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The Impact of Peer-To-Peer Lending on Commercial Bank's Market Share:Bank-Level Evidence

Dr. Tran Thi Xuan Anh[1], Nguyen Le Thu[2]
[1]Faculty of Finance, Banking Academy of Vietnam
[2]Student of Advanced Finance program, Banking Academy of Vietnam
email: anhttx@hvnh.edu.vn

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ABSTRACT
This study offers the first thorough analysis of how Peer-to-Peer (P2P) lending has affected the market share of commercial banks in Vietnam. It does so with a special emphasis on shareholder characteristics, such as the proportion of foreign and state-owned shares. The study, which examined data from 31 commercial banks between 2017 and 2023, found that, whereas marketplace lending has a beneficial effect on conventional banks' market share, P2P has a negative impact on banks' market share. Notably, this is the first study to show that state-owned banks often hold a bigger market share than banks with a larger foreign owner structure when it comes to peer-to-peer lending. Moreover, this study is the first to pinpoint how market discipline helps lessen the negative impact of peer-to-peer lending on the market share of commercial banks. In light of the emergence of peer-to-peer lending platforms, these insights are essential for investors, commercial banks, and legislators to effectively navigate the changing peer-to-peer lending landscape, plan ahead, and maintain the stability and competitiveness of the banking sector. This study pushes traditional banks to capitalize on the rapid advancement of technology to improve client experiences and market share, and it also broadens the conversation about the relationship between traditional banking and developing financial innovations.

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INTRODUCTION

The global banking sector has seen a strong adoption of new technologies linked to the accomplishments of the fourth industrial revolution, including blockchain, cloud computing, extensive data analysis, and artificial intelligence (AI). These technologies are applied to business models, financial products and services, and methods of approaching and interacting with bank and credit institution clients to enhance operational efficiency (Vu, 2023). FinTech may be seen as having a particular function in modernizing the financial system as it helps to improve profitability and financial performance. Fintech can completely transform banking in the future as it does not rely on traditional branches (Azarenkova et al., 2018; Coetzee, 2018; Wonglimpiyarat, 2017). P2P lending is a relatively new Fintech service that allows individuals and businesses to lend to and borrow from one another using websites or online P2P platforms (Kohardinata, 2020). Fintech lenders employ alternative data, big data, artificial intelligence, and machine learning approaches to make loan decisions quickly (Lee & Shin, 2018). The banking sector has lately faced a new threat with the emergence of FinTech (P2P) start-ups, whose services are primarily focused on lending and payment, which are the primary activities of commercial banks (Stern et al., 2017).

Previous studies on the effects of peer-to-peer lending on bank performance suggest that the consumer theory explains how peer-to-peer lending affects market share for commercial banks (Kohardinata et al., 2020). According to consumer theory, if a new service is used in conjunction with existing services, it may take the place of earlier services that, from the perspective of consumer theory, serve the exact expectations (Aaker & Keller, 1990; Levin & Milgrom, 2004; Phan et al., 2020). Substitution products often have a universal application to replace other things and satisfy the same criteria (Aaker & Keller, 1990). Based on consumer theory, peer-to-peer lending platforms may be able to replace banking industry products and services when they join the capital market. Technology is transforming financial services and creating new competitors outside established market segments (Goldstein et al., 2019). Alternative platforms can function as complementary platforms when they collaborate technologically with commercial banks to cater to the lower end of the market, yet they can also function as replacements when they serve the same market as banks. Peer-to-peer lending platforms can be an advantageous complement to traditional banking, allocating excess funds across the community (Jiang et al., 2018; Li et al., 2017; Ma et al., 2018). However, peer-to-peer lending might not impact the banking sector's performance (Kohardinata et al., 2020; Li et al., 2017). One reason is that the primary users of P2P networks usually do not have access to commercial loans (Thakor, 2020; Zhang et al., 2019). Thus, P2P lending platforms do not compete with traditional banks but serve a particular market (Kohardinata et al., 2020; Zhang et al., 2019). Banks cannot offer loans in other low-quality areas, but P2P platforms may (Tang, 2019). In locations with few banks, and the local economy is still struggling, FinTech-based lenders might fill in the gaps. Fintech can be a new avenue for those not served by traditional banks (Jagtiani & Lemieux, 2018; Li et al., 2017). The fact that many banks have made an effort to integrate these technologies or start FinTech businesses into their operations after understanding the significance of FinTech is another reason why FinTech may be an asset to banks (Li et al., 2017).

On the other hand, since P2P platforms and banks are similar in providing loans to customers for personal and business purposes, they may replace banks. The banking industry's performance is negatively impacted by the emergence of FinTech (Phan et al., 2020). This result is consistent with Zhang et al.'s (2019) observation that more significant P2P lending balances harm domestic banks' loan balances. FinTech provides a technology solution. FinTech-based companies are more advantageous than banks since as many regulations do not bind them and can obtain better technical support (Zalan & Toufaily, 2017). Due to the rapid growth of P2P lending and the public's recognition of its importance and convenience, small and medium-sized businesses (SMEs) and individuals will find it challenging to obtain a loan from a bank while the banking industry continues to apply strict regulations and is more cautious about each loan. Because of this, more individuals will use P2P lending platforms, especially those looking for loans that are easy to get and rapid (Kohardinata et al., 2020; Zhang et al., 2019). One potential benefit of rising P2P lending is expanding access to financial services in locations, including rural areas, where there is less competition from banks (Tang, 2019;

Wolfe & Yoo, 2017). However, since peer-to-peer lending serves the same market, commercial banks are usually clients of capital markets; therefore, peer-to-peer lending might function as a substitute or a competitor.

Previous studies on the global spread of peer-to-peer lending have produced some noteworthy statistical findings. Peer-to-peer lending has caused conventional banks to lose market share (Romanova & Kudinska, 2016). Specifically, as of September 2013, the US has a 51% share in the global P2P market, followed by China with 28% and the UK with 17%. Kirby and Worner (2014) propose that market values are expected to total USD 6.4 billion. Fintech companies in Vietnam are characterized by their involvement in the finance and banking industry. These companies are non-bank organizations with technological capabilities and technology startups that develop solutions to support banking activities without directly serving end users or independently developing new solutions and services (Vu, 2023). More than 100 Fintech businesses are offering mainstream peer-to-peer lending services on an ever-expanding scale after more than five years of operation (Vu, 2023). This graph illustrates the peer-to-peer lending platform's explosive expansion. Fintech businesses will have a hard time taking the position of commercial banks in the near future since the latter are still a respected, established, and knowledgeable credit institutions. Peer-to-peer lending, however, may eventually pose a challenge to the bank's market share. It may be argued that Fintech businesses have a significant influence on the necessity for banks and other conventional financial institutions to quickly reinvent their technological offerings and adjust to market demands.

