker-borrower interaction using distance as proximity and other factors that influence mortgage default. However, according to the processed mortgage data, banks seem to lend too often to people in their neighborhood. The proximity of potential borrowers to the bank will result in greater time and cost savings during the information gathering process. However, these conditions are proven to not significantly affect defaults.

Furthermore, the results found that only interest rates significantly affect mortgage bad debts. The higher the interest rate charged by banks to mortgage borrowers, the greater the repayment rate of the credit facility. To reduce the high credit risk in providing mortgage facilities to borrowers, banks will set high interest rates and compensate them with a lengthy period of interest rate payments. In addition, banks also provide longer loan

terms and a choice of fixed or floating interest rates. The company will evaluate these policies every six months depending on the economic conditions at the time of evaluation. Banks will implement policies to charge higher interest rates to potential borrowers as they use more valuable assets pledged as collateral to account for the risk of default.

The limitations of this study are expected to be further developed with the use of data before the pandemic and when the pandemic occurred in the 2020s will provide important insights into the variability in objectives, roles, and regulations. In addition, since we only express distance as proximity when broker-borrowers interact, we recommend using more precise measurements, such as nearest, middle, and farthest distances, to gain insights into areas where future research could have a greater impact on mortgage defaults. The theoretical contribution of this research is that mortgage default is more influenced by the interest rate set by the mortgage bank. Thus, managerially, banks should pay more attention to changes in loan interest rates so as not to burden mortgage borrowers to avoid the opportunity to default.

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