

# Does the development of fintech promote debt risk? Evidence from East Java province



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## ABSTRACT

Developments of financial technology have an impact on economic growth and people's income. The rapid development of fintech has the impact of increasing financial inclusion or debt risk. This study aims to determine the impact of fintech on consumption behaviour and debt risks in East Java. The research data is from January 2019 - December 2020 with fintech variables, online loans, consumption levels, and debt risk. The research methods used are SVAR and OLS to provide an explanation of the impact of fintech on consumption behaviour and debt risk. The results of the research, fintech in the short-run restriction does not directly affect consumption levels, but in the long-run restriction, it directly affects consumption. Fintech will affect consumption through online lending. On the other hand, fintech has a significant effect on loan risk. The policy mix between related institutions can increase the positive role of fintech and mitigate loan risk.

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## 1. Introduction

Developments in financial technology have an impact on economic growth (Aziz, 2019; Song & Appiah-otoo, 2022). Inclusive digital finance can increase people's income, reduce income inequality, and narrow disparities between regions (Sarma & Pais, 2011; Kablana & Chhikara, 2013). The development of digitally transformed financial markets has resulted in changes in consumption patterns. The increased need for consumption fulfilment and investment has driven up the need for funds (Deahandira & Primantari, 2022). Disparate innovations and strategies were put in place to encourage the liquidity needed by the community as a stimulus for economic growth. One of the innovations is increasing the liquidity of public funding with financial technology, commonly known as financial technology. Literature discusses the positive impact fintech in finance (Philippon, 2017; Lu et al., 2021; Panos & Wilson, 2020; Song & Appiah-otoo, 2022). Impact fintech can change people's consumption patterns by increasing the accessibility and affordability of financial service products (Philippon, 2017; Yang & Zhang, 2022). Low transaction costs and reducing the impact of information asymmetry in the lending and borrowing process are competitive fintech with banking institutions (Li et al., 2019; Banna & Alam, 2021; Yue et al., 2022). The privilege of fintech is a centralized services using the internet to facilitate access to finance (Gomber et al., 2017).

Credit-based digital platforms will increase the demand for credit that banking institutions cannot fulfill (Hodula, 2022). Hence, fintech presents as an alternative solution to reducing household credit problems (J. Yang et al., 2020; Zhong & Jiang, 2021) and SME (Lu et al., 2021; Sheng, 2021). Ease of access to credit markets changes the Marginal Propensity to Consume (MPC) (Gabor & Brooks, 2017; Gross et al., 2020; Yue et al., 2022). Fintech has encouraged ease of access to credit markets

which has an impact on consumption levels and will further stimulate economic growth. The development of fintech which is not accompanied by monitoring and evaluation will have a negative impact. [Yue et al \(2022\)](#) explain that there is an impact of credit risk in the developments of fintech. the deeper problem, fintech will affect consumption patterns from high to low income groups ([Zhou et al., 2023](#)). Digital-based financial platforms will facilitate access to finance and trigger impulsive consumer behavior ([Panos & Wilson, 2020](#)). Digital finance is a systemic risk stimulus in the financial sector ([Xu, 2017](#)).

Conversely, low financial literacy will exacerbate understanding of the risks associated with using digital finance ([Ozili, 2020](#)). [Murphy \(2016\)](#) and [Leong et al \(2017\)](#) explains that there is a big risk associated with a lack of financial literacy. The results of [Liu & Zhang \(2021\)](#) show that the behaviour of Chinese students who get convenience in the availability of credit will increase financial risk. As a two-sided phenomenon fintech. As a two-sided phenomenon fintech, [Li et al \(2019\)](#) requires good judgment skills in filtering loans accurately in order to control credit risk. Negative and positive impacts on the development of fintech making the need for extensive research as literature. Development of fintech is very rapid, especially in Indonesia ([Suryono et al., 2021](#); [Suryono et al., 2019](#)). East Java Province, which is one of the provinces in Indonesia, has also had an impact on the development of fintech. Economic growth which reached 5.34% in 2022 and a digital literacy index of 3.55% in 2021 is considered prospective for increasing fintech. This study aims to analyse the impact of the development of fintech on consumptive behaviour and credit risk in East Java.