Research on the effect of peer-to-peer lending on the market share of traditional financial institutions like commercial banks is crucial given that Vietnam is a developing country and that the existence, stability, and growth of a banking system are concluded to play a significant role in the allocation and distribution of economic resources in countries as well as enhancing economic growth (Akims, 2022). In addition, alternative lenders can now get hundreds or even thousands of data points for a single borrower from various sources, thanks to advancements in technology. This may afford them a competitive advantage. Furthermore, technological improvements have enabled alternative lenders to get hundreds or even thousands of data points about a single applicant from many sources. As such, they could have an edge over traditional banks (Romanova & Kudinska, 2016; Saiedi et al., 2020). According to projections, the alternative finance sector would grow by 32.8% annually and reach US$404.7 million in 2023, primarily in Vietnam. This rise could affect the market share of traditional banks (Dubin, 2023). By investigating this topic, we would therefore be able to provide relevant information on these trends and their relevance for the banking business in Vietnam. This might help banks adapt to the changing financial landscape and reinforce their strategy.

The goal of some earlier studies is the same as ours: to determine how peer-to-peer lending affects commercial banks' market shares (Greenwood & Scharfstein, 2013; Wardrop et al., 2015; Philippon, 2016; Romanova and Kudinska, 2016). They listed several additional factors that influence how peer-to-peer lending and banks' market shares interact. For instance, Bunchak et al. (2018) discovered that P2P lending benefits traditional banks in the lending industry. They brought up a few points, such as banks' regulatory worries, related to this assertion. Moreover, data suggests that legislative restrictions, which insulate shadow banks from these limitations, have prompted conventional banks to reduce their mortgage lending (Buchak et al., 2018). Sedera (2020) also examines and contrasts the effects of peer-to-peer lending on commercial banks and rural banks. To the best of our knowledge, the topic of our study has not received enough attention. With an emphasis on FinTech growth in Vietnam, our main research objectives are to investigate how market discipline functions in this context and how peer-to-peer lending affects the market share of commercial banks. Our study added to the body of literature in several ways. Firstly, we contributed to the little literature on the connection between market shares held by banks and peer-to-peer lending. As far as we know, this is the first study looking at this link in Vietnam's commercial banks with several ownership types, including foreign, state-owned, and private banks. This is significant because Wang et al. (2021) argued that the ownership structure of the bank influences the relationship between shadow banking and bank efficiency and that P2P lending has a more significant effect on a bank's performance in banks with lower efficiency and

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higher levels of shadow banking (Ding et al., 2020; Figueira et al., 2009; Lensink et al., 2008). Therefore, more investigation is needed to ascertain if banks in developing nations must consider altering their ownership arrangements in response to the FinTech industry's explosive growth to maintain their market share and efficiency. Furthermore, this is the first research to examine how market discipline functions in the context of peer-to-peer lending's growing popularity and how it regulates the effect of this growth on the bank's market share. This is critical because market discipline may boost bank rivalry, as Xie et al. (2024) show. Consequently, banks could be more likely to offer competitive rates and terms to retain customers and grow their market share, improving customer satisfaction and protection.

The remainder of the research will proceed as follows: In Section 2, we assess the literature review and present our theories. In Section 3, we summarize the variables utilized in the quantitative analysis and describe the data. In Section 4, we show the multivariate and descriptive findings. In Section 5, we present the discussion and findings of our inquiry will be presented in section 6.

LITERATURE AND HYPOTHESES

Several previous studies have examined the relationship between P2P lending and the global market share of commercial banks; nevertheless, the findings have been inconsistent. Romanova and Kudinska (2016) conclude that conventional banks have begun to lose market share due to the rise of alternative finance. Several prior studies have indicated that the expansion of peer-to-peer lending poses a danger to commercial banks' capacity to carry out their lending function and would negatively affect these institutions' market share and standing. Several studies show direct rivalry between commercial banks and P2P platforms (Cornaggia et al., 2018; Tang, 2019). Cornaggia, Wolfe, and Yoo (2018) claim that banks are losing market share to peer-to-peer lending platforms in the personal loan space. Tang (2019) discovers lower-quality bank borrowers are more likely to switch to a P2P platform when banks tighten their lending policies. This suggests that P2P lending might assist infra-marginal bank borrowers as a substitute for bank borrowing. Sedera (2020) suggest that fintech loans might ultimately displace traditional banks in Indonesia, which could impact the market share and profitability of current banks. Furthermore, as demonstrated by Jagtiani and Lemieux (2018), the share of loans made by Fintech companies to small enterprises increased in the loan category where banks are less common. According to published studies, P2P lending has increased in underserved areas without bank branches that offer credit facilities. As a result, more P2P lending capability is anticipated. Since P2P lending provides loans for both individuals and businesses, it is said that the decline in bank branches is because there were too many P2P lending operations scattered throughout various important locations where those banks would have considered operating (consumer and business loans). Based on consumer lending data from LendingClub in the US scenario, Jagtiani and Lemieux (2018) produced similar conclusions in other research, claiming that P2P lending has also moved into nonstrategic regions like those with insufficient banking facilities (measured by fewer bank branches per capita). It illustrates how Fintech could simplify their services, especially for remote areas. Banks are consequently vying with P2P lending for market share.

Financial innovation has also completely changed the banking sector, upending several long-standing practices. Though several shadow banks have emerged offering both Fintech and non-Fintech loans, some conventional Indonesian banks still face competition in the lending sector. Fichman et al. (2014) claim that the banking industry has traditionally been the least innovative and flexible regarding technology. This suggests that it is critical to comprehend Fintech innovators' many viewpoints about Fintech loans. Furthermore, P2P lending makes loans possible by allowing borrowers to get smaller, no-collateral loans. Lenders may also see an increase in their return on investment (Magee, 2011). By utilizing fintech, P2P lending can increase financial efficiency at a minimal cost (Anikina et al., 2016; Koffi, 2016; Vlasov, 2017). Prystav (2016) reviews the literature on peer-to-peer lending, particularly emphasizing the possibility that Fintech businesses' technology might reduce loan information friction. She proposes that credit availability or cost may improve by better gathering soft information in proximity data and better profiling loan applications. Furthermore, the P2P lending network leverages soft information, whereas traditional banks rely on hard facts. Soft

information and social collateral from online platforms are valuable tools for screening unsecured loans (Liu et al., 2020). Traditional banks utilize actual collateral and hard skills to decide whether to approve a loan. Consumers who choose to switch to P2P lending may do so if they cannot obtain a loan repayment through traditional bank lending with collateral (a home, automobile, etc.).

Furthermore, P2P loans are gradually replacing commercial bank loans (Cornaggia et al., 2017). Additionally, they found that, per σ in P2P lending, local and rural banks were making 1.8% less personal loans. Moreover, Kowalewski and Pisany (2022) conclude that bank consumer lending declines with an increase in BigTech credit. Similarly, given that BigTech competition significantly narrows the bank lending channel, Hasan and Li (2021) find indications of a potential replacement relationship between traditional banks and BigTech lenders. Cornaggia, Wolfe, and Yoo (2018) find that the number of personal loans made by commercial banks fell by 1.2% in markets where P2P lending activity had grown by one standard deviation. The emergence of alternative digital credit signifies heightened competition within the traditional banking industry and might potentially diminish its effectiveness (Beck et al., 2022). This is significant since lending is the main financial activity of financial intermediaries. Cuadros-Solas et al. (2023) state that there is a negative relationship between banking credit and the growth of digital lending. This indicates that there can be a shift in credit from traditional banking to alternative digital credit as more digital lenders join the credit markets. By creating new business models based on the use of Big Data, FinTech and BigTech businesses have the potential to upend traditional financial intermediaries and banks in particular (Siek & Sutanto, 2019). Furthermore, some critics estimate that the hostile actions of emerging banks might cost the incumbent banks up to $4.7 trillion. In response, some established banks have responded aggressively, aiming to impose the same regulatory barriers imposed on start-ups (Anagnostopoulos, 2018).

