

# Digitalization and Access to Household Credit: Pre and Post COVID-19 Pandemic

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## Abstract

This study examines the impact of digitalization on access to household credit during the National Economic Recovery Program. Data from the National Socioeconomic Survey (Survei Sosial Ekonomi Nasional/Susenas) and Village Potential Statistics (Potensi Desa/Podes) from 2019 (pre-pandemic) and 2021 (one year post-pandemic) are used in this research. Using the binomial logit model-fixed effect, this research found that digitalization has a significant impact on access to household credit, both before and during the COVID-19 pandemic. The majority of households with access to credit are headed by males living in rural areas, who are married, working, graduated from junior high school or above, and are 30-59 years old. In line with the national economic recovery program, the government can accelerate financial inclusion by increasing access to household credit to all levels of the society without gender discrimination through banking digitalization.

**Keywords:** Digitalization, Credit Access, Financial Inclusion, Logit, Pandemic

**JEL Classification:** G5, G2, O1, E5, O3

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# **Digitalization and Access to Household Credit:**

## **Pre and Post COVID-19 Pandemic**

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### **I. Introduction**

#### **1.1 Background**

Digitalization has grown rapidly during the COVID-19 pandemic. The term digitalization is defined as the process of moving to a digital business (Gartner, 2021) and the integration of digital technology in everyday life (Ochs and Riemann, 2018). Digitalization is driven by internet use, behavior change, societal expectations, and the availability of capital (Schreckling and Steiger, 2017). One industry that is actively discussing digitalization strategies is the banking industry (Graupner et al., 2015).

In the banking industry, digitalization is a necessity (Schmidt, 2017). Digitalization of banking is defined as a shift from the concept of traditional banks to future banks, which is done by encouraging banks to adjust business strategies, change governance, reorganize distribution networks, and promote banking transactions through digital means (OJK, 2021, Rumondang et al., 2019). With digitalization, people can access financial services without having to come to financial institutions (Demirguc-Kunt et al., 2018; Ozili, 2018; Fanta & Makina, 2019; Rumondang et al., 2019).

Digitalization encourages financial institutions to innovate in order to expand their services (Demirguc-Kunt et al., 2018). One form of innovation in the world of banking is branchless banking. Branchless banking is a strategy for distributing financial services that does not require customers to be physically present at the bank (Soetiono and Setiawan, 2018). Branchless banking allows individuals and companies to access online payment, savings and credit facilities. Branchless banking is able to reduce costs and inconvenience in the process of financial transactions (World Bank, 2014). Digitalization makes access to formal financial services easier, cheaper, faster, and more efficient (OJK, 2021). Banking digitization can increase efficiency and long-term economic growth (OJK, 2021; Beirne and Fernandez, 2021).

The widespread use of cell phones connected to the internet has encouraged wider access to finance (Patwardhan, 2018; Akyuwen and Waskito, 2018). Cell phones are considered the instrument with the most potential for reaching populations that are not served by conventional financial services (Sapovadia, 2018). Cell phones make it easier for people to access accounts digitally (Demirguc-Kunt, et al., 2018). Digital financial services can be accessed remotely for cashless payments (Beirne and Fernandez, 2021).

Along with the extensive use of cell phones and the internet, financial institutions have also made inroads by launching mobile banking, internet banking, mobile payments, electronic credit information systems, and technology-based individual identification systems (Soetiono and Setiawan, 2018). Dissemination of information and promotions related to financial services are also carried out massively through official websites and social media (Instagram, Facebook and Twitter).

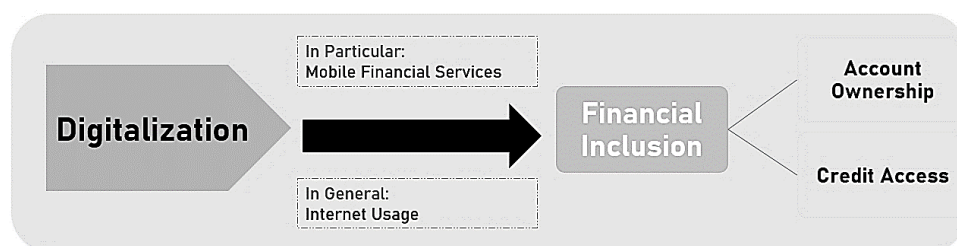
Digital financial transactions are also carried out by the government to pay salaries, pensions, and transfer social benefits. Payment via transfer requires the public to open an account and use it regularly. This shift in payment methods from cash to digital can reduce the risk of corruption and increase efficiency in the bureaucracy (Demirguc-Kunt et al., 2018).