## 2. Literature Review

Financial technology is defined as an industry that has various types of business models with swift development ([Schmitt & Weber, 2017](#)). Based on Bank Indonesia Regulation No. 19/12/PBI/2017 concerning the Implementation of Financial Technology, Financial Technology or FinTech is leveraging technology in the financial system that produces a product, service, or business model. Fintech which has benefits as an alternative investment as well as funding is fintech lending. Based on the regulation of the Financial Services Authority no. 77/POJK.01/2016 explains fintech technology-based lending is a lending and borrowing service in the rupiah currency directly between creditors/lenders and debtors/borrowers. Fintech has an influence on economic growth in a country ([Aziz, 2019](#); [Song & Appiah-otoo, 2022](#)). Development fintech makes it easier for people to access credit so that it becomes an alternative solution in increasing household financial liquidity ([J. Yang et al., 2020](#); [Zhong & Jiang, 2021](#)). Financial liquidity problems that can be resolved by fintech stimulate consumer behavior ([Panos & Wilson, 2020](#)). Household consumption which is part of the calculation of economic growth is the founder of the increase.

Consumption is the purchase of goods and services made by households with the aim of meeting needs ([Sitanggang, 2015](#)). The level of consumption describes the behavior and thinking patterns of individuals in the economy. Individual consumption behavior will be related to the level of preference in financial management. Thus, many factors affect the level of consumption. The level of income will have an impact on consumption behavior in accordance with the prevailing Keynesian theory. On the other hand, asset ownership and wealth also have an impact on household consumption ([Carroll & Kimball, 2001](#)). Apart from income and asset levels, developments in financial markets also have an impact on consumption levels. The development of financial markets can encourage consumption growth ([Levchenko, 2005](#)). Residents with less developed financial markets will face financial liquidity problems than residents living in areas where financial markets are developed ([Jappelli & Pagano, 1989](#)). Research conducted explains that there is a positive correlation between credit services and household consumption ([Ludvigson, 1999](#)). The development of digital transformed financial markets has resulted in changes in consumption patterns. Various kinds of literature describe the impact of fintech on consumption patterns ([J. Li et al., 2020](#); [Zhou et al., 2023](#)). Inclusive digital finance can increase people's income, reduce income inequality, and narrow disparities between regions ([Kabllana & Chhikara, 2013](#)).

Debt or credit are defined in the Regulation of Banking No. 10 of 1998, credit is the provision of money or bills, based on a loan agreement or agreement between the bank and the borrower with the obligation to pay off the debt within a certain period of time. Credit has an important role in economic growth ([Banu, 2013](#)). Loans or credit are always associated with the level of consumption as a stimulus for the movement of economic activity. Limited access to finance at banking institutions is a demand for credit. One of the ways to develop strategies to facilitate access to credit is by fintech. Credit-based

digital platforms increase the demand for credit that cannot be fulfilled by banks (Hodula, 2022). J. Yang et al (2020) and Zhong & Jiang (2021) explain that digital finance can reduce credit problems and increase household credit. Low transaction costs and reducing the impact of information asymmetry in the lending and borrowing process is a competitive advantage fintech with banking institutions (Banna & Alam, 2021; J. Li et al., 2020; Yue et al., 2022). Superiority fintech through offering customer-centered services using the internet to facilitate access to finance (Gomber et al., 2017). This research has reviewed various literature research previously as a basis for the formulation of goals. Research conducted by Zhou et al (2023) explains that fintech can change household consumption patterns with the concept trickle-down consumption. Research conducted by J. Li et al (2020) describes the fintech relationship to the level of consumption in China. Impact fintech Apart from the level of consumption, it also has an impact on the level of loan risk. This is in line with research conducted by Yue et al (2022) explain that fintech can lead to high credit risk. Development impact fintech's lack of supervision and evaluation raises various problems. Research by Suryono et al (2021) which explains the various problems present in development fintech in Indonesia.

### 3. Method

This research employs a quantitative approach to examine the relationship between dependent and independent variables. The research methods used for the quantitative approach are Structural Vector Autoregression (SVAR) and Ordinary Least Squares (OLS). The main concept of the study aims to analyze the relationship between consumption and debt trap through consumer behavior. The analysis of the relationship between fintech and debt trap utilizes the OLS method, as it seeks to determine the existence of a connection between these variables. On the other hand, the analysis of the relationship between fintech and consumption, incorporating an intervening variable, employs the SVAR method. This is because a simulation model is needed to understand the influence of fintech on consumption, either directly or through an intervening variable, namely debt. The conceptual framework built in the SVAR method revolves around society using fintech as a means to enhance consumption through the debt system. The advantage of the SVAR method lies in its ability to analyze both short-term and long-term perspectives, providing a detailed simulation model concept.