Furthermore, as technology develops, the caliber of offerings increases, allowing lenders to gain market share at rates that are on par with or even higher. Buchak et al. (2018) find that FinTech lenders provide higher interest rates than non-FinTech lenders. The propensity of customers to use more expensive FinTech lenders may be a reflection of how simple these services are. Thus, it does not seem probable that these new digital lenders will be able to displace banks in the future completely (Murinde et al., 2022a, 2022b). Another study also anticipated that peer-to-peer lending would negatively impact commercial banks' market share and performance. Yudaruddin et al. (2023) propose that borrowers can use online peer-to-peer (P2P) lending platforms without meeting strict credit standards thanks to FinTech, which can replace traditional banking services. Yudaruddin (2022b) demonstrates that FinTech startups hurt bank lending, while Yudaruddin (2022a) suggests that FinTech startups also hurt bank performance. Furthermore, Risha and Samudro (2021) claim that commercial banks are MSMEs' first choice for funding through loan services due to their long history. However, not all MSMEs can get cash under the commercial bank's lending program. This is because they are either considered unable to pay their debts or do not have enough assets to put up as collateral. Peer-to-peer lending, however, has given MSMEs, particularly those that are not bankable, an additional channel for loan acquisition. It suggests that MSMEs have at least two sources of funding, which would cause a move away from commercial bank borrowing and toward peer-to-peer lending. In summary, the growth of peer-to-peer lending has threatened commercial banks' market share. Consequently, we postulate the following:

H1a: Peer-to-peer lending is negatively associated with the market share of commercial banks

On the other hand, other academics find that the emergence of peer-to-peer lending has little effect on the market share of commercial banks because these institutions have long enjoyed benefits and good reputations. Besides, countries with more stringent legislation may find it difficult for FinTech and BigTech businesses to enter the market, hindering the expansion of this alternative financing (Cornelli et al., 2023). Käfer (2017) concludes that P2P lending is still minimal when compared to traditional banks. As of 2013, the total assets of the worldwide bank industry were around USD 127 trillion, of which just 0.05% was accounted for by P2P lending (IMF, 2015). Therefore, even if crowdlending increases yearly, it will take some time before its impact on traditional banking is felt. In addition, as commercial banks typically

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provide small businesses with a range of products in addition to loans, they can benefit from using data gathered about the company over an extended period to assess small businesses' creditworthiness (Mach et al., 2014). Consequently, it is believed that small enterprises rely primarily on commercial banks for loans, with little chance of transferring to other online lenders (Mach et al., 2014). Moreover, when it comes to lending needs, many customers still prefer traditional banking over alternative finance (Risha & Samudro, 2021). They conclude that P2P lending will not easily replace banks' established business models and the services they provide, especially when extending credit.

Additionally, the public has come to trust the banks so that it won't be ignored for strictly practical reasons. Peer-to-peer lending has a high risk for lenders and investors, which is another reason customers could be deterred from switching to fintech finance. Information asymmetry concerns may be more severe in P2P lending than in traditional markets, particularly as the bulk of individual Fintech lenders lack financial competence, and the lending process occurs in a highly pseudonymous online environment (Ba, 2010). P2P lending uses soft information to help lenders assess borrower risk more accurately and completely. Collier and Hampshire (2010) find that lenders can use borrowers' soft information as significant indicators of their dependability to evaluate the default risk and set interest rates. Consequently, it is well known that one of the primary differences between traditional financial institutions (such as banks) and peer-to-peer lending organizations is the latter's incapacity to utilize social collaterals and soft information efficiently. Traditional banking has used collateral to decrease adverse defaults and complex credit data to lower information asymmetry (Bester, 1985). Complex credit information can be accurately measured and shared reliably, but soft credit information cannot. Most clients still choose commercial banks since P2P lending appears riskier and has a higher interest rate for smaller loans than traditional banks (Santoso et al., 2019). Giudici (2018) and Haewon et al. (2012) state that no investment, including peer-to-peer lending, is risk-free. In a peer-to-peer lending scenario, lenders bear entire liability for a non-performing loan rather than the organizer; the bank will manage the financial system (Risha & Samudro, 2021). Furthermore, Risha and Samudro (2021) found that although the processes of commercial banks are complex and time-consuming, their interest rates are lower than those of peer-to-peer lending. Commercial banks' complex loan application process is sometimes perceived as detrimental to MSMEs, especially those that are not bankable. However, given the commercial banks' long history of winning the public's trust, it will be difficult for P2P lending to replace them in loan issuance (Samudro & Risha, 2021).

According to several other earlier studies, commercial banks are more inclined to invest in state-of-the-art technology and improved customer experiences to increase their market share and attract new business. The advantages of FinTech and BigTech platforms in the lending arena will undoubtedly influence the traditional banking sector as well as the alliances between banks and fintechs. Due to the pervasiveness of technology and the influence of these new firms, traditional banks face increased pressure to modernize their fundamental business processes and services (Prabhala et al., 2021). Cole, Cumming, and Taylor (2019) specifically provided several arguments in favor of the hypothesis that P2P lenders serve as banks' complements. First, entrepreneurs with less available finance sources are more likely to be impacted by agency difficulties that hamper their advancement. Second, by serving as a kind of external certification, financing from one source might make it easier to acquire capital from another. Thirdly, a more vibrant entrepreneurial community promotes community entrepreneurial agglomeration in terms of expanded business opportunities, entrepreneurship, and finance sources. This enriches the location of an entrepreneur's headquarters. Additionally, as the banking sector becomes more digitalized due to Fintech, incumbent institutions may be forced to grow and increase their market shares due to the increased motivation to provide better services (Sedera, 2020). Based on the study above, we suggest the following:

H1b: Peer-to-peer lending is positively associated with the market share of commercial banks

Xie et al. (2024) propose that market discipline may also increase bank competition, resulting in improved products and services for clients. Banks could be more willing to provide advantageous

terms and rates to retain current customers and attract new ones, improving customer satisfaction and security. Put another way, market discipline might encourage banks to maintain financial solid stability by acting as a disincentive against risky lending practices. Furthermore, studies conducted on customer behavior in the US, Germany, and Russia revealed that the most important factors to consider when selecting a bank were performance, stability, and trust (Schmidt & Bergsiek, 2009). Furthermore, it will not be disregarded for purely pragmatic reasons because the public trusts the banks. Another reason consumers could be discouraged from moving to fintech financing is the significant risk associated with peer-to-peer lending for lenders and investors. Most individual Fintech lenders lack financial expertise and the lending process occurs in a highly anonymous online setting, so information asymmetry problems may be more acute in P2P lending than in traditional markets (Ba, 2010). P2P lenders use soft information to aid in a more thorough and accurate assessment of borrower risk. Collier and Hampshire (2010) state that lenders may utilize soft information from borrowers to gauge their dependability in determining interest rates and predicting default risk. Therefore, it is commonly recognized that the inability of P2P lending companies to use social collaterals and soft information effectively sets them apart from more established financial institutions like banks. Collateral has been utilized in traditional banking to reduce unfavorable defaults, and complex credit data has been used to reduce information asymmetry (Bester, 1985). Soft credit information cannot be reliably and correctly assessed or transmitted, whereas complex credit information can. Due to their perceived risk and higher interest rates for smaller loans than traditional banks, most customers still choose commercial banks over P2P lending (W. Santoso et al., 2019).

