A Study of the Impact of Financial Literacy and Financial Development on Peer-to-Peer Lending in Developed and Developing Countries

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การศึกษาผลกระทบของความรู้ทางการเงินและการพัฒนาทางการเงินต่อการให้กู้ยืมแบบ Peer-to-Peer ในประเทศที่พัฒนาแล้วและกำลังพัฒนา

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จิฟฟี่ แทน เจิ้ง ฮง : การศึกษาผลกระทบของความรู้ทางการเงินและการพัฒนาทางการเงินต่อการให้กู้ยืมแบบ Peer-to-Peer ในประเทศที่พัฒนาแล้วและกำลังพัฒนา. (A Study of the Impact of Financial Literacy and Financial Development on Peer-to-Peer Lending in Developed and Developing Countries) อ.ที่ปรึกษาหลัก : ขนิษฐา แต้มบุญเลิศชัย

การศึกษานี้พยายามที่จะตรวจสอบว่าความรู้ทางการเงินและการพัฒนาทางการเงิน โดยเฉพาะการเข้าถึงทางการเงิน ความลึกทางการเงิน และประสิทธิภาพทางการเงินส่งผลต่อการขยายตัวของสินเชื่อแบบ peer-to-peer (P2P) โดยใช้กลุ่มตัวอย่างจาก 40 ประเทศที่มีข้อมูลในปี 2020 อย่างไร ผลการวิจัยเผยให้เห็นว่าความรู้ทางการเงินและประสิทธิภาพทางการเงินส่งผลในเชิงบวกต่อการขยายตัวของสินเชื่อ P2P ในขณะที่ความลึกทางการเงินมีความสัมพันธ์เชิงลบกับการขยายตัวของสินเชื่อ P2P นอกจากนี้ ความรู้ทางการเงินมีส่วนสำคัญต่อการขยายตัวของสินเชื่อ P2P ในประเทศกำลังพัฒนา แต่ไม่ใช่ในประเทศที่พัฒนาแล้ว การค้นพบนี้ชี้ให้เห็นว่าความรู้ทางการเงินไม่ได้เป็นปัจจัยสำคัญต่อการขยายตัวของสินเชื่อ P2P ในประเทศที่พัฒนาแล้ว เนื่องจากประเทศที่พัฒนาแล้วมีอัตราความรู้ทางการเงินที่สูงกว่าประเทศกำลังพัฒนาอยู่แล้ว การศึกษานี้ชี้ให้เห็นว่าการให้ความสำคัญกับการศึกษาทางการเงินมากขึ้น โดยเฉพาะอย่างยิ่งในประเทศกำลังพัฒนา และความช่วยเหลือในแง่ของเงินทุนจากรัฐบาลเพื่อปรับปรุงประสิทธิภาพทางการเงินจะช่วยอย่างมากในการขยายตัวของสินเชื่อ P2P

สาขาวิชา	เศรษฐศาสตร์ประยุกต์	ลายมือชื่อนิสิต .....
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This study seeks to examine how financial literacy and financial development, specifically financial access, financial depth, and financial efficiency affect the expansion of peer-to-peer (P2P) lending using a sample of 40 economies with data obtained in 2020. The findings reveal financial literacy and financial efficiency positively affect the expansion of P2P lending, while financial depth negatively correlates with the expansion of P2P lending. Additionally, financial literacy contributes significantly to the expansion of P2P lending in developing economies, but not in developed economies. This finding suggests that financial literacy does not factor significantly into the expansion of P2P lending in developed economies because developed economies already have higher financial literacy rates than developing economies. This study suggests that more emphasis on financial education, especially in developing economies, and assistance in terms of fundings from the government to improve financial efficiency will greatly aid in the expansion of P2P lending.

Field of Study:	Applied Economics	Student's Signature .....
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1. Introduction

Rapid advancement in the field of financial technology and financial innovation has ushered in a new era where individual lenders are able to provide unsecured loans directly to borrowers without any financial intermediaries, such as banks (Lin et al., 2009). Peer-to-peer (P2P) lending, which bypasses traditional lending by banks, is fast gaining attention in the field of financial technology (Fintech) (Liu et al., 2014), and platforms such as LendersClub cater to groups that may be underserved by traditional financial institutions by expanding access to credit to them, and also in areas where the local economy is not well, ultimately allow credit access for those who were credit-rationed (Jagtiani & Lemieux, 2018).

There are several key advantages of this lending model. Firstly, the internet facilitates disintermediation, which in turn, enables P2P lending to directly link lenders and borrowers. This also serves as a more socially beneficial form of financing, as lenders and borrowers do not have to be concerned about being exploited, or taken advantage of, by financial intermediaries due to their significantly larger market power and pursuit of profit without sufficient regard for the interests of their clients (Milne & Parboteeah, 2016)

Secondly, strides in financial technology innovations enable borrowers to secure loans at a lower cost by utilising fully automated algorithms to underwrite and price loans via appropriate systems (Balyuk, 2016; Philippon, 2016). The comparatively lower transaction costs mean microloans are possible, as one does not need to be bound by a minimum-sum limit when borrowing. These microloans can be pooled together to

fund projects that require huge capital funding. This appeals to lenders as it significantly reduces the potential losses of an individual lender in the event of a loan default.

Thirdly, P2P lending platforms have a technological edge over formal financial institutions, such as banks, which routinely allocate a huge part of their budget to technology, but in the form of upkeeping existing systems, and not on technological innovations. Consumer banks, in particular, usually have large legacy systems that pose a big problem as they are difficult to replace because of the infrastructure that has been built around them (Milne & Parboteeah, 2016).

