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The Debtor's Behavior in Microfinance Industry: An Exploratory Study of Measurement Scales

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Abstract

This study is an exploratory descriptive research that attempts to explore the measurement indicators of debtors' behavior in the microfinance industry. It employs as much of previous studies showed little attention in the relation of debtor's behavior and non-performing loans. On the contrary, they spotlight more on the banking-specific information and macroeconomics factors. Therefore, this research tries to discover the debtor's behavior which is assumed to have an impact on non-performing loans. The behaviours which employed and proposed are impulsiveness, risk-taking behavior, and trustworthiness. This study aims to inquire the measurement scales of proposed behaviors and test the validity and reliability of those indicators by employing exploratory factor analysis (EFA). The result shows three indicators accepted being a measuring instrument of impulsiveness, two for risk-taking behavior, and four signs for trustworthiness. It also examines in the descriptive analysis of the debtor's behavior based on their socio-demographic criteria such as gender, age, marriage status, and wage. The research result would give an insight into both empirical and practical advantages in terms of microfinancing management. Theoretically, this paper serves as a valid and reliable debtors' behavior measurement scales that would contribute for future research in testing the relation of such behavior variables to non-performing loans.

Kata Kunci:
Kredit bermasalah; Kredit mikro; Perbankan; Lembaga keuangan; Penilaian Kredit

Abstrak

Penelitian ini merupakan penelitian deskriptif eksploratif yang berupaya menggali indikator pengukuran perilaku debitur dalam industri keuangan mikro. Penelitian-penelitian sebelumnya menunjukkan sedikit perhatian dalam hubungan perilaku debitur dan kredit macet. Sebaliknya, mereka lebih menyoroti informasi khusus perbankan dan faktor makroekonomi. Oleh karena itu, penelitian ini mencoba untuk mengetahui perilaku debitur yang diduga berdampak pada kredit macet. Perilaku yang digunakan dan diusulkan adalah impulsif, perilaku pengambilan risiko, dan kepercayaan. Penelitian ini bertujuan untuk mengetahui skala pengukuran perilaku yang diusulkan serta menguji validitas dan reliabilitas indikator tersebut dengan menggunakan analisis faktor eksplorasi (EFA). Hasil penelitian menunjukkan bahwa terdapat tiga indikator yang diterima sebagai alat ukur impulsif, dua indikator untuk perilaku pengambilan risiko, dan empat indikator untuk kepercayaan. Analisis deskriptif juga mengkaji perilaku debitur berdasarkan kriteria sosio-demografis seperti jenis kelamin, usia, status pernikahan, dan upah. Hasil penelitian ini akan memberikan wawasan tentang manfaat empiris dan praktis dalam pengelolaan keuangan mikro. Secara teoritis, penelitian ini menyajikan skala pengukuran perilaku debitur yang valid dan reliabel yang akan berkontribusi untuk penelitian di masa depan dalam menguji hubungan variabel perilaku tersebut dengan kredit bermasalah.

1. Introduction

Based on the data from The Financial Services Authority (OJK) of Indonesia, the credit in the micro sector industry increased by 12.5%. However, the rise of credit has been

followed by increasing non-performing loans in micro-industry. Consider the data, the increasing of non-performing loans are 28% every year. It should be serious attention when the increase of credit lending less than the increase of its non-performing loans has meant that such financing activities did not create economic growth. Even, it could threaten financial stability as a whole. Therefore, it needs a study that is directed to diminish the extent of non-performing loans.

Many prior researchers examined many variables which affected non-performing loans. It such divide into two categories, first, the scholars who examined the variables derived from the internal factors of financial institutions, and the second who examined the external factors of financial institutions. For example, based on prior research the internal factors of financial institutions such as capital adequacy ratio, Loan to deposit ratio, return on equity (ROE), return on assets (ROA), and management quality affected to non-performing loans (Godlewski, 2005; Garcia-Marco & Robles-Fernandez, 2008; Abid et al., 2014; Ghosh, 2015; Çifter, 2015). The capital adequacy of financial institutions implied how much capital owned by financial institutions, it means that the more money held, the greater their capital can cover the likelihood of non-performing loans. Therefore, the financial institution can push down the level of their non-performing loans.

The external factors which have examined and related to non-performing loans of financial institutions are the countries' conditions of macro and microeconomics (Louzis et al., 2012; Saba et al., 2012; Messai & Jouini, 2013; Skarica, 2014; Kjosevski & Petkovski, 2017; Festić et al., 2011). Macroeconomics such as inflation, unemployment rate, interest rate, is a systematic risk which affected the uncertainty of business, and as is common knowledge that the worse the macroeconomic conditions, the more difficult the debtor to pay their debt. Beside of that, prior research like Amuakwa-mensah et al. (2017) entered both of variables into their research, and they found that all variables affected to non-performing loans. According to much prior research, the internal factors of financial institutions related to bank-specific factors, then external factors related to macroeconomics and microeconomics. Beyond these factors, Noglo & Androuais (2015) found that the qualitative dimensions of the debtor such as sex, age, ethnic, occupation influenced non-performing Loan of financial institutions.