Mild, Waitz, and Wöckl (2015) argue that lenders in P2P lending markets cannot accurately price default risk or assess borrowers' creditworthiness like they do with banks, which has implications for FinTech growth. Additionally, FinTech initiatives rely heavily on outside service providers to create systemic links with major financial institutions; as such, the failure of these providers might increase systemic risk and reduce financial stability (Fung et al., 2020). Meanwhile, regulators view market discipline as a strategy for controlling default and systemic risk (De Ceuster & Masschelein, 2003). Hou et al. (2016) looked at the relationship between the rise of Internet finance and the discipline of the banking market in the Chinese financial sector. They demonstrated how the former strengthens the latter. Thus, in developing countries with rapidly expanding FinTech, the supervisory role of market discipline may become increasingly important. Moreover, market discipline can reduce information asymmetry in emerging markets, which will help lenders accurately price default risk or assess borrowers' creditworthiness (Huang & Wang, 2017). Consequently, it is reasonable to expect that it will minimize the negative impact of peer-to-peer lending on commercial banks' market share since it helps banks enhance customer transparency and mitigate lending risks. With these explanations in mind, we propose the following theory:

H2: Market discipline negatively affects the peer-to-peer lending and commercial banks' market share relationship

RESEARCH DATA AND MODEL

Research data

We collect information from 31 Vietnamese commercial banks from 2017 to 2023. As of December 31, 2021, there were forty-three commercial banks (State Bank of Vietnam, 2021). Thirty-three commercial banks with the most complete data were chosen for the study sample to ensure the balance sheet data, as some banks' data were not fully provided throughout the research period. Additionally, because they did not reveal their financial information and conducted business differently from commercial banks, two Vietnamese microfinance organizations and two joint venture banks were also left out. As of December 31, 2023, the total assets of the commercial banking system were 19,545,672 billion VND (State Bank of Vietnam, 2024). As for the 31 commercial banks, we estimate that as of December 31, 2023, their combined assets were 17,183,133 billion VND, which accounts for 87.91% of all the commercial banks' assets in the system. Thus, the authors' selection of 33 commercial banks would represent the whole commercial banking industry in Vietnam.

Specifically, the seven banks owned by the state include Agribank, CTG, VCB, BID, and three banks

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that the state has acquired: OceanBank, VNCB, and GPBank (The State Bank of Vietnam, 2022). Due to restricted access and data collection, the study sample consists of 25 joint stock commercial banks and four state-owned commercial banks (Agribank, CTG, VCB, and BID), 2 foreign commercial banks (Shinhan Bank and HSBC), and 4 state-owned commercial banks. Additionally, the research period of 2016 to 2023 was chosen since this is the time frame during which alternative financing entered the loan industry and saw a notable upsurge. There are 217 observations in the study's entire sample.

Variable measure

Dependent variable

In order to examine the impact of peer-to-peer lending on commercial banks' market share and test hypotheses 1 and 2, we consider BSHARE as a dependent variable. This indicator is based entirely on accounting data instead of market value, meaning the percentage of market share that a bank owns. This indicator is calculated by dividing a commercial bank's assets by the total assets of thirty-three sample commercial banks. The previous studies also use the total assets of commercial banks to measure the market share of these traditional financial institutions (Xue & Cheng, 2013; Sedera, 2020; Baldwin & Alhalboni, 2023; Cardillo et al., 2024; Cuadros- Solas et al., 2024). We calculate the market share percentage of 33 commercial banks in each year from 2017-2023 to evaluate the share of banks in the research period and divide the group of observations according to the form of ownership.

Independent variables

To test hypothesis 1, we used three indicators to evaluate the fluctuation and development of peer-to-peer lending. In year t, the transaction value of alternative business lending (crowdlending) is recorded as (TOB). Next, (TOC) refers to the transaction value of alternative consumer lending, defined as marketplace lending. The third indicator is the number of loans in crowdlending in 1,000 users (NOB). As suggested in previous research, the emergence and development of peer-to-peer lending, which is represented by the value of crowdlending and marketplace lending, would pose a threat to commercial banks' market share (Bower & Christensen, 1995; Cornaggia et al., 2018; Tang, 2019).

Control variables

We choose a number of banks' financial indicators and liquidity capacity as control factors in addition to dependent variables. The control variables pertaining to the financial viability and operational efficiency of banks comprise (a) Bank total assets (BSIZE). A bank's total assets can serve as a gauge of its size; the more the total assets, the larger the bank, with loans and deposits accounting for a significant portion of the total assets. The Basel Accord places a strong emphasis on the operational and financial system safety of banks, emphasizing their capacity to compete, apply risk management, boost liquidity, and uphold enough capital. Sedera (2020) mentions there is a positive relationship between a bank's size and its market share; the larger the bank's total assets, the larger the part of the market that it owns. Since the bank's total assets are quite large, we reduce the likelihood of skewness by using the natural logarithm of this data. (b) ROEA, or return over average equity. The return on average equity serves as a gauge for financial performance. (c) Return on Average Assets, or ROAA. This demonstrates the profitability of a bank's whole asset base. (d) Net interest margin, or NIM. Net interest margin is the measure of the difference between the amount of interest paid to lenders and the interest revenue generated by banks relative to the total number of assets. These measures have been used in other studies to assess commercial banks' performance (Sedera, 2020; Phan et al., 2021; Nguyen et al., 2021; Nguyen & Dang, 2022). (e) Loan deposit ratio (LDR). This statistic is used to evaluate a bank's liquidity by comparing the total loans provided by the bank to the total deposits made during the same time. They were shown to have an effect on financial stability in the literature. Finally, (f) state-ownership ratio (SOWN) and (g) foreign ownership ratio (FOWN) show the ownership structure of banks.