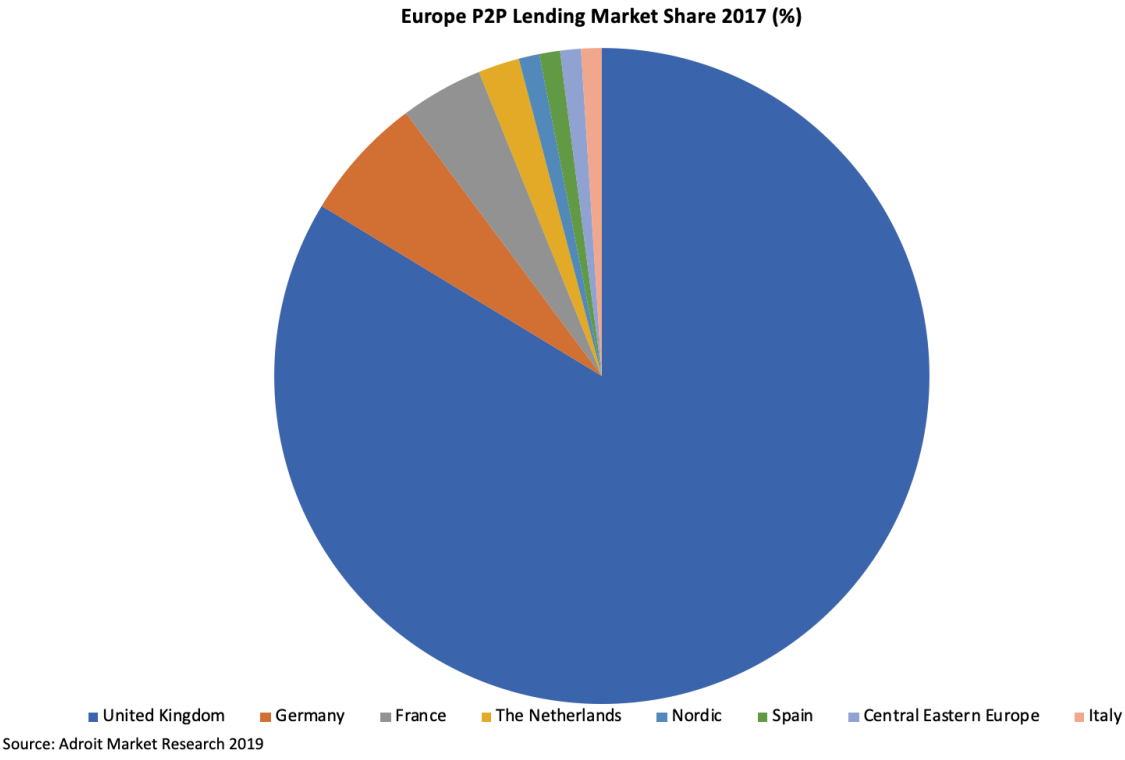
P2P lending rose to prominence in the aftermath of the subprime mortgage crisis in the United States, where it was able to assist small and medium-sized enterprises and individuals who found it difficult to secure loans from banks by offering an alternative source of borrowing for investment and consumption (Larrimore et al., 2011). By 2009, Prosper, a San Francisco-based P2P lending platform, was responsible for funding more than $178 million dollars (USD) in loans (Prosper.com, 2008). It is estimated that by 2013, the P2P loan market in its entirety will have facilitated loans to the tune of more than 5 billion dollars (USD) (Gartner, 2010).

Since 2005, online P2P lending has experienced a surge in expansion across many countries, such as the United States, China, Italy, Canada, and Japan (Chen & Han, 2012). The P2P lending market in Malaysia has also experienced a similar surge in attention, and it became the first ASEAN country to grant operating licences to six P2P platforms in 2016, and to another eight new market operators in 2019 (Securities

Commission Malaysia, 2019). P2P lending is especially appealing for small and medium enterprises (SMEs) as it serves as a convenient method to secure financing (Rowan et al., 2019).

In 2017, The United Kingdom dominated the P2P lending market with a market share of 82%, followed by Germany and France with the second and third largest market share respectively. The founding of Zopa in the United Kingdom marked the beginning of the P2P lending market, after which many new companies were founded to cater to the rising demand of P2P lending. As of 2017, the global P2P lending market is fragmented with many international and regional players across the globe, such as Prosper Marketplace, Lending Club, and China Rapid Finance (Adroit, 2019).

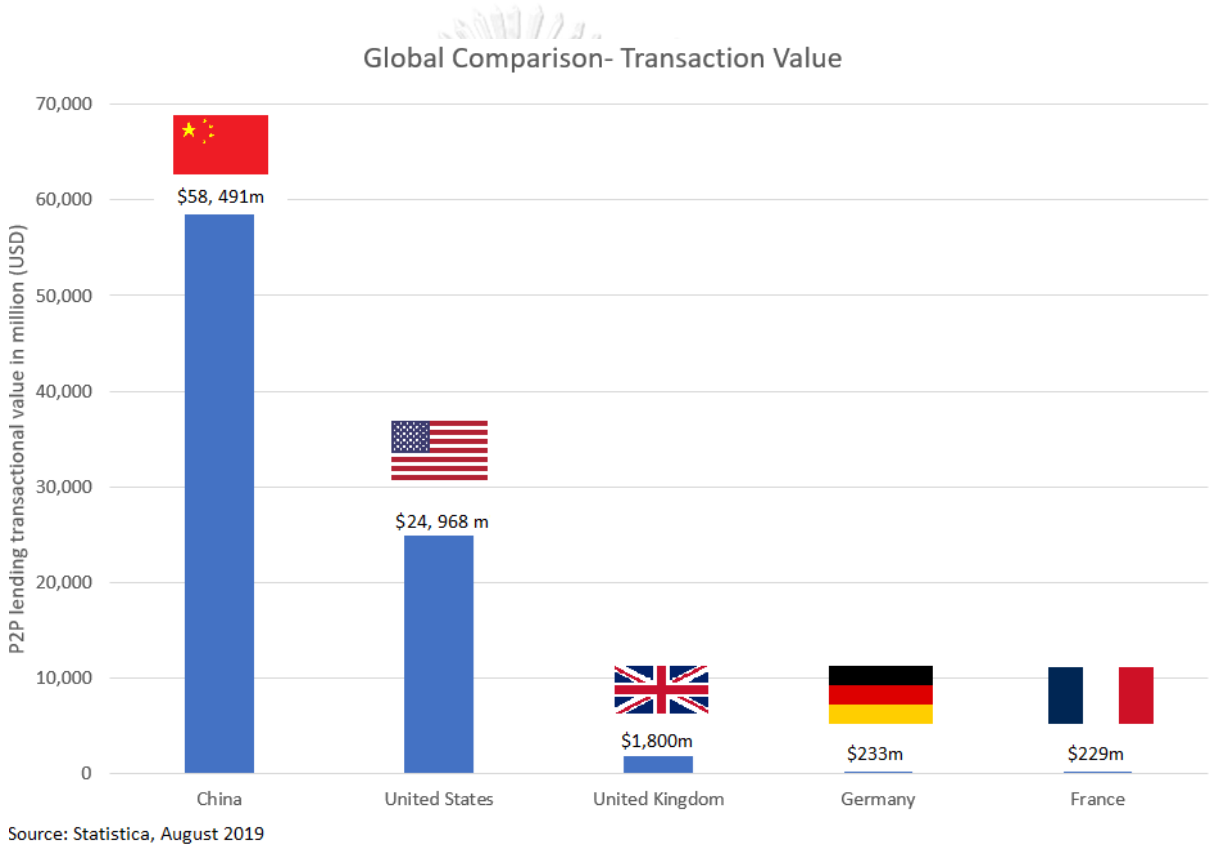
Figure 1: Europe Lending Market Share (2017)