Recently, microcredit analyzing tools of financial institutions has only focused on such mentioned variables. Financial institutions believe that bank-specific factors and macroeconomics have been an essential variable to predict non-performing loans. They are less likely to paid attention on the specific demand-side informations of microcredit industry such as debtors' behavior. Instead of study a debtors' behaviors, the recent demand-side information which usually emplyed to measure the feasibility of credit are debtor gender, debtor occupation, debtor income level, and debtor financial performance. In other said, it such informations are only focused on the borrower's ability to pay rather the debtor's willingness to pay. To measure the debtor's willingness to pay, it needs to learn the many informations regarding the debtor behavior. Therefore, this research attempts to examine the debitor's behaviour of microcredit lending. In the future, the specific purpose of it is to enter

this action into microcredit analyzing tools and predict non-performing loans of financial institutions accurately.

Using a survey method, this research propose as well as measure the measurement scales of behaviour of impulsiveness, risk behaviour, and trustworthiness. This research arranges the action of such indicator as well as employs exploratory factor analysis to measure the validity and reliability of the measurement indicators. The structure of this paper is divided into five parts, such as (1) explaining the main reason as well as main objective of why this research ought to be conducted, (2) elaboration the kind of previous studies that related to the main issue of this paper, (3) describe the research methodology for attaining as well as accomplishing the research objective, (4) figure out the research result, and (5) conclude and discuss the result.

2. Literatur Review

This section shows literature studies of many variables that related to non-performing loans of financial institutions from 2000 to 2017 (see Table 1). According to the summarize of literature review on the variable which affected to non-performing loans, it shows that most of the previous researchers too paid more attention to bank-specific and macroeconomics factors. They have been little attention to specific information of the debtor, including debitor's behaviour. It means that these study only focuses on measuring the borrower's ability to pay, not the borrower's willingness to pay. Moreover, it ought to be remembered that successive loans have depended on both borrower's ability and willingness to pay.

Table 1. The summarize of literature studies

Scholars and Year	Variables
Lee (2002)	Bank ownership concentration
Li (2003)	Banking-specific factors (Total bank's loans, Size, Interest rate)
Godlewski (2005)	Bank deposit
Ghosh (2005)	Banking-specific factors (Debt to equity ratio, Real cost of capital, the ratio of capital to risk-weighted assets); Macroeconomics (Inflation, GDP growth, Real growth of broad money, Index of the real effective exchange rate)
Lu, Thangavelu, & Hu (2005)	Bank type (State-owned enterprises or not)
Eng & Nabar (2007)	Bank specific factors (Bank stock returns and Bank future cash flow)
Garcia-Marco & Robles-Fernandez (2008)	Bank specific factor (Bank ownership concentration and Risk-taking behaviour)
Suzuki et al. (2008)	Government policy (Interest rate margin and the Tax rate of saving deposits)
Festić et al. (2011)	Macroeconomics (Export goods and services, Foreign direct investment, Gross fixed capital formation to GDP); Banking-specific factors (Deposit to loan ratio, Loan to asset ratio, Net foreign assets)
Kauko (2012)	Macroeconomics (GDP, Inflation, Export, Import and M3 to GDP ratio)
Saba et al. (2012)	Macroeconomics (Real GDP per Capita, Inflation); Banking-specific factors (Total loans)
Chijoriga (2011)	Banking-specific factors (Liquidity ratio, Profitability ratio, Working capital ratio, Leverage ratio, and Firm size)
Louzis et al. (2012)	Macroeconomics (GDP, Unemployment, Interest rate, and Public debt)
Alali & Romero (2013)	Banking-specific factors (Shareholder equity to total assets, Shareholder equity to total loans, Gross capital to risk assets, Total loans to total assets, Non-performing loans to total assets, Agricultural loans to total assets, Personal loans to total assets, Real estate loans to total assets, Non-performing loans to total assets, Total