In addition to testing hypothesis 2, we follow the previous research of Nguyen and Dang (2022) to add three more indicators relating to market discipline to the research model. It is suggested that commercial banks with higher market discipline will be more competitive, which can be considered as a strength over other competitors in the market, such as other financial institutions and Fintech firms (Xie et al., 2024). Among these indications is the Dummy variable (LIST) (h). If a bank is listed on the Vietnamese stock exchange in year t, LIST = 1; if

not, LIST equals 0. Stock market regulations govern listed banks. As a result, they give their depositors and stockholders more trustworthy information (Nier & Baumann, 2006). Next, another dummy variable, RATE, has a value of 1 if a bank receives a Moody's rating in year t and 0 otherwise. If a significant rating agency rates a bank, investors and depositors can obtain more information about the bank. In the disclosure process, rating agencies like Moody's serve as middlemen. They have access to information banks choose not to disclose and incorporate into their ratings (Nier & Baumann, 2006). Lastly, the disclosure index (DISC) for (j). Nier and Baumann (2006) are the index's authors. The eighteen fundamental disclosures that comprise DISC are found in the ORBIS Bank Focus database, which is a representation of the bank's reported accounts. The disclosure index is one of the most important elements of market discipline (Nier & Baumann, 2006; Wu & Bowe, 2010).

Model specifications

By matching the features of each variable, we employ panel regression to comprehend the effect of peer-to-peer lending on the market share of commercial banks. In several additional research conducted by other author groups, including Nguyen & Dang (2022), Derrick W.H. Fung et al. (2020), Chioma P. Nwosu et al. (2020), and Dao et al. (2019), the regression approach of array data been widely utilized. The miniature squares model (OLS), random impact model (REM), and fixed impact model (FEM) are the three different kinds of array data models. While Chengming Li et al. (2022) employed OLS techniques, certain author groups, including Derrick W.H. Fung et al. (2020), Sederal (2020), Dao et al. (2019), and Nguyen & Dang (2022), employed the FEM approach. There has been no other related study using the REM model. In this study, the Hausman test was performed to determine whether the collected array data would be consistent with the REM model or the FEM model.

First, to examine the effect of peer-to-peer lending on commercial banks' market share (H1), we used the following model:

$$BMSit = \beta0 + \beta1*TOBit + \beta2*TOCCit + \beta3*NOBit + \beta4*BSIZEit + \beta5*ROEit + \beta6*ROAit + \beta7*NIMit + \beta8*LDRit + \beta9*SOWNit + \beta10*FOWNit + eit \quad (1)$$

Second, to examine the effect of market discipline on the peer-to-peer lending–commercial banks' market share relationship (H2), we estimated the second model as follows:

$$BMSit = \beta0 + \beta1*TOBit + \beta2*TOCCit + \beta3*NOBit + \beta4*BSIZEit + \beta5*ROEit + \beta6*ROAit + \beta7*NIMit + \beta8*LDRit + \beta9*SOWNit + \beta10*FOWNit + \beta11*MADit*TOBit + eit \quad (2)$$

In which:
β0: intercept
βk with k = (1,10): slope i: bank i
t: year t
edit: residuals

MAD is a vector of the leading independent variables of market discipline measures, including LIST, RATE, and DISC

RESULTS

Correlation analysis

To generate the correlation matrix table between the variables, we utilize the Stata 16 tool. The correlation between the variables in the matrix is often not very high. There are 66 correlation pairs in the matrix table, and 2 indicate a connection between the independent variables BSIZE and ROEA (57.36%). The correlation between NIM and ROEA (64.82%) is quite high but still less than 70%, so its impacts are not statistically significant. Nonetheless, there is a strong (more than 70%) association between TOB and NOB (90.62%), ROEA and ROAA (84.07%), and NIM and ROAA (79.14%), all of which are likely to occur in multi-line phenomena.

Regression results

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banks was assessed by models, and the results are summarized as follows: According to the Pool Regression Model, there is a statistically significant relationship between the independent factors and the dependent BSHARE variable for four variables: TOB, BSIZE, LDR, and SOWN. These P-values (Sig.) are less than 1%. The results of the Pool regression model show that independent factors may explain 93.69% of the variation in the dependent variable, with an adjusted R-square of 93.69% overall.

Table 1. Regression result of Pooled OLS, FEM, and REM model

Variables	Pooled OLS	FEM	REM
TOB	-0.9910 ***	-0.8924 ***	-1.0616 ***
TOC	0.1346	0.2227 ***	0.2442 ***
NOB	0.0001	0.7566	0.4884
BSIZE	2.5224 ***	2.0755 ***	2.5833 ***
ROEA	-0.0206	-0.0240 ***	-0.0165
ROAA	-0.1824	0.1947 *	0.1210
NIM	-0.0527	-0.0183	-0.0391
LDR	0.0326 ***	0.0078 **	0.0126 ***
SOWN	0.0548 ***	-0.0088 *	0.0167 ***
FOWN	0.004	-0.0072 *	-0.0034
Constant	-76.258	-60.675	-76.9727
Observations	217	217	217
Adjusted R- square	93.69%	70.52%	87.03%
F-test		89.25 (0.0000)	
LM test			438.63 (0.0000)
Hausman test		Chi2 = 59.92 (0.0000)	

Note: *, **, and *** represent for the statistical significance of 1%, 5%, and 10% respectively

We keep estimating the effect of independent factors on the BSHARE dependent variable using the FEM and REM models.

The FEM regression model has Prob > chi2 = 0.00%, less than the rate of 5%. Therefore, the unsuitable model of the cough hypothesis may be refuted. This indicates that the factors reflecting the characteristics of banking (BSIZE, ROEA, ROAA, LDR, SOWN, and FOWN) examined in the model may be indicative of market share (BSHARE), and that the independent variables in the model, such as NOB and NOC with a P-value less than 1%, are assumed to be able to explain the change of the dependent variable. We depend on the P-value of each regression coefficient i to examine each component in further detail. The impact of peer-to-peer lending on the banks' market share may be explained by the FEM model using the following components: BSIZE and ROEA factors with P-values less than 1%, LDR factor with a P-value less than 5%, and ROAA, SOWN, and FOWN variables with a P-value less than 10%. While the second independent variable, TOC, and the other control variables, BSIZE, ROAA, and LDR, are positively connected to the dependent variable, the independent variable, TOB, and the control variables, ROEA, SOWN, and FOWN, have an inverse relationship with the BSHARE.

The REM regression model has Prob > F = 0.00% less than 5% significance level so the model is statistically significant. The dependent variable's variability can be explained by the independent variables with a statistical significance of 1% added to the model. That is, the dependent variable represents the growth of peer-to-peer lending, such as the value of consumer and business lending (TOB and TOC), and the independent variables represent the characteristics of banks, such as market share, total assets (BSIZE), loan to deposit ratio (LDR), and state ownership ratio (SOWN). The model results show that all three control variables—BSIZE, LDR, and SOWN—are statistically significant since the P-value is less than 1%. This allows us to better understand each factor by using P> t as

the statistical value of the variables. As in the FEM model, banks' share is negatively impacted by the independent variable TOB, but positively by the second independent variable TOC and the set of control variables BSIZE, LDR, and SOWN.