Digitalization is considered the most significant driver of financial inclusion (Ozili, 2018; Koh and Ha, 2018; Patwardhan, 2018). Financial inclusion is defined as the proportion of individuals and companies that use formal financial services (World Bank, 2014). Meanwhile, the International Monetary Fund (IMF) defines financial inclusion as access to and use of formal financial services by households and firms (Sahay et al., 2015).

Financial inclusion has become a policy priority all over the world (Sarma and Pais, 2010; World Bank, 2014; Allen, et al., 2015, Ozili, 2018). A country is said to have a high level of financial inclusion if a large portion of its population has used financial services (World Bank, 2014; Akyuwen and Waskito, 2018). An inclusive financial system is characterized by the expansion of financial services for all elements of the economy and increased benefits for the economy, both macro and micro (Fauzan, 2020). Without an inclusive financial system, people must rely on their own limited savings to invest in education or become entrepreneurs (World Bank, 2014). Formal financial services are public goods that should be available to the entire population, without discrimination (Sharma and Kukreja, 2013).

Financial inclusion is fundamental to economic growth and poverty alleviation (World Bank, 2014). Financial inclusion plays an important role in improving welfare (Sarma, 2008) and quality of life (Beirne and Fernandez, 2021). In the National Economic Recovery Program, financial inclusion also plays an important role in accelerating economic growth.

According to Figure 1, digitalization can affect financial inclusion through the transmission of mobile financial services, in this case internet banking (Akyuwen and Jaka, 2018; Durai and Stella, 2019). Digitalization also affects financial inclusion through the widespread use of the internet as an information medium, such as social media, websites, etc. (Gabrielsson, et al., 2019).

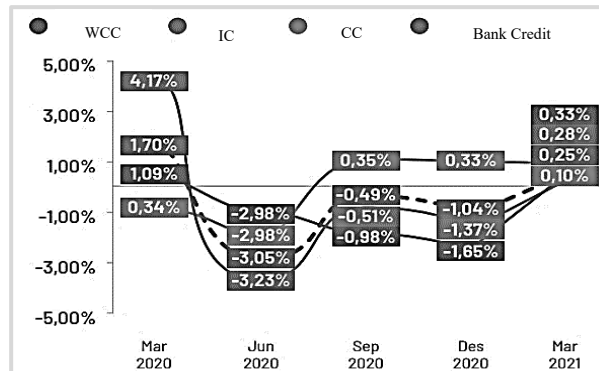


**Figure 1.** Research Framework

Fundamentally, account ownership is the first step towards financial inclusion, but it does not automatically imply optimal use of services (Sarma, 2008; World Bank, 2014; Demirguc-Kunt et al., 2018). In order to experience the full benefits of having an account, one must use the account for financial transactions, whether to save, make payments, or access credit. In particular, access to credit is an indicator that can be used to better measure financial inclusion (World Bank, 2014). Access to household credit is defined as credit received by households through formal financial institutions regulated by the government (Demirguc-Kunt et al., 2018).

Access to bank credits makes it easier for households to facilitate consumption from time to time (World Bank, 2014). On the other hand, credit expansion can also cause a financial crisis if not managed properly.

In Indonesia, household consumption has the largest contribution to national income, reaching 57.66 percent (BPS, 2021). During the COVID-19 pandemic, the economy slowed down. Figure 2 shows the contraction of Consumption Credit (CC) in early 2020 followed by contraction of Working Capital Credit (WCC) and Investment Credit (IC) in the following quarter. This condition has an impact on the weakening of household consumption and contraction of banking credit (BPS, 2021; OJK, 2021).



**Figure 2.** Bank Credit Contraction during the COVID-19 Pandemic

Source: OJK, 2021

In line with the National Economic Recovery Program, the government is committed to encouraging increased financial inclusion (OJK, 2020). The government issued Presidential Decree No. 114 of 2020 to support the National Strategy for Financial Inclusion. Efforts to increase financial inclusion are carried out by two main strategies, namely improvement of digital-based financial services and acceleration of bank credit.

Referring to previous research, digitalization is considered to play an important role in accelerating financial inclusion, especially access to credit (Sarma and Pais, 2010; Ozili, 2018; Evans, 2018; Bui, 2021). According to research in 49 countries, Sarma and Pais (2010) stated that the use of the internet and cell phones have a significant effect on financial inclusion. They say that financial inclusion consists of three aspects, namely accessibility (account ownership), availability (banking infrastructure), and use (credit access).