Scholars and Year	Variables
	lease to total assets, total loans to total deposits, Allowance for loan losses to total assets, net loans charges off to total assets, Provision for loan losses to total assets)
Messai & Jouini (2013)	Bank specific factors (ROA, The changes in loans, The loans reserve to total loans ratio); Macroeconomics (GDP growth, Unemployment rate, Real interest rate)
Abid et al. (2014)	Banking-specific factors (ROE, Solvency ratio, Inefficiency, Size); Macroeconomics (GDP, Inflation, Interest rate)
Skarica (2014)	Macroeconomics (GDP, Unemployment, Inflation)
Ghosh (2015)	Banking-specific factors (Capitalization, Liquidity, Poor credit quality, Cost inefficiency, Banking industry size, Profitability); Macroeconomics (GDP, Real personal income rates, Inflation, State unemployment rates, Public debt)
Noglo & Androuais (2015)	Peer monitoring, Social capital (sex, ethnic, occupation)
Çifter (2015)	Banking-specific factors (Bank concentration, Credit to deposit); Macroeconomics (Export, Exchange rate, Unemployment)
Viswanadham & Nahid (2015)	Debitor's socio-demographic background and loans status (Sex, Marriage status, Paid employment, the purpose of loans; Type of interest rate chosen, duration); Macroeconomics (GDP; Economic growth, Economic condition); Bank specific factor (Bank concentration)
Filip (2015)	Macroeconomics (GDP, Inflation, Unemployment rate)
Assibey & Asenso (2015)	Banking-specific factors (Net minimum capital ratio, Net interest margin)
Dimitrios, Helen, & Mike (2016)	Banking-specific factors (ROA, Loan to deposit ratio); Macroeconomics (Tax to GDP ratio, Unemployment rate, Government budget to GDP ratio, General gross to GDP ratio, GDP growth)
Vithessonthi (2016)	Bank specific factor (Total bank's Loan)
Amuakwa-mensah et al. (2017)	Banking-specific factors (lagged NPL, Credit risk, Size, Loan growth, Inefficiency, Financial credit risk, lending rate); Macroeconomics (Inflation, GDP growth, Real exchange rate, Public debt)
Kjosevski & Petkovski (2017)	Banking-specific factors (Ratio of equity to total assets, ROA, ROE, Growth gross loans); Macroeconomics (GDP growth, Inflation, Unemployment, Domestic credit to the private sector)
Ghosh (2017)	Banking-specific factors (Capitalization, Lending specialization, Quality of credit, Diversification, Profitability, Operational efficiency); Macroeconomics (GDP growth, inflation)
Betz et al. (2017)	Macroeconomics (Public debts)
Tarchouna et al. (2017)	Banking-specific factor (Bank corporate governance)
Us (2017)	Global crisis
Waqas et al. (2017)	Banking-specific factors (Inefficiency non-interest income, Profitability, Leverage, Bank size); Macroeconomics (GDP growth, Inflation, Interest rate, Exchange rate, Unemployment rate)
Soedarmono & Sitorus (2017)	Banking-specific factors (Loan growth, Ratio of total equity to total assets, the ratio of total liquid assets to total deposits and short-term funds, Ratio of loan loss provision to total assets, Tobin's Q ratio); Macroeconomics (Economic freedom index, Logarithm of real GDP per capita, Credit information index, Coverage of credit information by private credit bureaus, Coverage of credit information by public credit registries).
Nikolaidou & Vogiazas (2016)	Global financial crisis

Therefore, this study proposes kind of borrower's behaviour variables which perhaps influence non-performing loans, such as impulsiveness, risk-taking behaviour, and trustworthiness. This study appeals that its behaviour seems reasonable to be considered to measure the borrower's willingness to pay. According to Patton et al. (1995), *impulsiveness* is related to people in controlling their thoughts and behaviour. Individuals who have high impulsivity tend to make difficulty in controlling their thoughts and behaviour. For example, high impulsivity is likely to have difficulty in resisting their needs to borrow and consume with or without his/her sufficient purchasing abilities. Therefore, in the case of debt

payment, impulsive individuals tend to have a higher probability of defaulting their payment of the debt as he/she could not optimally control their needs and wants. The second behaviour is risk-taking behaviour, Lejuez et al. (2002) argued in their research that risk-taking behaviour is a potential behaviour for danger or harm people's prosperity. Arya et al., (2013) give an instance on betting activities by conducting an experimental studies, the found that people who involved in this activity were likely to have higher risk-taking behavior and became potential higher probability of default. Therefore, in the context of debt payments, it can be assumed that high risk-taking behaviour implicated to high non-performing loans of microfinance institutions. The next borrower's behaviour is *trustworthiness*, its variables seem like similar to a trust, however, Greenwood & Iii (2010) argue that such both of that have been extremely different. Trust is a situational factor, whereas, trustworthiness is a quality displayed by individuals that then create trust. People who have high trustworthiness tend to have successive to meet their obligations. Therefore, individuals who have less in trustworthiness related to producing potential probability of default. Thus, in the field of debt payments, the debtor who has higher trustworthiness is more likely discipline to pay their debt installments.

This study will test the indicators of those three variables. Testing of this indicator is critical and become pivotal point as it could be a reference to the availablity of valid and reliable measurement scales of those. The indicators are measured based on some previous studies that would be re-adjusted, in particular, in the field of credit industry appropriately.

3. Method

In measuring the indicators of the borrower's behaviour, this research employs a pilot study. The study uses people who are the borrower of the microfinance institution in Magelang City as a research sample. For collecting the data, this study employs survey method, in which people would ask to fill out the questionnaire that containing the predefined indicators. This research use multi-item scales of the indicator in measuring the borrower's behaviour. As mentioned previously, the indicators which employed in this research are conducted by some adjustment from kind of previous studies, in particular from psychological scholars who have concerned to study the proposed behavior. Afterwards, the amount of the indicators of risk-taking behaviour and trustworthiness are eight and ten items scale. Each indicator of three variables will be measured by employing exploratory factor analysis (EFA).