**Table 1.** Definition of Variables

Variable	Definition	Units	Source
Debt	Loan distribute to loan recipients	Rupiah	OJK
Fintech	Number of loan recipient accounts	Account	OJK
Debt Trap	TWP90/measurement of the level of default or failure to settle obligations stated in the agreement above 90 days from the due date	Percent	OJK
Cons	Total household consumption as a proxy for average per capita expenditure (food and non-food)	Rupiah	BPS of East Java province

Source: Author definition

Table 1 shows the definition of variables used in this study. This research in East Java Province during the period January 2019 - December 2020. The variables used in this research consist of the number of online debt, the number of fintech, consumption, and the debt default of more than 90 days (TWP90). Sources of data in this research are the Central Bureau of Statistics (BPS) of East Java Province and the Financial Services Authority (OJK). This research uses two hypotheses in analyzing role fintech on consumption and online debt in East Java with the simultaneous method. In the first hypothesis testing, the impact of fintech can facilitate access to credit and increase the level of household consumption. Based on the research model of T. Yang & Zhang (2022); B. Yang et al (2022) and Zhou et al (2023) explains digital finance inclusion has a significant positive relationship with the level of household consumption. Moreover, the Research conducted by Yue et al. (2022) explains that the level of household consumption is influenced by the level of loans and digital finance inclusion. Thus the model in the first hypothesis can be written as follows:

$$\ln Cons_t = \alpha_0 + \beta_1 \ln Fintech_t + \beta_2 \ln Debt_t + e_t \quad (1)$$

in the second hypothesis testing, the impact of fintech and consumption levels will increase the risk of bad credit. Based on research conducted by Yue et al (2022) explains that digital finance inclusion

significant positive effect on bad loans. On the other hand, this study adds the level of consumption in explaining the risk of bad credit. The model in the second hypothesis can be written as follows:

$$\text{LnDebttrap}_t = a_0 + \beta_1 \text{LnFintech}_t + \beta_2 \text{Const}_t + e_t \quad (2)$$

The method used in analyzing equation (1) is Structural Vector Autoregression (SVAR). The SVAR method is a method developed from vector Autoregression (VAR) introduced by Sims (1980). The difference between the SVAR and VAR methods lies in the restrictions on the relationship between variables with the aim of providing limitations on the dynamics of interactions between variables (Dana, 2018; Putra & Kurniawan, 2021). The VAR model can be written as follows:

$$Y_t = \sum_{i=0}^{\infty} (A_i U_{t-i} = A(L)X_t) \quad (3)$$

Where  $U_t$  is the variable vector used in this research;  $A_i$  is contemporaneous relations between the variable and  $A(L)$  is a finite-order matrix polynomial with the Lag  $L$  operator. Next, enter the restrictions according to what was done by Sims (1980). Restrictions in this study can be written as follows:

$$\begin{bmatrix} e_1 \\ e_2 \\ e_3 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ a_{21} & 1 & 0 \\ a_{31} & a_{32} & 1 \end{bmatrix} \begin{bmatrix} \epsilon_1 \\ \epsilon_2 \\ \epsilon_3 \end{bmatrix} \quad (4)$$

Where equation (4) is matrix coefficient for short-run restriction and for long-run restriction as follows:

$$\begin{bmatrix} e_1 \\ e_2 \\ e_3 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ a_{31} & a_{32} & 1 \end{bmatrix} \begin{bmatrix} \epsilon_1 \\ \epsilon_2 \\ \epsilon_3 \end{bmatrix} \quad (5)$$

Matrix (4) and (5) explain the relationship restrictions between variables in equation (1). This research also uses the method of Ordinary Least Square (OLS) for equation (2). OLS is a least squares method for selecting unknown parameters in a linear regression model. The use of OLS in equation (2) is to be able to provide an overview of the relationship of fintech against bad loans in East Java.