In line with Sarma and Pais (2010), Ozili (2018) conducted a research which analyzes cross-border banking data from the World Bank. Results show that increased availability of cellular phones and good internet connection has a positive impact on access and use of financial services, in this case access to credit. In addition, based on research in 44 African countries during 2000-2016, Evans (2018) proves that digitalization has a positive and significant impact on access to credit. It is also stated that access credit is important in promoting financial inclusion on a sustainable basis. However, regulations regarding poor credit access are claimed to be a major stumbling block for financial inclusion.

Recent research by Bui et al. (2021) in Vietnam explains that digitalization facilitates credit applications and increases credit approval rates. However, the adoption of digital technology does not necessarily increase

financial transparency, but encourages banking innovation. Technological innovation can reduce access barriers that lead to increased financial inclusion.

## **1.2 Research Purpose**

Until now there are still pros and cons related to the impact of digitalization to access to credit. Fanta and Makina (2019) stated that the use of cell phones and internet had no effect on credit access. This was also backed by Midika (2016), who stated that internet use is claimed to not have any correlation with the use of financial services. Internet use is considered to not have a direct effect on financial inclusion, but only on financial literacy (Shen et al., 2019). In Indonesia, research on financial inclusion was conducted by Nugroho and Purwanti (2018). This study uses data on the characteristics of a sample of the Indonesian population from the 2014 Global Findex. The results show that financial inclusion in Indonesia is still low based on indicators, such as account ownership, savings, and access to bank credit. It is proven that financial inclusion is only influenced by income level, education level, and age.

This study contributes to the literature on financial inclusion from the perspective of household credit. We examine the impact of digitalization on access to household credit within the framework of the National Economic Recovery Program. This study uses data from the 2019 and 2021 national socio-economic survey (Susenas) and the village potential (Podes) data released by the Central Agency of Statistics (Badan Pusat Statistik/BPS). Based on the availability of data, this study focuses on the level of customers in banks and cooperatives as providers of formal financial services.

The remainder of this paper is structured as follows. Section II presents the data and methodology, while Section III presents the result and discussion. Section IV explains the conclusions (recommendations and acknowledgements).

## **II. Data and Methodology**

### **2.1 Data**

This study uses quantitative data. All data are presented in the form of numbers, including data that were initially qualitative in nature but were then re-analyzed and coded into quantitative data. Our study uses the 2019 and 2021 National Socio-Economic Survey (Susenas) and Village Potential (Podes) datasets to analyze the impact digitalization on access to household credit. The Susenas data are used as the main data, supported by the Podes data to complete the control variables (in this case signal strength).

Susenas is a survey carried out by BPS to obtain information on household socio-economic characteristics related to the achievement of welfare. Meanwhile, Podes data collection is carried out to provide basic regional data related to villages (kelurahan). The Susenas samples were randomly distributed in 34 provinces

and 514 districts/cities with a total of 320 thousand households in 2019 and 345 thousand households in 2021. This study uses data from 2019 and 2021 to highlight conditions before and during the COVID-19 pandemic.

The outcome variable of this research is credit access. Credit access is defined as the status of formal credit receipts by households from banks and or cooperatives in the past year (BPS, 2021). Credit access is considered a relevant indicator for measuring financial inclusion. This is in line with research conducted by Sarma & Pais (2010); Fungacova & Weill (2015); Nugroho & Purwanti (2018); Evans (2018); Xu (2020); and Bui, et al. (2021).

Meanwhile, the variable of interest in this research is digitalization. This variable was measured using indicators such as internet usage, cell phones, and e-banking internet usage. The use of internet services, including the use of social media, is part of digitalization (Gabrielsson, et al., 2019). The use of cellular phones is considered important in the sense that they are the main medium used by the public to access digital financial services (Evans, 2018; Demirguc-Kunt, et al., 2018). In line with the research framework, the use of the internet and cell phones is considered as a representation of digitalization in general, while the use of e-banking is considered as a representation of digitalization in particular. In this context, the head of the household is considered as a representation of the household in question.

Referring to previous research, digitization variables have the potential to be endogenous (Falentina et al., 2020; Bui et al., 2021). This research has optimally controlled the variables of household characteristics that cause bias in the dependent variable and uses the district/city code as regional control fixed effect. Other control variables used included age, gender, marital status, education level, employment status, income level, household size, residential area strata, and signal strength.