The indicators that not fulfil the threshold of validity and reliability value will be deleted from the measuring tool. To measure the threshold of validity and reliability, this research at the loading factor value for validity and Cronbach alfa value for reliability. The indicators accepted to be a valid and reliable indicator if the loading factor value above 0.7 (>0.7) and Cronbach alfa above 0.6 (>0.6). This study restricts only on three behavioural variables. The restriction occurred because we assume that the variables are most closely related to the borrower's willingness to pay.

This research also studies the descriptive analysis of the borrower's behaviour according to their socio-demographic criteria such as gender, age, marriage status, and wage. The descriptive analysis will give an advantage of the detail picture of borrower's behaviour classification. Thus, after measuring the validity and reliability of the indicators, the research sample will be classified based on their socio-demographic and describe the behaviour based on valid and reliable indicators.

4. Result and Discussion

This research distributed 500 questionnaires to the debtor of microfinance in Magelang, however, the amount of survey which returned to the researcher is 100 pieces. Therefore, the data is sorted and analyzed by exploratory factor analysis (EFA) to retain the validity and reliability of the indicators. Table 2 shows the result of the impulsiveness' indicators, and there are only three indicators which fulfilled the threshold of the value of validity.

Table 2. The validity and reliability tes of impulsiveness indicators

No	Code	Indicators	Loading Factor	Prob
1.	IMP01	**I always make decisions based on my conscience**	0.763	<0.001***
2.	IMP02	**I decide to buy something based on my impulse**	0,784	<0.001***
3.	IMP03	**I am always very secure in making every decision**	0,601	<0.001***
4.	IMP04	**I make many decisions without much consideration**	0.712	<0.001***
5.	IMP05	I always speak spontaniously	0.037	0.355
6.	IMP06	I prefer to talk about the present rather than the future	-0.025	0.402
7.	IMP07	I do not like to solve a complex problems	-0.174	0.036
8.	IMP08	I do not like to move shelter	-0.280	0.002
9.	IMP09	I very interested in a new job	0.154	0.056
10.	IMP10	I always focus to think on one problem	-0.323	<0.001
Cronbach alfa : 0.779				
Composite R : 0.824				

Based on the result in Table 2 , there are only four variables which have loading factor value above 0.6 (>0.6). The indicators are (1) *I always make decisions based on my conscience*, (2) *I decide to buy something based on my impulse*, and (3) *I always make decisions without many considerations and* (4) *I am always very secure in making every decisions*. Afterwards, this research tests the reliability of three indicators, and consider to the result, the Cronbach alfa's value is above 0.7. It means that in addition to valid indicators are also reliable.

Table 3 presents the validity test of risk behaviour's indicators. Consider the result which presented in **Table 3**, and there are only two indicators which have a loading factor value above 0.7 (>0.7). In other words, there are only two variables which fulfilled the validity value. The indicators are (1) I invested 10% of my income in saving deposit per year; (2) *I spent 5% of my income in time-deposit per year*; (3) *I invested 10% of my income in a new business*; (4) *I am very interested in betting football match*, and (5) *I often buy lottery numbers*. The Cronbach alfa of two indicators is above 0.6 (>0.6). It means that the two indicators also a reliable

indicator in measuring the variable of debtor's risk-taking behaviour. The result of the reliability test of risk-taking behaviour indicators is presented in the appendix. Hereafter, the third and the last variable is trustworthiness.

Table 3. The validity and reliability test of risk-taking behavior

No	Code	Indicators	Loading Factor	Prob
1.	RIS01	**I invested 10% of my income in saving deposit per year**	0.653	<0.001***
2.	RIS02	**I spent 5% of my income in time-deposit per year**	0.644	<0.001***
3.	RIS03	**I invested 10% of my income in a new business**	0.62	<0.001***
4.	RIS04	**I am very interested in betting football match**	0.751	<0.001***
5.	RIS05	**I often buy lottery numbers**	0.774	<0.001***
6.	RIS06	I am willing to lend my wage to my friends	0.376	<0.001
7.	RIS07	I like to employ the job which pay based on my performance	-0.284	0.001
8.	RIS08	I usually buy more than my wage revenue in a month	0.111	0.128
Cronbach alfa		: 0.890		
Composite R		: 0.948		

Table 4 presents the result of the validity test of trustworthiness' indicators. It shows that there are eight indicators which have a loading factor value above 0.6 (>0.6). The indicators are (1) *I am very respectful of others*; (2) *I always try to be fair with others*; (3) *I am very respectful of others*; (4) *I always try to be fair with others*, (5) *I always obey to the rule*; (6) *I always believe that the rule of law must be strictly enforced*; (7) *I always make planning and do the jobs appropriately*; and (8) *I always responsible to my jobs*. The reliability test also shows that Cronbach alfa value of four indicators is above 0.7 (>0.7). It means that the four indicators of trustworthiness are valid and reliable.