#### 4. Results and Discussion

Table 2 shows that technological developments change people's consumer patterns and increase the accessibility and affordability of financial services (Philippon, 2017; T. Yang & Zhang, 2022). The benefits provided by fintech are to reduce information asymmetry between borrowers and lenders and reduce transaction costs (Banna & Alam, 2021; J. Li et al., 2020; Yue et al., 2022). The ease of accessing financial services reduces the risk of people's financial difficulties, so they can change their marginal propensity to consume (Gabor & Brooks, 2017; Gross et al., 2020; Yue et al., 2022). The Impact of fintech on increasing access to financial services and consumption levels is tested on equation (1) using the SVAR and OLS methods. The Impact of fintech on debt and consumption using the SVAR method, with the approach of short-run restriction and long-run restriction. Short-run restriction shows that FinTech has a significant positive effect on online debt. This can be seen from the probability value of 0.00 which is smaller than the alpha value ( $\alpha = 1\%, 5\%, 10\%$ ) and a coefficient value of 1.524. This condition means that the increase in fintech will increase the debt by 1.524. Credit-based digital platforms increase the demand for credit that cannot be fulfilled by banks Hodula (2022), J. Yang et al (2020) and Zhong & Jiang (2021) explain that digital finance can reduce credit problems and increase household credit.

The results on short restriction, fintech has no effect on consumption. This result can be seen from the probability value of 0.147 which is greater than the alpha value ( $\alpha = 1\%, 5\%, 10\%$ ). The Impact of fintech in influencing consumption levels in East Java indirectly and through increased online debt. This can be seen from online debt that has an influence on the level of consumption with a probability value of 0.00 which is smaller than the alpha value ( $\alpha = 1\%, 5\%, 10\%$ ) and a coefficient value of 0.01. Different results, the approach long restriction which shows that fintech has an influence on the level of consumption in East Java. This can be seen from the probability value of 0.000 which is less than the alpha value ( $\alpha = 1\%, 5\%, 10\%$ ) and a coefficient value of 0.002. The online loan variable also

shows a significant influence on the level of consumption in East Java with the approach long restriction. This result can be seen from the probability value of 0.049 which is smaller than the alpha value ( $\alpha = 5\%$ ,  $10\%$ ) and a coefficient value of 0.000. Differences in results on approaches short-run restriction and long-run restriction in relationship fintech with consumption show that East Java is in the process of developing digital finance. The problem with the development of fintech is the uneven accessibility and use (Ozili, 2020). Simorangkir et al (2021) explain that fintech has a positive and significant effect on economic growth in East Java in the long term due to low accessibility and use.

**Table 2.** Results of Fintech Analysis of Debt and Consumption

Variable	Short-run Restriction			Long-run Restriction		
	Fintech	Debt	Cons	Fintech	Debt	Cons
Fintech	0.188*** (9.486)	1.524*** (4.224)	-0.000 (-1.451)	0.000*** (9.486)	-	0.002*** (5.433)
Debt	-	0.456*** (9.486)	0.001*** (5.444)	-	0.660*** (9.486)	0.000** (1.967)
Cons	-	-	0.000*** (9.486)	-	-	0.002*** (9.487)

Source: data processed

Increased consumption amid technological developments such as fintech creates an opportunity and a challenge. This research uses a robust model to overcome the problems of autocorrelation and heteroscedasticity in this equation model. Ease of access to credit through fintech will increase consumption. However, people who have weak financial literacy will understand little of the risks associated with using digital finance (Ozili, 2020). Leong et al (2017) and Murphy (2016) explains that there is a big risk associated with a lack of financial literacy. Liu & Zhang (2021) explain that the behavior of Chinese students who get easiness in the availability of credit will increase financial risk. The development of fintech was uncontrolled will lead to bad credit problems (Yue et al., 2022). Table 3 describes the impact of fintech and consumption on the debt trap in East Java. The development of fintech significant effect on the debt trap. This result can be seen from the probability value of 0.003 which is smaller than the alpha value ( $\alpha = 1\%$ ,  $5\%$ ,  $10\%$ ) and a coefficient value of 0.007. The development of fintech must be accompanied by the development of digital literacy and financial literacy. Yue et al (2022) explained that digital financial developments that facilitate access to credit will increase the risk of default. Digital finance in finance will generate systemic risks (Xu, 2017).