Variable	Definition	Source of Data
<b>Outcome Variable</b>		
Credit Access	Dummy variable for household formal credit access; 0 if formal credit access; 1 if otherwise	Susenas 2019 & 2021
<b>Interest Variable: Digitalization</b>		
Internet Usage	Dummy variable for internet usage of the head of household; 0 if not using; 1 if using	Susenas 2019 & 2021
Cell phone Usage	Dummy variable for cell phone usage of the head of household; 0 if not using; 1 if using	Susenas 2019 & 2021
E-banking Usage	Dummy variable for e-banking usage of head of the household; 0 if not using; 1 if using	Susenas 2019 & 2021
<b>Control Variables: household characteristics</b>		
Age	Ratio variable for the age of the head of household at the time of enumeration	Susenas 2019 & 2021
Gender	Dummy variable for the gender of the head of household; 0 for female; 1 for male	Susenas 2019 & 2021
Marital Status	Dummy variable for the marital status of the head of household; 0 if unmarried; 1 if married or previously married	Susenas 2019 & 2021
Graduated Elementary School	Dummy variable for the education level of the head of household; 1 if graduated from elementary school (SD); 0 if otherwise	Susenas 2019 & 2021

Variable	Definition	Source of Data
Graduated Junior High School	Dummy variable for the education level of the head of household; 1 if graduated from junior high school (SMP); 0 if otherwise	Susenas 2019 & 2021
Graduated Senior High School	Dummy variable for the education level of the head of household; 1 if graduated from senior high school (SMA); 0 if otherwise	Susenas 2019 & 2021
Graduated college	Dummy variable for the education level of the head of household; 1 if graduated from college; 0 if otherwise	Susenas 2019 & 2021
Employment Status	Dummy variable for the employment status of the head of household; 1 if working; 0 if otherwise	Susenas 2019 & 2021
Income Level	Ratio variable for ln average expenditure per capita per month	Susenas 2019 & 2021
Household Size	Ratio variable for the number of household members in the household, in units of people	Susenas 2019 & 2021
Residential Area Strata	Dummy variable for the classification of the household location; 0 if located in a rural area, 1 if located in an urban area	Susenas 2019 & 2021
Signal Strength	Ratio variable for cell phone signal strength in the household area, proxied by the number of BTS towers	Podes 2019 & 2021
<b>Regional Control Fixed Effect</b>		
District/City Code	The use of district/city codes to consider the differences in characteristics between districts/cities	Susenas 2019 & 2021

**Table 1.** Data Description

## 2.2 Methodology

To analyze the effect of digitalization on credit access, this study uses Binomial Logit Model-Fixed Effect. This method is used because the outcome variable (credit access) is discrete and binary (Woldridge, 2016). Therefore, researchers can identify the probability of households accessing bank credit. The use of the logit model is in line with the research conducted by Sarma and Pais (2010) and Nugroho and Purwanti (2018). The estimated probability of credit access is formulated into the following model:

$$\hat{P}(1) = \Lambda(\beta_0 + \beta_1 internet_i + \beta_2 cell\_phone_i + \beta_7 graduated\_sd + \beta_8 graduated\_smp + \beta_9 graduated\_sma_i + \beta_{10} graduated\_pt_i + \beta_{11} work_i + \beta_{12} ln\_percapita_i + \beta_{13} household\_size + \beta_{14} urban_i + \beta_{15} bts_i + \theta_i + e \dots\dots\dots) \quad (1)$$

In such model,  $\Lambda(z)$  is a logit function; credit access is a binary outcome variable;  $\hat{P}(credit\_access=1)$  is the probability of households accessing bank credit;  $x$  is the variable of interest or control variable;  $\beta_0, \dots, \beta_{15}$  is the regression coefficient;  $i$  is the reference for the research period (2019 and 2021); internet is the variable that indicates internet usage (whether or not the household head uses internet); cell\_phone is the variable that indicates cell phone usage (whether or not the household head uses a cell phone); e-banking is the variable that indicates e-banking usage (whether or not the household head uses e-banking); age is the variable that indicates the age of the household head (in years); male is the variable that indicates gender (whether or not the household head is male); married is the variable that indicates marital status (whether or not the household head is married/has previously been married); graduated\_sd is the variable that indicates education level (whether or not the household head

graduated from elementary school/equivalent); *graduated\_smp* is the variable that indicates education level (whether or not the household head graduated from junior high school/equivalent); *graduated\_sma* is the variable that indicates education level (whether or not the household head graduated from senior high school/equivalent); *graduated\_pt* is the variable that indicates education level (whether or not the household head graduated from college); *ln\_per capita* is the variable that indicates income level (in-proxy with ln average expenditure per capita per month); *household\_size* is the variable that indicates household size (in person); *urban* is the variable that indicates the residential area strata (whether or not the household is located in an urban area); *bts* is the variable that indicates signal strength (in- proxy with the number of BTS per district/city);  $\theta$  is the district/city code as the regional control fixed effect; *e* is the error term which is assumed to be normally distributed.