Table 4. The validity and reliability test of trustworthiness behavior

No	Code	Indicators	Loading Factor	Prob
1.	TRS01	I am very happy when someone will listen to my personal problems	0.293	<0.001
2.	TRS02	I really carry things that is needed by my friends	0.241	0.006
3.	TRS03	**I am very respectful of others**	0.694	<0.001***
4.	TRS04	**I always try to be fair with others**	0,712	<0.001***
5.	TRS05	**I always obey to the rule**	0.759	<0.001***
6.	TRS06	**I always believe that the rule of law must be strictly enforced**	0.751	<0.001***
7.	TRS07	**I always give the money change honestly**	0.700	<0.001***
8.	TRS08	**I always pay taxes on time**	0.741	<0.001***
9.	TRS09	**I always make planning and do the jobs appropriately**	0.630	<0.001***
10.	TRS10	**I always responsible to my jobs**	0.616	<0.001***
Cronbach alfa		: 0.811		
Composite R		: 0.864		

After analyzing the validity and reliability of behavioural indicators, the subsequent phase is the descriptive analysis of debtor behaviour based on their social-demographic

criteria. Figure 1 shows the result of the descriptive analysis based on debitor's age. This study is useful to provide a picture of debtor's behaviour based on their age.

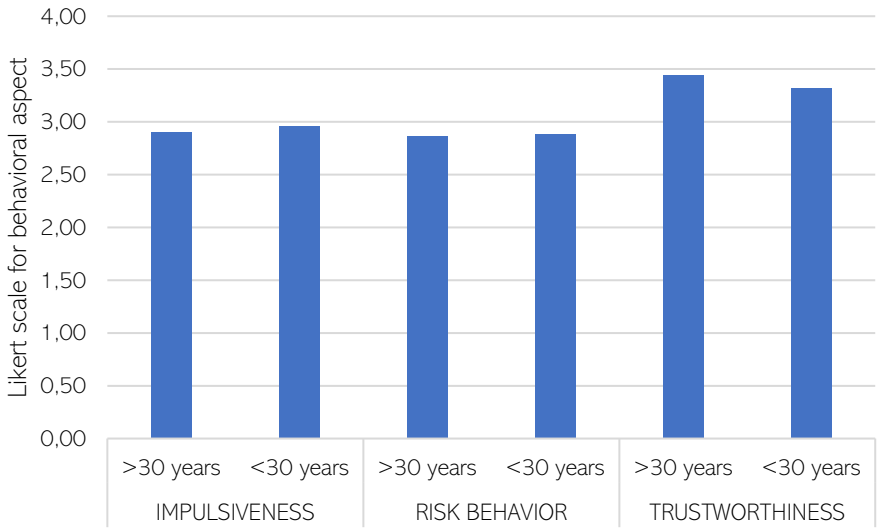

Figure 1. The descriptive of debtor's behavior based on their age

According to the result, the borrower who under 30 years old tend to have higher impulsiveness, higher risk-taking behavior, and lower trustworthiness than the debtor who above 30 years old. After that, Figure 2 shows the descriptive analysis of borrower behavior based on their gender.

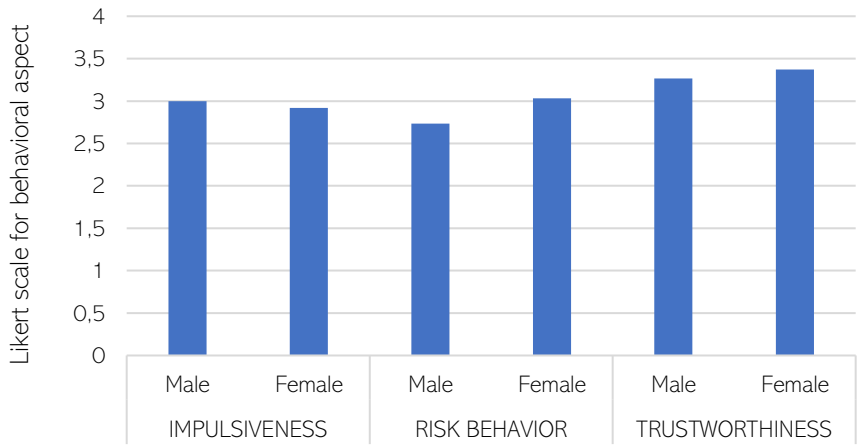

Figure 2. The descriptive analysis of debtor's behavior based on their gender

The result indicates that female borrower tends to has higher risk-taking behavior, more significant trustworthiness, and lower impulsiveness than a male borrower. The third social-demographic categories which analyzed in this research is marital status. Figure 3 shows that single borrower tends to have higher impulsiveness, more significant risk-taking behavior, and lower trustworthiness than the married borrower.