Next, to choose the right model between FEM and Pooled OLS, we use the F test and receive the result of 89.25 with a significance level of 0.0000 (<5%). The H0 hypothesis, which is more suited for examining the impact of independent factors on the BSHARE dependent variable than the Pooled OLS model, maybe refuted at this level of significance. In a similar vein, we evaluate whether REM is a better fit for estimating the impact of independent factors on the dependent variable than the Pooled OLS model by using Breusch-Paga's Lagrange factor test (LM test). With a significance threshold of 0.0000 (<5%), the LM test result is 438.63, indicating the rejection of hypothesis H0 and the superiority of REM over Pooled OLS.

Finally, The Hausman test is used to determine whether the model, FEM or REM, is better suited for examining the variables influencing banks' market share..

The Hausman test has a value of Chi2 = 59.92 with a probability of 0.0000. This likelihood, at a significance level of 5%, permits the rejection of hypothesis H0, which states that there is no association between Ui and the independent variables. This indicates that there are fixed elements influencing market share. As a result, the FEM model is the best appropriate model for determining the variables that influence the market share of traditional banks.

According to the authors' expectations, the fixed impact model's relevance is demonstrated in control variables with regression coefficients at a significance level of 1%, such as BSIZE and ROEA; 5%, LDR; and 10%, ROAA, SOWN, and FOWN. Of particular note is the variable that represents the development of peer-to-peer lending (NOB and NOC), which has been statistically significant at 1%. The study then focuses on the anticipated outcomes from the FEM model and employs tests to look for model flaws such as autocorrelation and variable variance.

Testing model defects

With the hypothesis H0: there is no change in the variance phenomenon, we utilize the Wald test to determine if the variance phenomenon has changed in the random impact estimation model. According to the test's results, the phenomenon of variance change in the FEM estimation model is not rejected since P-Value > Chi2(31) = 0.0000 is less than the significance level of 5%. As a result, the estimated equation will either be erroneous or will have left out crucial independent variables that have an impact on the dependent variable.

Next, using the hypothesis H0: no autocorrelation, we use the Wooldridge test to determine if autocorrelation exists in the random effect estimation model. Since there is no string correlation phenomena in the FEM estimation model, hypothesis H0 should be rejected since this test yields a probability that is 0.0951 larger than the significance level of 5%. In addition, the model's mean VIF of 3.72, which is less than 10, indicates that multicollinearity is not present.

Table 2. Result of defect tests

Defect tests	Wald test	Wooldridge test	Multicollinearity test
Result	P-Value > Chi2(31) = 0,0000	Prob > F = 0,0951	Mean VIF = 1.64

The generalized least squares estimation model (GLS)

When there are no identical items on the diagonal or when the variance-covariance matrix of the regression equation's error portion does not contain all zeros at positions outside of the diagonal, the generalized least squares (GLS) approach is used. Variable variance and autoregression are issues. This model will employ the GLS generalized least squares regression model to correct for autocorrelation and variance changes because the FEM model's findings for these variables exist. Only the generalized technique of least squares has the property of being the best non-linear deviation estimate approach when these situations emerge (Nguyen et al., 2021).

The generalized least squares estimation model for the impact of peer-to-peer lending on traditional banks' market share

Table 3. Result of GLS regression model

	Variables	Regression coefficient	P-value
Independent variables	TOB	-0.8377 ***	0.000
	TOC	0.2492 ***	0.000
	NOB	1.0416	0.106
Control variables	BSIZE	2.2115 ***	0.000
	ROEA	-0.0060	0.394
	ROAA	0.0059	0.942
	NIM	-0.2786	0.390
	LDR	0.0054 **	0.033
	SOWN	0.0569 ***	0.00
	FOWN	0.0008	0.539
Constant		-66.9661	0.000
Observations		217	

Note: *, **, and *** represent for the statistical significance of 1%, 5%, and 10% respectively

Following the GLS regression model's execution, which has successfully navigated the phenomena of variable variance and self-correlation, the regression results indicate that two independent and control variables—the total value of alternative business lending (NOB), the total value of alternative consumer lending (NOC), the total assets of banks (BSIZE), the ratio of lending over the deposit (LDR), and the ratio of state ownership (SOWN)—are proposed to influence banks' market share. The remaining variables are not statistically significant including the number of alternative business lending per thousand people (NOB), return over average equity (ROEA), return over average assets (ROAA), net interest margin (NIM), and the ratio of foreign ownership (FOWN) so we have not found a correlation between these variables for the market share of traditional banks. In Vietnam, P2P Lending has witnessed a massive development. Approximately 40/100 operating financial technology (Fintech) companies are providing peer-to-peer lending services to customers (Vu, 2023). Total lending to businesses (NOB) and total lending to consumers (NOC) are increasing. P2P Lending entered the Vietnamese market around 2015 and mainly operates in large cities such as Hanoi and Ho Chi Minh City, notably companies such as Huydong, Tietkiemonline (SHA), Tima and currently nearly 4,800,000 people registered for loans, disbursed more than 93,000 billion VND,... (State Bank of Vietnam, 2020). Besides, about 79% of the population in Vietnam still currently does not have access to loans from banks, therefore, the increasing rate of Internet and Smartphone usage along with large loan demand has become a driving force. Promote the development of P2P Lending activities in Vietnam. This shows that lending services from traditional banks are being challenged by peer-to-peer lending as these forms are considered easier to access and quicker in procedure than traditional banks.

As a result, the BSHARE dependent variable's regression equation is recast as follows:

$$BSHARE = -66.9661 - 0.8377 *TOB + 0.2492*TOC + 2.2115*BSIZE + 0.0054*LDR + 0.0569*SOWN + \varepsilon \quad (1)$$

The fixed-effects regression results for the influence of market discipline on crowdlending-commercial banks' market share relationship

The fixed-effects regression results show that the presence of market discipline (MAD) has inversely affected the relationship between alternative business lending and commercial banks' market share. This impact has been proven by the regression coefficient of -0.1581 and the statistical significance of 1%. In other words, the existence of market discipline can help mitigate the negative effect of peer-to-peer lending on the market share of commercial banks. This shows that maintaining and strengthening market discipline is necessary to

balance between expanding peer-to-peer lending activities and protecting commercial banks' market share. Commercial banks in Vietnam have seriously disclosed information and complied with market discipline (Do et al, 2023). Commercial banks have fully and accurately disclosed information on business activities, financial situations, risks, and issues related to social responsibility (Tran & Nguyen, 2022). This not only helps increase transparency and create trust for investors and customers but also contributes to improving the quality of governance and enhancing the competitiveness of commercial banks. However, disclosing information and complying with market discipline still faces some challenges such as ensuring transparency and accuracy of published information and strict compliance with legal regulations (National Financial Supervisory Commission, 2018). This also poses a requirement for commercial banks to improve their competitiveness, through improving services, optimizing processes, and applying new technology to meet increasing demand. customer diversity. At the same time, maintaining market discipline is necessary to enhance competition, requiring flexible adjustment of policy and management from the government.