### III. Results and Discussion

#### 3.1 Results

##### 3.1.1 Digitalization in the Household

We begin our discussion by examining the descriptive statistics and cross-tabulation results. Descriptive statistics can be observed in Table 2. Currently, it is found that almost half of households in Indonesia have a savings account. Before the COVID-19 pandemic, only 42.2 percent of the population had an account. This figure then rose to 48.9 percent post-pandemic. However, only a few people have access to formal credit (16.9 percent). This is due to bank policies that tighten the requirements for applying for credit during the pandemic to minimize the potential for bad loans.

Variable	Pre-COVID-19	Post-COVID-19
(1)	(2)	(3)
Have a savings account	42.2	48.9
Have access to formal credit	17.0	16.9
Use the internet	31.5	45.3
Own a cell phone	77.1	79.9
Use e-banking	3.2	5.1
Gender (male)	84.4	85.1
Graduated from elementary school	28.1	28.9
Graduated from junior high school	15.5	15.8
Graduated from senior high school	23.9	26.2
Graduated from college	8.8	9.7
Married/previously married	96.8	97.0
Working	88.3	89.1
Living in an urban area	41.4	42.1

**Table 2.** Descriptive Household Statistics (percentage)

Source: BPS (2021). Processed by Susenas

In terms of the use of digital technology, there was an increase in the use of cell phones, the internet, and e-banking after the pandemic compared to before the pandemic. The majority of household heads (79.9 percent)



use cell phones. This is an increase of more than 2 percent compared to before the pandemic. The number of household heads who use the internet is also quite high (45.3 percent), which is up almost 14 percent compared to before the pandemic. This increase was due to government policies regarding Work From Home (WFH) and Study From Home (SFH) which increased digitalization in households.

However, the surge in internet usage did not necessarily mean an increase in the number of e-banking users. The COVID-19 pandemic was unable to significantly boost e-banking. The number of household heads who use e-banking only increased by 1.90 percent during the pandemic. Of the total internet users, it is recorded that only about 11 percent use it for personal e-banking purposes. This shows that while many people use the internet, only a small number use it for online financial transactions. The Indonesian Financial Services Authority (Otoritas Jasa Keuangan/OJK) (2021) states that digitalization in banking is still prone to data leakage and account abuse. Demirguc-Kunt et al. (2018) stated that e-banking must be supported by a strong regulatory framework and consumer protection to ensure that people feel safe and comfortable while carrying out financial transactions.

Based on the household characteristics, the majority of households in Indonesia are headed by men, who have graduated from elementary and high school, who are married, working, and live in rural areas. The trend of its value have also increased from before to after the COVID-19 pandemic. Almost 90 percent of households are headed by men.

Variable (1)	Min (2)	Max (3)
Age (year)	10	97
Expenditure per capita per month (in thousands of rupiah)	0.1	94.7
Number of household members (person)	1	29
Number of BTS towers in the district/city where they live	1	1177

**Table 3.** Descriptive Household Statistics (Post Pandemic)  
Source: BPS (2021). Susenas processed

According to Table 3, the Susenas records that the head of households surveyed are between 10 and 97 years old. This figure varies greatly, with the average age of the head of a household being around 48 years. From a total of 340 thousand household respondents, one household was found to be headed by a 10-year-old. This household consists of 1 person, a female, who is unmarried and has yet to graduate from elementary school. This household head does not work and receives income in the form of a pension fund or transfer. This household spends around 802 thousand rupiah for monthly needs. The head of this household is has also been using a cell phone and the internet for the last three months.

This phenomenon of an underaged head of household is not the only one in Indonesia. The 2021 Susenas recorded that around 0.1 percent of households were headed by young people who were 10-17 years old. Most of them graduated from junior high school and below and were already working. At a fairly young age, they were already responsible for the household needs of one to eleven people.

Moving on to the income level variable, expenditures for food and non-food items varied widely. Expenditure per capita ranged from 100 thousand rupiah to 95 million rupiah per month, with an average expenditure per capita of 1.3 million rupiah per month. This is in line with Adiat and Tjachja's (2020) research

which found that income inequality in several regions of Indonesia is very high with a tendency to increase every year.