Source: Adroit Market Research 2019

In 2019, the total transaction value in the P2P lending industry amounted to $86, 333 million. Figure 2 shows the variance of uptake in P2P lending across the top five countries in 2019. This includes China with $58, 491 million, followed by the United States with $24, 068 million, the United Kingdom with $1, 800 million, Germany with $223 million, and France with $299 million (statistica, 2019).

Figure 2: Global Comparison- Transaction Value



Source: Statistica, August 2019

Research Question

Given the numerous competitive advantages of P2P lending and the variations in the uptake of P2P lending in different countries, it is important to study the factors that affect P2P lending. Specifically, how existing financial benchmarks, such as the financial literacy rate and financial development can account for differences across countries with regards to the growth in the P2P lending market.

2. Background Information

Peer-to-peer (P2P) Lending

The online peer-to-peer (P2P) lending phenomenon began in the United Kingdom with the founding of Zopa (Kupp & Anderson, 2007), and rapidly gained traction in the United States in 2006 with the creation of San Francisco-based Prosper Marketplace, Inc. ("Prosper"). P2P platforms, such as Zopa and Prosper, are platforms that specialise in personal loans. In addition to personal loans, a diverse range of P2P financial platforms have also emerged to cater to other demands, such as Market Invoice, which specialises in invoice discounting, and Currency Cloud, which specialises in foreign exchange transactions.

Besides serving as a favourable alternative to lenders due to the higher rates of return, and a greater degree of access to credit at a reasonable cost to borrowers who may not otherwise be able to secure a loan from formal financial institutions (Milne & Parboteeah, 2016), the P2P lending market also caters to other demands, such as providing a channel for philanthropy, such as donation crowdfunding, where individuals living in poverty are able to receive money from those who are willing to extend a helping hand via donations. Donation crowdfunding also serves as an outlet for funders to donate to causes they believe in. Another form of crowdfunding is commercial crowdfunding, which seeks to finance artistic and innovative endeavours, which usually have difficulties with funding, especially in the early stages (Hossain & Oparaocha, 2017).

The rapid development of P2P financial lending platforms in recent years, together with the numerous competitive advantages they have to offer, have led numerous market observers to make ambitious projections about the extent to which P2P lending market can capture the market share in lending services offered by formal financial institutions (Milne & Parboteeah, 2016).

Financial literacy

There are many broad definitions of financial literacy in different bodies of literature. One of which is the ability to efficiently manage financial resources for the purpose of ensuring one's financial well-being (Knoll & Houts, 2012). Buch (2018) defined financial literacy as a reflection of one's ability to process financial concepts, execute sound financial decisions and manage the benefits and risks of making such decisions. Morgan and Trinh (2019) proposed that financial literacy is made up of three key components: attitudes toward long-time financial planning, financial knowledge, and financial behaviour. Financial attitudes towards long-time financial planning comprise the willingness to make plans for savings and an individual's time preference. These preferences often serve as key indicators of financial resilience and well-being.

Financial knowledge describes information that enables individuals to accurately assess the risks and benefits of different financial services and products and make well-informed and appropriate financial decisions. A rudimentary knowledge of financial concepts enables individuals to correctly understand what is happening in the financial world, and appropriately respond to events and news that might have a bearing on their financial situation.

Financial behaviour differs from financial knowledge as it relates to decisions and actions that stem from financial knowledge. Some types of behaviour, such as making impulsive purchases, and practising the habit of spending, are likely to have a detrimental impact on an individual's financial situation.

Without a strong grasp of financial literacy, socioeconomically disadvantaged groups could fall further behind as income and wealth inequality becomes larger. Lusardi and Mitchell (2014) have shown that wealth and income share a strong correlation with the financial knowledge of adults, and parents with less income or education have been found to be less equipped than other parents in imparting financial knowledge to their children (Lusardi et al., 2010). On the other hand, Van Rooij et al. (2011) employed the De Nederlandsche Bank Household Survey to examine the link between stock market participation and financial literacy. They discovered a positive relationship between the likelihood to invest in stocks with the household financial literacy level. Higher financial literacy rates enable individuals to execute financial decisions with more confidence, such as assessing the risks and benefits of different financial instruments for investment purposes.

Rapid and wide-ranging financial technological developments in the current digital age have also necessitated the need to have a solid understanding of financial information, and the ability to assess the risks and benefits of different forms of emerging financial technologies. Individual investors who partake in P2P lending often lack the necessary experience in lending, as well as knowledge of the financial industry (Iyer et al., 2016). A study by Morgan and Trinh (2019) finds a high positive

correlation between financial awareness and literacy of products with financial development in the Lao People's Democratic Republic, while another study by Han et al. (2019), which investigates the role of financial knowledge in P2P borrowing in the People's Republic of China (PRC), concluded that financial literacy levels are predictive of participation in the P2P market.

Financial Development

Financial development occurs when financial markets, instruments, and intermediaries work together to mitigate, though do not necessarily eliminate the effects of transaction costs and imperfect information (Čihák et al., 2012). The financial sector comprises institutions and markets, as well as the regulatory and legal framework that facilitates transactions to be made by the extension of credit. Financial development plays an integral part in economic development by promoting economic growth through the accumulation of capital and advancement in technology by increasing savings rates, encouraging, and facilitating the inflows of foreign investments, as well as optimising capital allocation (World Bank, 2016). Financial development also plays a crucial role in the growth of small and medium-sized enterprises (SMEs) through the provision of access to financing. SMEs are typically labour-intensive and perform better than large enterprises in terms of creating more job opportunities, and they play a crucial role in economic development, in particular developing economies (Keskġn et al., 2010).