	Variables	Regression coefficient	P-value
Independent variables	TOB	-0.9217 ***	0.000
	TOC	0.2259 ***	0.003
	NOB	0.7395	0.401
Control variables	BSIZE	2.0680 ***	0.000
	ROEA	-0.0362 ***	0.000
	ROAA	0.0059 ***	0.002
	NIM	-0.0154	0.777
	LDR	0.0103 ***	0.003
	SOWN	-0.0097 **	0.044
	FOWN	-0.0051	0.208
Moderator variable	MAD*TOB	-0.1581 ***	0.000
Constant		-60.4779	0.000
Observations		217	

*Note: *, **, and *** represent for the statistical significance of 1%, 5%, and 10% respectively*

Based on the regression coefficient and the statistical value, the BSHARE dependent variable's regression equation is written as follows:

$$BSHARE = -60.4779 - 0.9217 *TOB + 0.2259*TOC + 2.0680*BSIZE - 0.0362*ROEA + 0.0059*ROAA + 0.0103*LDR - 0.0097*SOWN - 0.1581*MAD*TOB + \varepsilon \quad (2)$$

DISCUSSION

Initially, the market share of commercial banks has initially suffered as a result of alternative financing. Stated differently, the existence and growth of crowdlending have directly decreased banks' market share, as demonstrated by the regression coefficient of alternative business lending's total value, which is -0.8377 and statistically significant at 1%. This impact may be explained by the fact that the rise of peer-to-peer lending primarily increased the appeal of borrowing as well as lending by eliminating banks as middlemen and substituting platforms as more effective middlemen. This is especially important when it comes to the advantages for both borrowers and lenders Jackson (2013). First, with bank deposit interest rates at an all-time low, lenders find it particularly intriguing to obtain a portion of the bank's margin. Second, as seen by the borrowers, banks were compelled to reduce their leverage following the subprime crisis. Borrowers were compelled to use P2P lending as an alternative to traditional lending as they were having trouble obtaining loans. In addition, the social element contributed to the development of alternative financing. Some investors want to formalize lending to their friends, enjoy interacting with borrowers and other lenders, or are interested in managing their

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money independently. They may take advantage of this through crowdlending. Lastly, some lenders find the dynamic nature of crowdlending appealing in reasons of regulatory arbitrage. For instance, unlike traditional banking, crowdlending platforms and lenders are usually exempt from the need to maintain regulatory capital. In addition to capital regulation, crowdlending is generally still subject to lax regulations. This means that one factor giving platforms a competitive edge over traditional banks is the absence of expensive regulatory compliance, which lowers entry barriers and poses a threat to the market share of commercial banks. This result is in line with other earlier research investigations conducted by Tang (2019), Murinde et al. (2022), and Cornaggia, Wolfe, & Yoo (2018).

Secondly, as opposed to the first point, peer-to-peer lending can aid in a bank's growth in market share. There is a positive association between market share held by commercial banks and marketplace lending, as indicated by the regression coefficient of the total transaction value of consumer lending (TOC) of 0.2492 with a statistic value of 1%. Alternative financing platforms frequently service clientele that traditional banks would find difficult to assist, such as independent contractors, small firms, and those with unique financial requirements (Risha & Samudro, 2021). Banks may reach these neglected communities and grow their client base and market share by collaborating with alternative lenders or investing in them. In addition, alternative lenders are innovators in the field of digital lending. The rise in popularity of this type of loan encourages banks to apply more cutting-edge technology in order to enhance customer happiness and service quality (Hornuf, Klus, Lohwasser, & Schwienbacher, 2021). Banks can benefit from efficient client interactions, simplified procedures, and user-friendly interfaces. By using comparable digital tactics, banks can draw in tech-savvy clients and become more competitive, which will help them hold onto and grow their market share. Another factor is that the public has come to trust conventional banks, so they won't just be ignored when it's convenient. Peer-to-peer lending has a high risk for lenders and investors alike, which is another reason why customers could be deterred from switching to fintech finance. In other words, Stated differently, most customers still choose commercial banks because most Fintech lenders lack financial experience, the lending process takes place in an extremely pseudonymous online environment, and information asymmetry issues may be more severe in P2P lending than in traditional markets (Ba, 2010). This result is consistent with earlier research by Cornelli et al. (2023), Risha & Samudro (2021), and Mach et al. (2014).

In addition, with a statistical significance level of 1%, the regression coefficient of the total assets of commercial banks (BSIZE) is 2.2115, indicating a positive link between these variables and the market share of the banks. This makes sense since a bank with a greater asset base would likely be able to offer a wider range of services and lend more money, which will draw in more clients and grow its market share (Pilloff, 1999). Besides, the market share of commercial banks is positively impacted by the percentage of state-owned banks, as indicated by the regression coefficients of 0.0569, as well as the statistical values of 1%. State-owned banks frequently have long-term objectives that align with the objectives of national growth. Their primary focus is on financial inclusion, providing help to industries including micro and small businesses, agriculture, and the fight against poverty. Their supremacy in the industry is a result of their willingness to take measured risks and invest in alternative loans. They have the resources to test out cutting-edge financing schemes. Because they are controlled by the government and are subject to steady regulations, state-owned banks are typically seen as reliable and secure. Clients entrust them with their money matters. Their market share is further increased by this favorable view, which results in a greater client base (Koroleva et al., 2020). Moreover, the regression of lending to the lending-to-deposit ratio (LDR) is 0.0054 with a statistical value of 5% implying that there is a positive relationship between this control variable and the dependent variable, which is banks' market share. A higher LDR ratio shows that a bank is managing risk effectively. Banks with high LDR are lending more than they deposit, indicating they have strong risk assessment and management processes (Saidu, 2023). This can enhance the bank's reputation and attract more customers, thereby increasing market share.

Last but not least, with the significant statistical value of 1%, the regression coefficient of component MAD*TOB, where MAD is the vector of the main independent variables of market

discipline measures including LIST, RATE, and DISC, is -0.1581 indicates that market discipline has a negative influence on the relationship of the total value of alternative business lending and market share of commercial banks. In other words, the presence of market discipline can help migrate the inverse impact of crowdlending on the traditional banks' market share. This relationship can be explained by several reasons. First, market discipline can help banks manage risk more effectively (Kato, 2021). Banks that demonstrate strong risk management practices can attract more customers and investors, potentially offsetting any loss of market share due to crowdlending. Second, crowdlending platforms require lenders to depend solely on information provided by borrowers, which can influence the lender's financial behavior as well as investment decisions and profits (Perdana et al., 2023). Banks that maintain market discipline can build trust and enhance their reputation, attracting customers who may be wary of the risks associated with crowdlending. Lastly, Crowdlending offers new investment opportunities, often providing better returns than some alternative investment channels (Ziegler & Shneor, 2020). However, thanks to responsible risk management, banks that demonstrate market discipline by transparently managing risks and providing clear information can attract a large number of investors, which can help them maintain or even increase market share (VanHoose, 2017).