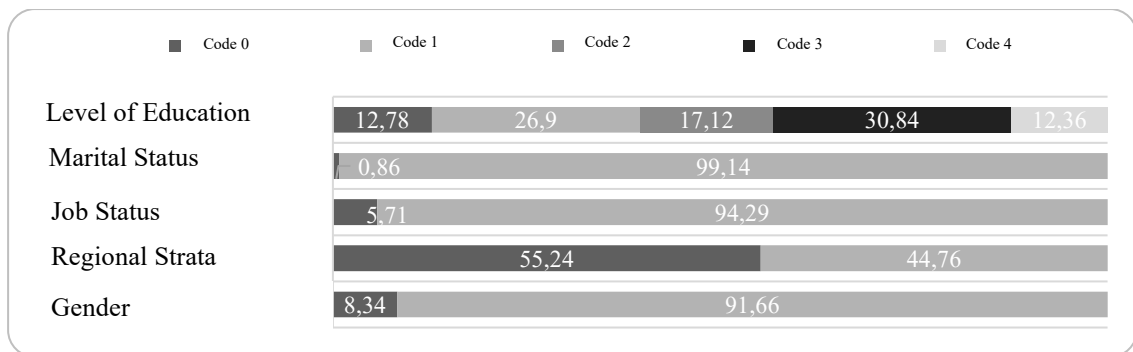
In terms of household size, the largest number of household members recorded was 29 people. This usually occurs in a household consisting of several heads of households. Meanwhile, the number of household members determines the number of needs that must be met every month. Harahap (2021) stated that families with many household member need far more resources than families with fewer household members.

The signal strength variable, which is proxied by the number of BTS towers in the district/city of residence shows a fairly high inequality. There are districts/cities that only have 1 BTS. On the other hand, there are other districts/cities that have up to 1,177 BTSs. This condition causes the reception of internet and cell phone signals between districts/cities to vary widely. This is one of the reasons why the writers use the regional fixed effect control to accommodate regional differences in further analysis.

### **3.1.2 Credit Access based on Household Characteristics**

Account ownership is an early indicator of financial inclusion (World Bank, 2014). By having an account, one can easily carry out financial transactions (Demirguc-Kunt, et al., 2018). BPS (2021) noted that account ownership increased by around 6.72 percent during the COVID-19 pandemic. In 2019, 42.19 percent of households were recorded to be account holders, and this soared to 48,91 percent in 2021. Restrictions on mobility, such as the Large Scale Social Restrictions (Pembatasan Sosial Berskala Besar/PSBB) and the Restrictions on Social Activities (Pemberlakuan Pembatasan Kegiatan Masyarakat/PPKM) during the COVID-19 pandemic prompted rapid changes in people's behavior patterns (Permana, et al., 2021). People began to shift from shopping offline to online. In order to shop comfortably via e-commerce, people were encouraged to create a savings account as a means of payment. This is what caused account ownership to increase during the COVID-19 pandemic.

Unfortunately, the increase in the number of account ownership was not accompanied by growth in credit access. BPS (2021) noted that credit access growth slowed down at the start of the pandemic. Access to household credit decreased from 17.04 percent (in 2019) to 16.60 percent (in 2020). The OJK (2021) stated that there was a weakening in household consumption due to the pandemic which caused credit contraction. Along with the implementation of the national economic recovery program, access to credit increased again in 2021 to 17.04 percent.



Description:

**Level of Education**

Code 0 No formal Education  
 Code 1 Graduated elementary school  
 Code 2 Graduated junior high school  
 Code 3 Graduated senior high school  
 Code 4 Graduated college