**Table 3.** Result of Fintech Analysis and Debt Trap

Variable	Coefficient	Z-Stat	Prob
Fintech	0.007	2.935	0.003
Cons	86.37	22.605	0.000
Adj R-Square		0.698	

Source: data processed

The level of consumption also has a significant effect on non-performing loans in East Java. The probability value of 0.00 is smaller than the alpha value ( $\alpha = 1\%$ ,  $5\%$ ,  $10\%$ ) and a coefficient value of 86.37 indicates a significant positive relationship. Uncontrolled impulsive consumption will affect the debt trap. On the other hand, the influence of digital finance will affect people's consumption behavior, especially with low incomes (Zhou et al., 2023). Application-based financial digital financial platforms with easy access will trigger impulsive consumer behavior (Panos & Wilson, 2020). Yue et al (2022) states fintech without good digital and financial literacy can stimulate an increase in the debt trap in China. Based on Table 2 and Table 3 there are positive and negative impacts on the development of fintech in East Java. The positive impact is fintech can increase consumption and access to finance. Increased consumption and access to finance will have an impact on economic growth. Miranti et al (2023) stated that ease of internet access and credit had a positive impact on economic growth in East Java.

The development of fintech in East Java faced a big challenge. This is based on research results that explain that there is credit risk in the development of fintech. Credit risk due to weak digital literacy. Weak digital literacy and digital finance will have an impact on increasing credit risk related to impulsive consumption (Yue et al., 2022; Zhou et al., 2023). Suryono et al (2021) argue there is a main problem with fintech in Indonesia, namely low digital and financial literacy, and an increase in fintech illegal and personal data fraud. The development of fintech in Indonesia, there are also

problems with infrastructure development, weak regulators in dealing with moral hazard, platform eligibility, and loan eligibility (Suryono et al., 2019). On the other hand, the interest rate given by fintech is relatively high which creates a credit risk (Deahandira & Primantari, 2022). Policy implications that need to be carried out in encouraging digital finance-based economic growth through policy mixes. Collaboration between related institutions in building infrastructure and regulations to optimize potential, innovation, and consumer protection. Collaboration between Bank Indonesia and the Indonesian Ministry of Finance (Ministry of Finance) through the distribution of social assistance as a form of increasing financial inclusion and development of fintech. On the other hand, Bank Indonesia also needs to encourage the acceleration of digital transformation through payment system regulatory reforms. Payment system arrangements must be based on efficiency and security.

Other collaborations also need to be carried out by Bank Indonesia and the Indonesian Ministry of Communication and Information (Kominfo) in the provision of infrastructure, digital connectivity, and consumer security in the use of fintech. Kominfo also needs to supervise and control new financial digital platforms before implementing an electronic system so that there is no increase in fintech illegal. On the other hand, based on Minister of Communication and Informatics Regulation No. 20 of 2016 protection of personal data in electronic systems requires extra supervision to prevent data leakage. Supervision of operational development and Health fintech also needs to be carried out by Bank Indonesia in collaboration with OJK. OJK's role in the development of fintech can be in the form of proper regulation in regulating the developmental activities of fintech and transaction systems. OJK also plays an active role in supervising fintech illegal. OJK needs to do an analysis of credit scoring to secure fintech in disbursing loans. fintech no analysis credit scoring which can minimize information asymmetry (Pokorná & Sponer, 2016). Apart from the central government, the regional government of East Java Province also needs to increase its role in fintech through increasing digital literacy, increasing digital infrastructure, and digital-based MSMEs.

## 5. Conclusion

Based on the results of this research using the SVAR and OLS methods, it shows that there is a relationship between fintech consumption and debt trap. The use of the SVAR method with short-run restriction shows that fintech has no direct effect on consumption. However, fintech indirect effect on consumption through increased online lending. Meanwhile, SVAR with long-run restriction shows a fintech effect on the level of consumption. The results of the analysis using OLS in equation (2) show that FinTech significantly positively increases debt trap. The policy that needs to be implemented is the policy mix of the relevant government agencies. Bank Indonesia is working with the Ministry of Finance in increasing financial inclusion through the distribution of technology-based social assistance. Collaboration between Bank Indonesia and Kominfo in providing infrastructure, digital connectivity, and consumer safety in the use of fintech. As well as the role of the OJK and East Java Province in improving fintech with strategic policy.

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## Declarations

- Author contribution** : Marheni D.K, leading the research team, played a key role in problem identification, model creation, and analysis, as well as in compiling research articles. Sherry focused on literature review, gathered sampling data, conducted data processing using STATA version 17.0, and interpreted the data. Yulfiswandi contributed to the discussion of research results and assisted in composing research articles.
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