The banking system plays a crucial role in converting the impact of financial development into economic growth (Liu et al., 2014), and it has been shown that financial market development, in particular in the banking sector, is a key proponent of economic growth (Maudos & Fernandez de Guevara, 2006). As financial depth is a measure of the size and financial institutions and markets in a country, an increase in the size of financial institutions and markets would result in financial deepening, and consequently, an expansion in financial services and products offered. This attracts new domestic and foreign entrants into the banking industry, leading to increased competition. Previous studies have also shown that competition amongst banks drives growth (Cetorelli, 2004; Cetorelli & Strahan, 2006). Competition amongst banks can cause banks to lower their lending costs, which drives up the demand for bank funds needed for business and economic development (Beck et al., 2004; Berlin & Mester, 1999).

A study by De-Ramon et al. (2018) finds that in terms of financial efficiency, a higher level of financial efficiency can suggest a higher level of competition and increase accessibility to financial markets. According to Levine (2005), there is evidence to suggest that financial markets, such as derivatives markets and stock markets, have a strong influence on economic development. One example would be when securities markets provide financial access by mobilising savings from individuals and households to invest in potentially financially lucrative projects. This, in turn, becomes an important step in driving the economy forward. Another example is when financial markets enable the diversification of risk. This is especially beneficial for inherently risky investments which might otherwise be overlooked due to the high

degree of risk they carry. A study by Ayadi et al. (2015) reveals a positive link between economic growth and financial development in developed economies, and finds that the development of the financial sector is not negatively associated with economic growth. Hicks (1969) and Miller (1998) believe that finance contributes strongly to economic growth.

Financial development comprises three main components: (1) financial access, (2) financial depth, and (3) financial efficiency. Access to financial services, for example, serves as an important goal to strive towards in terms of financial and economic development as it serves as the foundation of financial and economic development. An ownership of an account in a financial institution can, and often, serve to equip people with access to an array of financial services that facilitates a more convenient method of performing monetary transactions, investing in different financial instruments, among many other advantages. There is sufficient evidence that financial development positively contributes to economic development and growth by allowing access to services like loans to a larger market (Maskara et al., 2021). Yet, at the same time, there are still communities, such as in the United States that lack access to mainstream banks, which are often referred to as “banking deserts.” (Hegerty, 2020). While the situation has improved over the last decade with the significant reduction of bank deserts in inner cities, there are still many rural communities around the world that lack access to basic financial and banking services (Brennan et al., 2011; Kashian et al., 2018; Simpson & Buckland, 2016). This leaves people in such rural communities no other avenues except to turn to other financial alternative services

such as pawnbrokers and payday lenders (Dunham, 2019; Kim et al., 2019; Prager, 2014).

Another key advantage of having an account in a formal financial institution is that account holders have the option of receiving financial resources from another party, even from family or friends situated overseas, in the event of a financial emergency, as compared to those who do not have an account. Access to financial services is vital as they allow those who are financially disadvantaged to better prepare themselves for financial shocks and move money over time, in order to gain access to goods and services, manage and allocate resources better, and enhance their economic opportunities (Mader, 2018).

However, this presents a challenge for countries where not every individual is able to borrow from conventional financial institutions, either due to credit issues, or not being able to open an account with said institutions. A study by Vanroose and D'Espallier (2013) showed that the number of microfinance institutions is higher in countries where there is a lower percentage of account holders in formal financial institutions. Rural communities that still lack access to formal financial institutions are especially vulnerable due to the difficulty they face in accessing basic financial services offered by formal financial institutions. This, in turn, creates a demand for alternative avenues of financing. In this regard, P2P serves as a viable alternative to formal financial institutions by serving the financial needs of communities that do not have convenient access to banking services till services from formal financial institutions become available (Maskara et al., 2021).

Financial depth refers to the size of financial institutions and markets relative to the economy of a country, and the deepening of the financial system is one of the main drivers of economic growth (Maudos & Fernandez de Guevara, 2006). Financial deepening facilitates greater access to credit, in particular, for entrepreneurs and small and medium-sized enterprises (SMEs). Through the provision of necessary capital, financial deepening enables entrepreneurs to invest in new projects and expand existing operations, leading to the creation of jobs, increased productivity, and overall economic growth. Financial deepening can also lead to increased competition in the banking industry, as it encourages banks to innovate and adopt new technologies such as digital transformation, online banking platforms, and other technological solutions to offer a more convenient and user-friendly experience for consumers, and also to differentiate themselves from their competitors. This increased competition amongst banks, in turn, drives the economy forward (Cetorelli, 2004; Cetorelli & Strahan, 2006).

Financial Efficiency describes how productive and effective financial institutions are in managing costs, such as salary expenses, fixed costs, and other noninterest expenses (Spong et al., 1995), at the same time keeping default risks to a minimum. Formal financial institutions usually have vast repositories of data and information on borrowers, such as credit histories and financial statements. This allows formal financial institutions, such as banks, to conduct comprehensive credit assessments, along with sophisticated risk models and well-developed risk management practices in evaluating credit risk.

3. Literature Review

While the implications of the competition between formal financial institutions and individuals who partake in P2P lending have been widely discussed in the literature (Cole et al., 2019; Cornaggia et al., 2018), not much about the dissimilarities in the determinants of P2P lending, in particular, financial literacy and financial development have been studied at a cross-country level. This paper seeks to fill this gap by studying the relationship between financial literacy and financial development in P2P lending.

The importance and effects of financial literacy have been widely studied. In a paper by Lusardi and Mitchell (2011), they find a positive link between wealth accumulation and retirement to financial literacy. Similarly, Van Rooij et al. (2011) show that financial literacy affects financial decision-making, and those with a lower level of financial literacy are much less likely to invest in stocks. Klapper et al. (2015) find that high economic development is tied to high financial literacy, and that financial literacy sharply increases with educational attainment. Financial literacy also serves as a crucial resource for financial technology, and by extension, P2P lending.

A study by Morgan and Trinh (2019) finds that higher financial literacy rates show a significant relation to the awareness of fintech services and products, and that improvements in financial literacy could increase the rate of adoption of fintech services and products, ultimately creating a more inclusive financial ecosystem. The importance of financial literacy on the demand side is also highlighted in a study by Ghazali and Yasuoka (2018), where while new forms of innovation in finance such as

P2P lending are supposed to provide a wider range of financing options to start-ups and SMEs, a lack of financial awareness or knowledge still poses a challenge as it prevents consumers from fully understanding its features, as well as the benefits that these alternative avenues of financing confer.