**Marital Status**

Code 0 Not Married  
 Code 1 Married/Previously Married

**Job Status**

Code 0 Not Working  
 Code 1 Working

**Regional Strata**

Code 0 Rural  
 Code 1 Urban

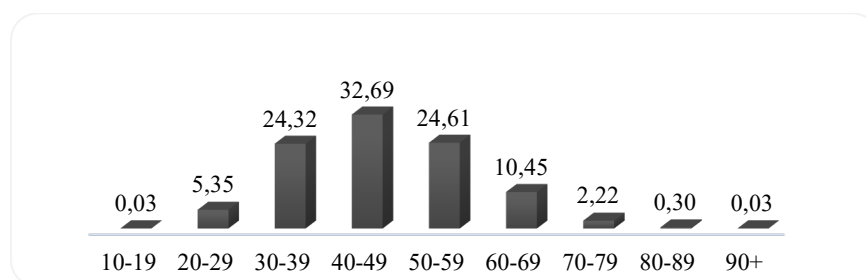
**Gender**

Code 0 Female  
 Code 1 Male

**Figure 3.** Credit Access based on Household Characteristics (in percent) 2021

Source: BPS, 2021

According to Figure 3, access to bank credit is dominated by people who are married (99,14 percent), male (91,66 percent), working (94,26 percent), graduated from junior high school and above (60,32 percent), and live in rural areas (55,24 percent). It is interesting to note that more people living in rural areas have access to credit than those who live in urban areas. It is suspected that during the pandemic, it was more difficult for people to access credit from banks because of the many conditions that must be met and banks were increasingly selective in disbursing funds (OJK, 2021). In rural areas, residents benefit from the number of cooperatives, such as the Village Unit Cooperative, which lend money to its members based on the principle of kinship.



**Figure 4.** Access to Credit based on the Age of the Household Head (in percent) 2021

Source: BPS, 2021

The majority of households who have access to bank credit were headed by individuals aged 30-59 years (Figure 4). This is in line with Elrangga's research (2016) which states that customers who are in the productive age category receive more bank credit. The age of 30 and over is not generally the time when people start working, it is an age when many of them are already established. They usually already have valuable assets that can be used as credit collateral at the bank.

It is interesting to note that around 0.03 percent of households headed by individuals under the age of 19 have received formal credit. It is not uncommon for young married couples to apply for cooperative credit. This

is because government and private banks usually have a minimum age requirement when applying for credit, which is 21 years. This is different from cooperative credits, whose credit applications have no age requirement and are open to anyone who is registered as a member of the cooperative. This is in line with Law No. 25 of 1992 concerning Cooperatives which states that cooperatives are people's economic movements based on the principle of kinship to improve the welfare of its members.

### 3.1.3 The Impact of Digitalization on Credit Access

We then present the results of our model estimation using the binomial logit model-fixed effect method. The results of this research prove that digitalization has a significant impact on credit access, both before and after the COVID-19 pandemic (see Table 4). It is proven that there is a significant difference between households who use the internet, cell phones, and e-banking compared to non-users in terms of credit access. This is in line with Evans' (2018) research which shows that digitalization has a significant effect on access to credit.

No.	Variable	Credit Access	
		2019	2021
1	Internet Usage	0.078*** (0.014)	0.120*** (0.013)
2	Cell phone Usage	0.361*** (0.016)	0.317*** (0.017)
3	E-banking Usage	-0.114*** (0.027)	-0.057** (0.022)
4	Age	-0.007*** 0	-0.008*** 0
5	Gender (Male)	0.207*** (0.018)	0.253*** (0.018)
6	Marital Status (Married)	1.482*** (0.051)	1.309*** (0.049)
7	Level of Education		
	Graduated Elementary School	0.148*** (0.051)	0.111*** (0.016)
	Graduated Junior High School	0.296*** (0.019)	0.210*** (0.019)
	Graduated Senior High School	0.390*** (0.018)	0.243*** (0.018)
	Graduated College	0.430*** (0.023)	0.196*** (0.022)
8	Employment Status (working)	0.348*** (0.021)	0.425*** (0.021)
9	Income Level	0.655*** (0.010)	0.564*** (0.010)

No.	Variable	Credit Access	
		2019	2021
10	Household Size	0.220*** (0.003)	0.224*** (0.003)
11	Residential Area Strata (Urban)	0.036** (0.012)	0 (0.012)
12	Signal Strength	-0.004 (0.014)	0 (0.031)
District/city fixed effect		□	□
N		315 672	334 229

**Table 4. Estimated Probability of Credit Access (Before and After the COVID-19 Pandemic)**

This table reports the binomial logit model-fixed effect. Standard errors are in parentheses \* p < 0.10. \*\* p < 0.05. \*\*\* p < 0.01.

Source: The 209 and 2021 Susenas and Podes (processed)

Variables, such as age, gender, marital status, level of education, employment status, level of income, and household size have a significant effect on household credit access. This study proves that the probability of credit access is strongly influenced by marital status. This is in line with OJK (2021) which states that the approval of bank credit is higher for married couples. For example, a married couple can use their joint income when applying for a Home Ownership Loan. This is the reason why married couples have a higher probability of credit approval compared to single people.

As a post estimation, the writers calculate the Average Marginal Effect (AME) from the Binomial Logit Model-Fixed Effect in Table 5. The AME makes the interpretation of analysis results more informative (Cameron and Trivedi, 2009). The Average Marginal Effect is an advanced estimate to find out how much the outcome variable shifts as a result of change in one independent variable when the other independent variables are constant at a specific value (Long and Freese, 2006).