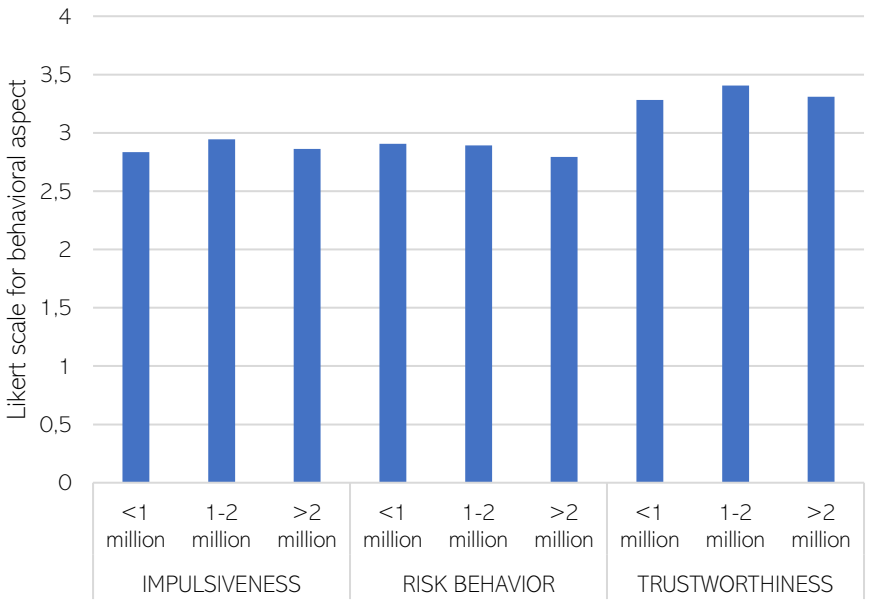

Figure 3. The descriptive analysis of debtor's behavior based on their wage

Afterwards, the last social-demographic categories are debtor wage. Figure 4 shows the descriptive analysis of borrower behaviour based on those groups.

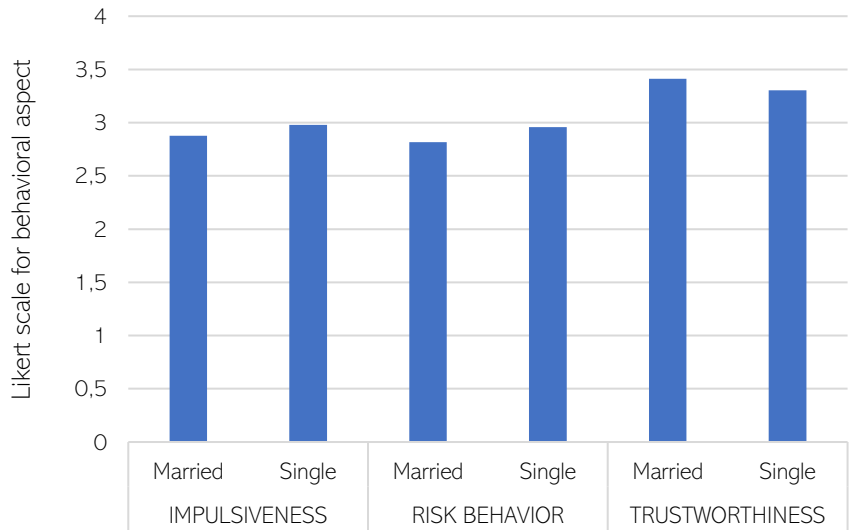

Figure 4. The descriptive analysis of debtor's behavior based on their marital status

According to the result, a borrower who has a wage between 1 to 2 million IDR tends to have higher risk-taking behavior, more significant trustworthiness, and lower impulsiveness than the debtor who has a wage above 2 million IDR and under 1 million IDR. However, it ought to be remembered, instead of testing the significant difference among demographic indicators, figures 1, 2. 3, and 4 are restricted only as descriptive statistics. This preliminary study could be employed to improve further research in examining the relationship of such variables to the extent of proposed behaviors.

5. Conclusion

The first analysis of this research is a literature study of the determinant factors affecting non-performing loans. Much of prior studies have given more attention to the variable of banking-specific factors and macroeconomics, and on the contrary, there is less attention on the specific behavioral elements of the debtor. Therefore, this research proposes the variable of debtor's behavior in affecting non-performing loans. The behavior is impulsiveness, risk-taking behavior, and trustworthiness. In the second analysis, this research employs a pilot study to examine the proposed debtor's behavior indicators. There are three indicators of impulsiveness, two indicators of risk-taking behavior, and four trustworthiness indicators accepted to the valid and reliable indicators. In future research, indicators should be considered a measuring tool for the proposed debtor's behavior in predicting non-performing loans. The third analysis is a descriptive analysis of debtor's behavior based on their socio-demographic criteria. The socio-demographic has been described in this research are age, gender, marital status, and wage. The result of this analysis gives evidence that the different socio-demographic criteria create a difference in their behavior. For example, a debtor under 30 years old tends to have higher impulsiveness, more significant risk-taking behavior, and lower trustworthiness than a debtor who is above 30 years old.