Existing studies also suggest individuals with less financial knowledge behave differently from those who are more financially knowledgeable. Moorman et al. (2004) also find that when it comes to making personal decisions, individuals who are more financially knowledgeable differ a lot from individuals who are less financially knowledgeable. In another study by Han et al. (2019), they find that financial literacy is predictive of market participation in P2P financial services from a study that investigates the role of financial knowledge in P2P banking services by measuring financial expertise and financial familiarity in China. The same study also revealed that an improvement in financial knowledge has a positive impact on the further expansion of P2P banking services, as what is currently impeding its expansion is the lack of understanding and unfamiliarity with financial products and services, ultimately greatly restricting the development of the P2P scene in China.

Financial development has been widely measured with a single indicator in empirical literature, such as the ratio of private credit to stock market capitalisation. However, a single indicator alone is often unable to offer a complete representation of the complexity of financial development as a whole, much less use it as a benchmark to compare the level of financial development among countries. Čihák et al. (2012) propose a set of indices to measure financial development, which comprises (1) financial access, which measures the degree of access to financial institutions and

markets by individuals, (2) financial depth, which is the size of the financial markets in a country, and (3) the efficiency of the provisions of financial services to individuals.

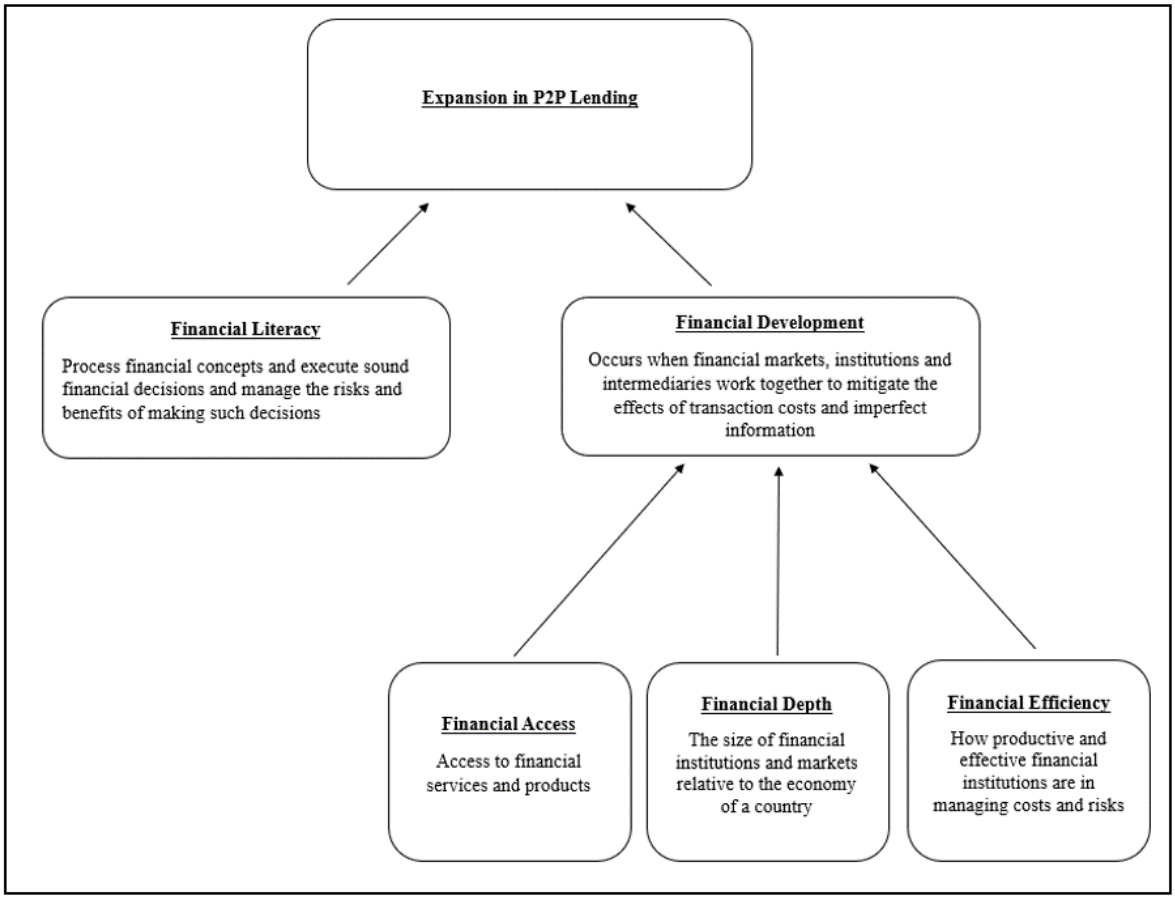
The link between economic growth and financial development has received widespread attention in recent years, and has remained an important issue of debate among policymakers (De Gregorio & Guidotti, 1995) and academics ever since the pioneering contributions made by Goldsmith (1959), McKinnon (2010), and Shaw (1973). Levine (1997) believes that economic efficiency, and ultimately growth, are enhanced by financial intermediaries. In a study by Goldsmith (1959), Levine and Zervos (1998), they employ a cross-country analysis to investigate the relationship between financial development and economic growth, and conclude that financial development helps to predict economic growth.

On the other hand, there have been many debates amongst academics on the role of financial development in poverty reduction and economic growth. Lucas Jr (1988) argued that finance is an over-stressed determinant of economic growth. However, there is sufficient empirical evidence to suggest that finance plays a central role in socioeconomic development, and by extension, economies with higher levels of financial development experience quicker growth and faster reduction in poverty levels (Levine, 1997, 2005). Similarly, Demirguc-Kunt and Levine (2008) highlight the positive effects of financial development, specifically how financial development positively affects economic growth. That is, a well-functioning financial system plays an important role in promoting economic growth in the long run.

In a study by Ayadi et al. (2015), they employ new quality (e.g. banking efficiency), and quantity (e.g. liquidity and size of the financial sector) as measures of financial development in order to assess potential links with economic growth. They conclude that the effects of quantity and quality of the financial system on economic growth are different in developing and developed countries, which would ultimately have an impact on all kinds of credit, including P2P loans. A better environment in financial development positively affects P2P lending as most P2P platforms regard speed, accessibility to P2P platforms by potential clients, and access to large quantities of collected data as favourable attributes (Barba Navaretti et al., 2017). Additionally, Oh and Rosenkranz (2022) highlighted the importance of information communication technological (ICT) infrastructure on the supply side, specifically internet access, to the expansion of P2P lending. That is, economies with better information technological support are more conducive to the expansion of P2P lending.