No.	Variable	Credit Access	
		2019	2021
1	Internet Usage	0,010*** (0,002)	0,016*** (0,002)
2	Cell phone Usage	0,046*** (0,002)	0,041*** (0,002)
3	E-banking Usage	-0,001*** (0,004)	-0,007*** (0,003)
4	Age	-0,001*** 0	-0,001*** 0
5	Gender (Male)	0,027*** (0,002)	0,033*** (0,002)
6	Marital Status (Married)	0,190*** (0,007)	0,169*** (0,006)
7	Level of Education		
	Graduated Elementary School	0,019*** (0,002)	0,014*** (0,002)

No.	Variable	Credit Access	
		2019	2021
	Graduated Junior High School	0,038*** (0,002)	0,027*** (0,002)
	Graduated Senior High School	0,050*** (0,002)	0,031*** (0,002)
	Graduated College	0,055*** (0,003)	0,025*** (0,003)
8	Employment Status (working)	0,044*** (0,003)	0,055*** (0,001)
9	Income Level	0,084*** (0,001)	0,073*** (0,002)
10	Household Size	0,028*** 0	0,029*** 0
11	Residential Area Strata (Urban)	0,005** 0,002	0 0,002
12	Signal Strength	0 (0,002)	0 (0,004)
Fixed effect district/city		□	□
N		315 672	334 229

**Table 5.** Average Marginal Effect on Probability of Credit Access=1

This table reports the marginal effect results. Standard errors are in parentheses \*  $p < 0.10$ . \*\*  $p < 0.05$ . \*\*\*  $p < 0.01$ .

Source: The 2019 and 2021 Susenas and Podes (processed)

The probability of credit access is always at least 1 percent higher for internet users than for non-users (Table 5). Furthermore, the probability of credit access is 4 percent higher for cellular phone users than for non-users. Interestingly, during the pandemic, the probability of credit access is 0.7 percent lower for e-banking users. This is related to banks being increasingly selective in disbursing bank credit to the public during the pandemic, including in terms of applying for credit via e-banking email (OJK, 2021).

The male population is shown to be 3 percent higher in terms of access to credit than the female population. This is because the bargaining position of women tends to be lower than that of men in financial decisions. This is in line with the research conducted by Allen, et al. (2015) which states that men, as heads of households, have greater power in terms of making household decisions, including decisions on applying for credit.

Mahastanti and Nugrahanti (2013) also stated that there is still a gender bias in terms of credit approvals from banks to women entrepreneurs. Banks view women to be more at risk in managing a business than men. Women are considered to have low education and work only to supplement family income. Therefore, formal credit approvals for female entrepreneurs tend to be lower than for male entrepreneurs.

Marital status also proved to have the most significant effect on the probability of credit access. Prior to the pandemic, the probability of credit access was 19 percent higher for those who were married or had been married. Meanwhile, during the pandemic, the probability was 17 percent higher. This shows that married

residents always have a higher chance of being approved for formal credit than unmarried residents, both before and during the pandemic (OJK, 2021).

## IV. Conclusion

### 4.1 Recommendations

This study concludes that digitalization has been proven to have a significant impact on access to household credit, both before and during the COVID-19 pandemic. Based on the analysis of the Susenas and Podes data, it is known that the majority of households accessing formal credit in Indonesia are headed by males living in rural areas, who are married, working, graduated from junior high school or above, and are 30-59 years old.

In line with the National Economic Recovery Program, financial inclusion can be increased by accelerating credit distribution to all levels of society without gender discrimination as has been done by BRI through the Super Micro People's Business Credit (Kredit Usaha Rakyat/KUR). This credit is prioritized for workers affected by termination of employment and housewives. The Super Micro KUR provides a loan ceiling of up to 10 million rupiah without any minimum business term requirements. This kind of credit scheme can be developed more broadly to improve the bargaining position of women in financial inclusion.

For future research, the analysis of financial inclusion can be focused on the 11 percent of internet users who already use e-banking. It may be interesting to further investigate about the reasons why the use of e-banking is still very low in the midst of a surge in internet usage.

### 4.2 Acknowledgements

We would like to thank the Central Agency of Statistics for granting a scholarship to pursue a master's degree in Economics and Development, at Universitas Gadjah Mada. This article is one of the outcomes of this study period. No potential conflicting interests were reported by the writers. Data were taken from the 2019 and 2021 Susenas and Podes. We are happy to provide such data if needed.

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