After analyzing the measuring tool for proposed debtor's behavior, the next step of future research that should be conducted is examining the relationship between the recommended behavior in this study, and non-performing loans. After knowing such a relationship, the result can be offered to create a new credit scoring tool based on the debtor's behavior. Afterward, the descriptive analysis of the debtor's behavior based on their socio-demographic gives many advantages in practical and empirical issues. For example, the microfinance institutions must be careful in allocating their funds to the non-marital borrower. Based on the analysis, the non-marital debtor tends to have high risk-taking behavior, and it implied that the non-marital debtor tends to have a higher potential default. In empirical issues, the different debtors' behavior based on the various socio-demographic criteria gives evidence that future research must include the socio-demographic rules concerning debtor's behavior and non-performing loans. However, as mentioned previously, the evidence of different behavior based on the demographic indicators is just descriptive statistics. For getting more empirical evidence, it should be tested by employing other statistical tools for further research.

Authors' Declaration

Authors' contributions and responsibilities

The authors made substantial contributions to the conception and design of the study. The authors took responsibility for data analysis, interpretation, and discussion of results. The authors read and approved the final manuscript.

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Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

Additional information

No additional information from the authors.

Reference

Abid, L., Ouertani, M. N., & Zouari-Ghorbel, S. (2014). Macroeconomic and Bank-specific Determinants of Household's Non-performing Loans in Tunisia: A Dynamic Panel Data. Procedia Economics and Finance, 13(December 2013), 58–68. https://doi.org/10.1016/S2

Alali, F., & Romero, S. (2013). Characteristics of failed U . S . commercial banks : an exploratory study. *Accounting and Finance*, *53*(August 2011), 1149–1174. https://doi.org/10.1111/j.1467-629X.2012.00491.x

Amuakwa-mensah, F., Marbuah, G., Ani-asamoah, D., & Amuakwa-mensah, F. (2017). Re-examining the Determinants of Non- Performing Loans in Ghana ' s Banking Industry : Role of the 2007 – 2009 Financial Crisis Re-examining the Determinants of Non-Performing

Arya, S., Eckel, C., & Wichman, C. (2013). Anatomy of the credit score. *Journal of Economic Behavior and Organization*, *95*, 175–185. https://doi.org/10.1016/j.jebo.2011.05.005

Assibey, E. O., & Asenso, K. J. (2015). Regulatory capital and its effect on credit growth, non-performing loans and bank efficiency. *Journal Pf Financial Economic Policy*, *7*(4), 401–420. https://doi.org/10.1108/JEIM-02-2014-0013

Betz, J., Kruger, S., Kellner, R., & Rosch, D. (2017). Macroeconomics Effects and Frailties in the Resolution of Non-Performing Loans. *Journal of Banking & Finance*. https://doi.org/10.1016/j.media.2017.03.008

Chijoriga, M. M. (2011). Application of multiple discriminant analysis (MDA) as a credit scoring and risk assessment model. *International Journal of Emerging Markets*, *6*(2), 132–147. https://doi.org/10.1108/17468801111119498

Çifter, A. (2015). Bank concentration and non- performing loans in Central and Eastern European countries. *Journal Businees Economics and Management*, *16*(1), 117–137. https://doi.org/10.3846/16111699.2012.720590

Dimitrios, A., Helen, L., & Mike, T. (2016). Determinants of non-performing loans: Evidence from Euro-area countries. *Finance Research Letters*, *18*, 116–119. https://doi.org/10.1016/j.frl.2016.04.008

Eng, L. L., & Nabar, S. (2007). Loan loss provisions by banks in Hong Kong, Malaysia and Singapore. *Journal of International Financial Management and Accounting*, *18*(1), 18–38. https://doi.org/10.1111/j.1467-646X.2007.01006.x

Festić, M., Kavkler, A., & Repina, S. (2011). The macroeconomic sources of systemic risk in the banking sectors of five new EU member states. *Journal of Banking and Finance*, *35*(2), 310–322. https://doi.org/10.1016/j.jbankfin.2010.08.007

Filip, B. F. (2015). The Quality of Bank Loans within the Framework of Globalization. *Procedia Economics and Finance*, *20*(15), 208–217. https://doi.org/10.1016/S2212-5671(15)00067-2

Garcia-Marco, T., & Robles-Fernandez, M. D. (2008). Risk-taking behaviour and ownership in the banking industry: The Spanish evidence. *Journal of Economics and Business*, *60*(4), 332–354. https://doi.org/10.1016/j.jeconbus.2007.04.008

Ghosh, A. (2015). Banking-industry specific and regional economic determinants of non-performing loans: Evidence from US states. *Journal of Financial Stability*, *20*, 93–104. https://doi.org/10.1016/j.jfs.2015.08.004

Ghosh, A. (2017). Sector-specific analysis of non-performing loans in the US banking system and their macroeconomic impact. *Journal of Economics and Business*. https://doi.org/10.1016/j.jeconbus.2017.06.002

Ghosh, S. (2005). Does leverage influence banks' non-performing loans? Evidence from India. *Applied Economics Letters*, *12*(15), 913–918. https://doi.org/10.1080/13504850500378064