Based on the literature reviewed, Figure 3 presents the conceptual framework that has been developed to illustrate the study of the effects of financial literacy and financial development, specifically financial access, financial depth, and financial efficiency on P2P lending.

Figure 3: Framework on Financial Benchmarks and the Expansion Peer-to-Peer Lending



Source: Author's illustration

4. Methodology

This paper seeks to investigate the impact of financial literacy and financial development on the expansion of peer-to-peer lending in developed and developing countries by using a Multiple Linear Regression model (equation 1) to estimate the impact of financial literacy and financial development on the expansion of P2P lending.

$$P2P_i = ß_0 + ß_1 FinLit_i + ß_2 FAI_i + ß_3 FDI_i + ß_4 FEI_i + ß_5 Fbroadband_i + ß_6 CPI_i + \varepsilon_i \quad (1)$$

Where $ß_0$ = y-intercept (constant term)

$ß_1$- $ß_4$ = Slope coefficients for each independent variable

$ß_5$- $ß_6$ = Slope coefficients for each control variable

ε_i= The model's error term

The definitions and types of variables to be included in the regression model can be found in table 1.

Table 1: Definitions and Types of Variables (Multiple Linear Regression Model)

VARIABLE	DEFINITION	VARIABLE TYPE
P2P	Peer-to-Peer Financial Lending Services (Log of Total Transaction Volume in USD)	Number
FinLit	Financial Literacy Index	Number
FAI	Financial Access Index	Number
FDI	Financial Depth Index	Number
FEI	Financial Efficiency Index	Number
Fbroadband	Fixed Broadband Subscription/100 people	Number
CPI	Corruption Perceptions Index (0-100)	Number

Additionally, the variables fixed broadband, which measures the number of fixed broadband subscription per 100 people, and the corruption perceptions index, which is a measure of corruption in a country, are included as control variables, as these variables are present in every country, and could potentially influence the independent variables. Hence, fixed broadband and corruption perceptions index are controlled for, in order to enhance the internal validity of the study on the link between financial literacy and financial development on the expansion of P2P lending.

5. Data

The data for peer-to-peer financial lending services used in this study is obtained from the Cambridge Centre for Alternative Finance and comprises 3 major components: (1) Peer-to-peer Marketplace Business Lending, (2) Peer-to-peer Marketplace Consumer Lending, and (3) Peer-to-peer marketplace Property Lending, as shown below in table 2. The total peer-to-peer loan volumes are provided in US dollars based on the exchange rate at the end of 2020. In total, 40 economies are included in the study.

Table 2: Alternative Finance Classification System for Digital Lending

P2P / Marketplace Lending	Peer-to-peer Marketplace Business Lending	Individuals and/or financial institutions who provide a loan to a **business** borrower
	Peer-to-peer Marketplace Consumer Lending	Individuals and/or financial institutions who provide a loan to a **consumer** borrower
	Peer-to-peer Marketplace Property Lending	Individuals and/or financial institutions who provide a loan, secured against a property, to a **consumer** or **business** borrower

Source: Cambridge Alternative Finance Benchmarks

For financial literacy, the data from the 2014 Standard and Poor's Ratings Services Global Financial Literacy Survey is used, which is the only and latest survey to date with a nationally representative and randomly selected body of individuals in a target population of aged 15 and above across 40 economies. The financial literacy scores are computed based on an individual's foundational knowledge of inflation, risk diversification, interest rates, and interest compounding. Based on the individual data of financial literacy scores by countries, Scandinavian countries scored the highest,

followed by Canada, Israel, and the United Kingdom. The results also revealed a large variance in financial literacy across economies.

The data for financial development is obtained from the financial (market) development index in the International Monetary Fund database. The financial (market) development index is an aggregate of 3 financial market indices: (1) financial access index, (2) financial depth index, and (3) financial efficiency index (International Monetary Fund, 2022).

Table 3 presents an overview of the countries included in the study. The countries are categorised into two groups- developed and developing economies. Using the World Bank Atlas method, the World Bank classifies developed economies as countries with a gross national income (GNI) of $13, 205 per capita or higher.

Table 3: Classification of Economies

Developing Economies (n = 17)	Developed Economies (n = 23)
Argentina, Brazil, Chile, China, Colombia, Ghana, Indonesia, Kenya, Malaysia, Mexico, Nigeria, Peru, Saudi Arabia, South Africa, Thailand, Turkey, Vietnam	Australia, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, New Zealand, Norway, Poland, Singapore, South Korea, Spain, Sweden, Switzerland, The Netherlands, United Arab Emirates, United Kingdom, United States

6. Empirical Findings

Tables 4, 5, and 6 provide the summary statistics for the group that comprises all economies, developing economies, and developed economies respectively. The dependent variable is the total P2P loan volume. The independent variables are financial literacy, financial access, financial depth, and financial efficiency. The control variables are fixed broadband and corruption perceptions index.

One observation is that the mean values for all the variables in the group of developing economies are lower than the mean values for all the variables in the group of developed economies, suggesting a clear difference between developing and developed economies.

A notable observation is that the minimum value of the total P2P loan volume in developed economies (7.31) in table 6 is higher than the total P2P loan volume in developing economies (4.5) in table 5. The larger P2P loan volume suggests that the P2P lending market is more developed in developed economies than in developing economies.

What is notable is that the variable corruption perceptions index is the only variable where the minimum value in the group of developing economies (31) is higher than the minimum value in the group of developed economies (11), suggesting corruption, measured by the variable corruption perceptions index, could account for the differences between developing and developed economies.

The variable fixed broadband, which measures the number of fixed broadband subscriptions per 100 people, is significantly higher in developed economies (22.66) than in developing economies (0.03), suggesting that fixed broadband subscriptions feature prominently in developed economies, and can also account for the differences between developing and developed economies.

Table 4: Summary Statistics (All Economies)

Variable	Obs	Mean	Std. Dev.	Min	Max
P2P	40	7.974	1.047	4.5	10.57
Financial Literacy	40	46.618	15.868	24	71
Fixed Broadbandsub	40	28.201	14.366	.03	48.76
Corruption Index	40	58.8	20.611	11	88
Financial Access	40	.553	.211	.01	1
Financial Depth	40	.612	.302	.07	1
Financial Efficiency	40	.553	.345	.03	1

Table 5: Summary Statistics (Developing Economies)

Variable	Obs	Mean	Std. Dev.	Min	Max
P2P	17	7.327	1.076	4.5	9.02
Financial Literacy	17	33.159	8.748	24	59.7
Fixed Broadbandsub	17	14.998	10.817	.03	37.58
Corruption Index	17	41.353	8.867	31	67
Financial Access	17	.395	.13	.01	.56
Financial Depth	17	.416	.283	.07	.95
Financial Efficiency	17	.407	.377	.03	1

Table 6: Summary Statistics (Developed Economies)

Variable	Obs	Mean	Std. Dev.	Min	Max
P2P	23	8.453	.735	7.31	10.57
Financial Literacy	23	56.565	12.135	33	71
Fixed Broadbandsub	23	37.96	6.82	22.66	48.76
Corruption Index	23	71.696	16.937	11	88
Financial Access	23	.671	.182	.38	1
Financial Depth	23	.757	.228	.18	1
Financial Efficiency	23	.66	.282	.16	1

Additionally, results of the pairwise correlation tests applied to the variables in the group comprising all economies, the group of developing economies, and the group of developed economies in tables 7, 8, and 9 respectively suggest no significant multicollinearity issues.

Table 7: Pairwise Correlation (All Economies)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) P2P	1.000						
(2) Financial Literacy	0.427	1.000					
(3) Fixed Broadbandsub	0.344	0.600	1.000				
(4) Corruption Index	0.297	0.691	0.698	1.000			
(5) Financial Access	0.138	0.461	0.597	0.549	1.000		
(6) Financial Depth	0.209	0.567	0.698	0.491	0.502	1.000	
(7) Financial Efficiency	0.278	0.197	0.509	0.148	0.114	0.611	1.000

Table 8: Pairwise Correlation (Developing Economies)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) P2P	1.000						
(2) Financial Literacy	0.266	1.000					
(3) Fixed Broadbandsub	-0.279	-0.226	1.000				
(4) Corruption Index	-0.012	0.424	0.304	1.000			
(5) Financial Access	-0.282	-0.020	0.407	0.358	1.000		
(6) Financial Depth	-0.411	0.464	0.424	0.429	0.309	1.000	
(7) Financial Efficiency	-0.256	0.007	0.496	0.020	0.031	0.688	1.000

Table 9: Pairwise Correlation (Developing Economies)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) P2P	1.000						
(2) Financial Literacy	-0.105	1.000					
(3) Fixed Broadbandsub	0.009	0.233	1.000				
(4) Corruption Index	-0.300	0.298	0.310	1.000			
(5) Financial Access	-0.415	-0.050	-0.013	0.071	1.000		
(6) Financial Depth	0.223	0.161	0.612	0.011	0.164	1.000	
(7) Financial Efficiency	0.616	-0.216	0.219	-0.333	-0.340	0.331	1.000

Application of Ordinary Least Squares (OLS) estimation yields the results in table 10. The following discussion focuses on the estimation results of the impact of financial

literacy and financial development on the expansion of P2P lending services in the regression results shown below in table 10.

Table 10: Regression Results

	(1) P2P	(2) P2P	(3) P2P
Financial Literacy	1.584**	2.948**	-.202
	(.625)	(1.176)	(.417)
Fixed Broadband	.071	.161	-1.005
	(.117)	(.211)	(.944)
Corruption Index	.059	-.076	-.036
	(.195)	(1.032)	(.221)
Financial Access	-.024	.132	-.799
	(.126)	(.243)	(.494)
Financial Depth	-.718**	-1.497	.564
	(.342)	(.923)	(.518)
Financial Efficiency	.462**	.529	.543*
	(.196)	(.337)	(.307)
Constant	1.447	-3.797	13.188***
	(2.843)	(7.447)	(3.413)
Observations	40	17	23
R-squared	.306	.408	.385
F-statistic	3.333	1.692	2.889

Robust standard errors are in parentheses
*** *p<.01*, ** *p<.05*, * *p<.1*

Table 10 reports the regression outputs at the country level, where the dependent variable for each model is the log of the total P2P loan volume. Table 10 also includes the regression outputs for three regression models: (1) represents the entire sample of 40 economies, (2) represents the group of 17 developing economies, and (3) represents the group of 23 developed economies. It shows the estimation results obtained by including financial literacy and the different components of financial development (financial access, financial depth, and financial efficiency) as the independent variables, and the log of fixed broadband and the log of corruption index as the control variables.

In model 1, financial literacy and financial efficiency are found to have a positive relationship with P2P expansion, implying that financial knowledge and efficiency of financial systems are important for the expansion of P2P lending. That is, an increase in financial knowledge and financial efficiency positively impacts the expansion of P2P lending. This accords with the literature, where Han et al. (2019) find that financial literacy is predictive of P2P market participation. The same study also revealed that an improvement in financial knowledge has a positive impact on the further expansion of P2P lending, as what is currently impeding the expansion of P2P financial services is the lack of understanding and unfamiliarity with financial products and services. The positive relationship between financial literacy and the expansion of P2P lending is also in line with the findings of Morgan and Trinh (2019) in which a higher level of financial literacy shows a significant relation to the awareness and understanding of fintech services and products, which could influence the uptake of P2P lending.

Financial efficiency relates to the effectiveness and productivity of financial institutions in utilising their resources to generate profits, as well as how efficiently they operate in terms of cost management and risk management. An increase in financial efficiency translates into more robust and stringent risk management practices. Banks employ sophisticated risk assessment models, and underwriting processes to evaluate the creditworthiness of borrowers, which allows financial institutions to leverage their expertise in risk management and collaborate with P2P lending platforms to enhance their risk assessment capabilities. This is especially crucial in P2P lending, as the credit risk is borne by individual lenders, instead of

financial institutions since P2P lending platforms facilitate financial disintermediation by directly connecting lenders with borrowers (Serrano-Cinca et al., 2015). While P2P lending platforms are addressing this issue by providing potential lenders with information about borrowers and their loan purpose, an increase in financial efficiency will greatly aid in the expansion of P2P lending as P2P lending platforms will be able to enhance their risk assessment capabilities by leveraging the increased risk management capabilities of financial institutions due to increased financial efficiency, thereby creating a safer environment for both lenders and borrowers.