Godlewski, C. J. (2005). Bank capital and credit risk taking in emerging market economies. *Journal of Banking Regulation*, *6*(2), 128–145. https://doi.org/10.1057/palgrave.jbr.2340187

Greenwood, M., & Iii, H. J. V. B. (2010). Trust and Stakeholder Theory : Trustworthiness in the Organisation – Stakeholder Relationship. *Journal of Business Ethics*, *95*(3), 425–438. https://doi.org/10.1007/s10551-010-0414-4

Kauko, K. (2012). External deficits and non-performing loans in the recent financial crisis. *Economics Letters*, *115*(2), 196–199. https://doi.org/10.1016/j.econlet.2011.12.018

Kjosevski, J., & Petkovski, M. (2017). Non-performing loans in Baltic States : determinants and macroeconomic effects Non-performing loans in Baltic States : determinants and. Baltic Journal of Economics, 17(1), 25–44. https://doi.org/10.1080/1406099X.201

Lee, S. (2002). Financial Restructuring in Korea and Japan: Resolution of Non-Performing Loans and Reorganization of Financial Institutions. *Journal of East Asian Studies*, *2*(2), 143–185. https://doi.org/10.1017/S159824080000093X

Lejuez, C. W., Read, J. P., Kahler, C. W., Richards, J. B., Ramsey, S. E., Stuart, G. L., … Brown, R. A. (2002). Evaluation of a behavioral measure of risk taking: The Balloon Analogue Risk Task (BART). Journal of Experimental Psychology: Applied, 8(2), 7

Li, Y. (2003). The Asian Financial Crisis and Non-performing Loans: Evidence from Commercial Banks in Taiwan. *International Journal of Management*, *20*(1).

Louzis, D. P., Vouldis, A. T., & Metaxas, V. L. (2012). Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios. Journal of Banking and Finance, 36(4), 1012–102

Lu, D., Thangavelu, S. M., & Hu, Q. (2005). Biased Lending and Non-performing Loans in China's Banking Sector. *Journal of Development Studies*, *41*(6), 1071–1091. https://doi.org/10.1080/00220380500155361

Messai, A. S., & Jouini, F. (2013). Micro and Macro Determinants of Non-performing Loans. *International Journal of Economics and Financial Issues*, *3*(4), 852–860. https://doi.org/10.1300/J079v27n04_02

Nikolaidou, E., & Vogiazas, S. (2016). Credit risk determinants in Sub-Saharan banking

systems : Evidence from five countries and lessons learnt from Central East and South East European countries. Review of Development Finance Journal, 1–37. https://doi.

Noglo, Y., & Androuais, A. (2015). The determinants of group lending repayment performance: evidence from Togo. *Canadian Journal of Development Studies*, *36*(4), 536–554. https://doi.org/10.1080/02255189.2015.1046372

Patton, J. H., Stanford, M. S., & Barrat, E. S. (1995). Factor-Structure-of-the-Barratt-Impulsiveness-Scale.pdf. *Journal of Clinical Psychology*, *51*(6).

Saba, I., Kouser, R., & Azeem, M. (2012). Determinants of Non Performing Loans The case of Ethiopian Banks. *The Romanian Economic Journal*, *44*(XV), 141–152.

Skarica, B. (2014). Determinants of non-performing loans in Central and Eastern European countries. *Financial Theory and Practice*, *38*(1), 37–59. https://doi.org/10.3326/fintp.38.1.2

Soedarmono, W., & Sitorus, D. (2017). Abnormal loan growth, credit information sharing and systemic risk in Asian banks. *Research in International Business and Finance*. https://doi.org/10.1016/j.ribaf.2017.07.058

Suzuki, Y., Miah, M. D., & Yuan, J. (2008). China's Non-Performing Bank Loan Crisis: the role of economic rents. *Asian Pacific Economic Literature*, *22*(1), 57–70. https://doi.org/10.1111/j.1467-8411.2008.00212.x

Tarchouna, A., Jarraya, B., & Bouri, A. (2017). How to explain non-performing loans by many corporate governance variables simultaneously? A corporate governance index is built to US commercial banks. Research in International Business and Finance. https:

Us, V. (2017). Dynamics of non-performing loans in the Turkish banking sector by an ownership breakdown: The impact of the global crisis. *Finance Research Letters*, *20*, 109–117. https://doi.org/10.1016/j.frl.2016.09.016

Viswanadham, N., & Nahid, B. (2015). Determinants of Non Performing Loans in Commercial Banks : A Study of NBC Bank Dodoma Tanzania. *International Journal of Financace & Banking Studies*, *4*(1), 70–95.

Vithessonthi, C. (2016). Deflation, bank credit growth, and non-performing loans: Evidence from Japan. *International Review of Financial Analysis*, *45*, 295–305. https://doi.org/10.1016/j.irfa.2016.04.003

Waqas, M., Fatima, N., Khan, A., & Arif, M. (2017). Determinants of Non-performing Comparative Study of Pakistan , Loans : A Comparative Study of Pakistan, India, and Bangladesh. *Finance & Banking Studies*, *6*(1), 51–68.