Financial depth, which captures the size of financial institutions and markets relative to the economy, is negatively correlated with P2P lending. That is, an increase in financial depth results in a decrease in the expansion of P2P lending. Financial deepening leads to an increase in financial services and products, which generates interest from domestic and foreign entrants into the banking industry. This, in turn, creates competition amongst banks, which leads to economic growth (Cetorelli, 2004; Cetorelli & Strahan, 2006). However, the increase in bank competition causes banks to lower their lending costs, in order to remain competitive (Beck et al., 2004; Berlin & Mester, 1999). This leads to financial deepening ultimately impeding the expansion of P2P lending as those who were once drawn to the lower cost of borrowing that P2P platforms once had to offer are now able to seek financing from established financial institutions, such as banks, rather than from P2P lenders. Additionally, financial deepening often leads to increased regulatory oversight and scrutiny from regulatory authorities, resulting in stricter regulations on lending activities to ensure financial stability and consumer protection. A study by Jiang et al. (2021) revealed that as a

result of a nationwide tightening of regulations on P2P platforms from 2018 to 2020 in China, only 29 out of approximately 5000 online platforms were operating in June 2020.

Between model 2 (developing economies) and model 3 (developed economies), only financial literacy was found to be significant in the group of developing economies, and not in the group of developed economies. This could be attributed to the fact that because financial literacy rates tend to be higher in developed economies (Klapper et al., 2015), hence it does not factor significantly into the expansion of P2P lending in developed economies as compared to developing economies. On the other hand, financial literacy contributes significantly to the expansion of P2P in developing countries, as the study by Han et al. (2019) showed that an improvement in financial knowledge positively impacts the further expansion of P2P lending, as what is currently impeding the expansion in P2P financial services is the lack of understanding and unfamiliarity with the technology itself. However, the findings on the impact of financial literacy and financial development on P2P lending in developing and developed economies are still preliminary as the number of economies included in each category is fewer than 30, hence the central limit theorem does not hold in this study.

7. Conclusion and Recommendations

The objective of this study was to study how existing financial environments, such as how the financial literacy levels and financial development can account for differences across countries with regards to the growth in the P2P lending market. A multiple linear regression model was used to estimate the impact of financial literacy and financial development on the expansion of P2P lending. In addition to financial literacy and financial development as the independent variables, the variables fixed broadband and corruption perceptions index were included as control variables, as these variables are present in every country, and could potentially influence the independent variables, thereby undermining the internal validity of the study on the link between financial literacy and financial development on the expansion of P2P lending if the variables are not included in the regression analysis.

The findings revealed that financial literacy and financial efficiency have a positive relationship with the expansion of P2P lending, which is consistent with the findings of Morgan and Trinh (2019), in which a higher level of financial literacy shows a significant relation to the understanding and awareness of fintech, as well as products and services related to fintech, which could influence the uptake of P2P lending. Financial efficiency also shares a positive relationship with the expansion of P2P lending, as one of the challenges is that because P2P lending platforms facilitate financial disintermediation, individual lenders have to bear the credit risk, instead of financial institutions (Serrano-Cinca et al., 2015). An increase in financial efficiency will positively affect the expansion of P2P lending as P2P lending platforms will be

able to enhance their risk assessment capabilities by leveraging the increased risk management capabilities of financial institutions due to increased financial efficiency. Financial depth, on the other hand, is negatively correlated with P2P lending. Financial deepening leads to an increase in financial services and products, which generates interest from other parties to enter the banking industry, which results in lower lending costs in order to stay competitive due to an increase in banking competition. This causes borrowers to seek financing from established financial institutions due to the lower transaction costs, instead of P2P lending platforms, ultimately impeding the expansion of P2P lending.

In terms of the differences between developing and developed economies, only financial literacy was found to be significant in the group of developing economies, and not in the group of developed economies, suggesting that financial literacy does not factor significantly into the expansion of P2P lending in developed economies as compared to developing economies as financial literacy rates tend to be higher in developed economies. On the other hand, financial literacy contributes strongly to the expansion of P2P lending in developing economies, and by extension, new financial technologies. A higher level of financial literacy confers a greater level of awareness and understanding of financial technology per se and enables individuals to confidently assess the risks and benefits of different financial products and services, which in turn leads to an uptake in the number of people who are willing to adopt and integrate new fintech products and services into their lives.

Given the benefits of P2P lending, and the importance of financial literacy and financial development in the expansion of P2P lending, it is imperative that policies

are aligned as such to encourage its continued expansion. One recommendation is for governments, especially those in developing economies, to place more emphasis on financial education, as one of the factors impeding the expansion of P2P lending platforms is the lack of understanding and unfamiliarity with fintech products and services. The increase in financial literacy on the demand side will enable consumers to be more knowledgeable about the different forms of fintech, as well as how they can utilise those technologies in a way that they can reap the most benefits from, and at the same time mitigating the potential risks that come with such technologies.

Another recommendation is to introduce policies pertaining to financial development that are conducive to the growth of the fintech sector, especially with regards to increasing financial efficiency. This could come in the form of fundings to assist banks invest in new technologies, such as cloud computing and artificial intelligence, which will enable banks to automate processes, reduce costs, and improve risk management. Additionally, the increase in fundings for the banking and finance industry by governments can be channelled towards research and development, as well as creating an environment that is conducive to innovation will help banks to develop new services and products that can improve efficiency.

8. Limitation and Further Research

This study seeks to explore the link between financial literacy and financial development on P2P lending across 40 economies, in which the economies are categorised into two groups-developing and developed economies. One limitation of this study is the sample size, in which there are only 17 economies in the group of developing economies, and 23 economies in the group of developed economies. One recommendation to overcome this limitation is to include more countries and the number of years, which in turn increases the number of observations that can be included in the study. Some suggestions for further studies in this area could be to explore the regulations of P2P lending. While the P2P lending market has experienced tremendous growth in the past decade, there is still uncertainty among governments on how it should be regulated. Some countries have strict and specific regulations for P2P lending, while other countries have left it to the market to self-regulate. In this regard, more research is needed to understand the best approach to regulate the P2P lending market.

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