CONCLUSION

The research examined the effect of peer-to-peer lending on commercial banks' market share using data from 33 commercial banks between 2017 and 2023, for a total of 217 observations in the study sample. The findings demonstrate that alternative financing has impacted traditional banks' market share in a number of ways, both favorably and unfavorably. Furthermore, the research investigates variations in the market share of commercial banking systems and banking groups based on the following attributes: foreign, state-owned, private, and listed on the stock exchange. Particularly, when it comes to the nascent markets of crowdlending and marketplace lending, the market share of state-owned banks in Vietnam is substantially greater than that of both private and banks with a large proportion of foreign ownership. Furthermore, as compared to the unlisted banks, the group of listed commercial banks has a significantly larger market share. Additionally, the study suggests that the adoption and application of market discipline might lessen the detrimental impact of peer-to-peer lending on the market share of traditional banks in the context of P2P lending.

Our primary research goals are to examine how peer-to-peer lending affects the market share of commercial banks and to compare market shares between listed and unlisted banks as well as across bank groups with varying ownership structures. Our research made several contributions to the body of literature. First, as far as we are aware, this is the first study looking at the development of peer-to-peer lending on the market share of traditional banks in a specific developing country like Vietnam. We first contributed to the earlier studies about the impact of crowdlending and marketplace lending on the market share of commercial banks. Levine (1997) finds that the banking sector is thought to be the main driver of the expansion of the economy. This makes the research essential since it will give banks, regulators, and policymakers useful information that will enable them to comprehend the shifting market and make wise decisions about creating business plans and enhancing services through the use of cutting-edge technology. Second, we discovered that the effects of peer-to-peer lending on the market share of banks with different ownership types differed when we examined the market share of commercial banks among three groups: state-owned, private, and foreign; listed and unlisted banks in the context of Fintech development. This finding is critical to commercial banks because it sheds light on how these institutions handle alternative lender competition. By doing so, banks can better understand how flexible and resilient various banking models are, which will enable them to balance and adjust their capital sources for more effective operations and management. Last but not least, our research indicates that market discipline can help traditional banks mitigate the negative effects of crowdlending on their market share. This means that banks should work to strengthen their information disclosure index and market discipline, as well as to improve the quality of published financial statements and annual report information. Only then will the general public have access to an official and trustworthy source of information.

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However, our study has some shortcomings. The research investigation is restricted to specific variables. For instance, even if we discover that peer-to-peer lending has varying effects on various owner arrangements, we haven't taken macroeconomic variables or bank features into account as a control variable. In order to get over this restriction, we suggest that additional studies include a variety of bank attributes, such as the number of bank branches, the locations of banks, the ratio of deposits to assets, etc., in addition to macro factors like interest rates and currency rates. Furthermore, the macro and micro elements that influence commercial banks' market share might alter depending on the economic climate of a given nation or area. Thus, in order to get beyond this restriction, we suggest doing further research on a multi-national and multi-regional scale with data from a larger range. From there, these effects may be examined in light of the unique institutions and traits of other nations and areas.

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APPENDIX

Table A1. List of 31 commercial banks used in research form

No	Short name	Full name
1	ACB	Asia Commercial Joint Stock Bank
2	BID	Joint Stock Commercial Bank for Investment and Development of Vietnam
3	CTG	Vietnam Joint Stock Commercial Bank for Industry and Trade
4	EIB	Vietnam Commercial Joint Stock Export Import Bank
5	HDB	Ho Chi Minh City Development Joint Stock Commercial Bank
6	LPB	Lien Viet Post Joint Stock Commercial Bank
7	MBB	Military Commercial Joint Stock Bank
8	MSB	Vietnam Maritime Commercial Join Stock Bank
9	OCB	Orient Commercial Joint Stock Bank
10	SSB	Southeast Asia Commercial Joint Stock Bank
11	STB	Sai Gon Thuong Tin Commercial Joint Stock Bank
12	TCB	Vietnam Technological and Commercial Joint Stock Bank
13	TPB	Tien Phong Commercial Joint Stock Bank
14	VCB	Bank for Foreign Trade of Vietnam
15	VIB	Vietnam International Commercial Joint Stock Bank
16	VPB	Vietnam Prosperity Joint Stock Commercial Bank
17	VNCB	Construction Commercial Joint Stock Bank
18	SHB	Saigon Hanoi Commercial Joint Stock Bank
19	ABB	An Binh Commercial Joint Stock Bank
20	BAB	Bac A Commercial Joint Stock Bank
21	BVB	Viet Capital Commercial Joint Stock Bank
22	KLB	Kien Long Commercial Joint Stock Bank
23	NAB	Nam A Commercial Joint Stock Bank
24	PGB	Petrolimex Group Commercial Joint Stock Bank
25	VBB	Vietnam Thuong Tin Commercial Joint Stock Bank
26	Agribank	Vietnam Bank for Agriculture and Rural Development
27	NCB	National Citizen Bank
28	SGB	Saigon Bank for Industry & Trade
29	VietABank	Viet A Commercial Joint Stock Bank
30	HSBC	HSBC Bank Vietnam Limited
31	SHBVN	Shinhan Bank Vietnam Limited

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Table A2. List of variables

Type of variables	Variables name	Definition and Measure	Source
Dependent variable	BSHARE	A bank's market share in year t = (Total assets of that bank in year t/Total assets of banks in research form in year t)*100	Bank's financial report
Independent variable	TOB	Transaction value of alternative business lending (crowdlending)	Statista database
	TOC	Transaction value of alternative consumer lending (marketplace lending)	Statista database
	NOB	The number of loans in crowdlending in 1,000 users	Statista database
Control Variables	BSIZE	Nature Logarithm of Bank' Total Assets	Bank's financial reports
	ROEA	Return over Average Equity	Bank's financial reports
	ROAA	Return on Average Assets	Bank's financial reports
	NIM	Net Interest Margin	Bank's financial reports
	LDR	The Ratio of Loan to Deposit is measured as the Bank's Total Amount of Loans to the Total Amount of Deposits for the same period	Bank's financial reports
	SOWN	State Ownership is measured as the Ratio of Government Shares to Total Shares	Bank's financial reports
	FOWN	Foreign Ownership is measured as the Ratio of Foreign Shares to Total Shares	Bank's financial reports
	LIST	The dummy variable is 1 if the bank is listed on the stock exchange and 0 otherwise	Bank's annual reports
	RATE	The dummy variable is 1 if the bank is rated by Moody's and 0 otherwise	Bank's annual reports
	DISC	The disclosure index is built based on 18 categories of core disclosures suggested by Nier and Baumann (2006).	Bank's financial reports

Table A3. Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Dependent variable				
BSHARE	3.225806	3.966118	0.1833229	14.83374
Independent variable				
TOB	7.158571	0.6575806	6.19	8.14
TOC	6.641429	0.2888343	6.11	6.99
NOB	0.3428571	0.0496016	0.3	0.4
Control variable				
BSIZE	32.95281	1.116827	30.64526	35.37204
ROEA	13.40906	7.879941	-12.33	30.33
ROAA	1.15078	0.8259265	-0.72	3.58
NIM	3.191403	1.357199	0.59	9.41
LDR	71.91959	12.44618	35.19	116.1
SOWN	14.65152	29.85696	0	100
FOWN	17.47318	24.6169	0	100
LIST	0.7096774	0.4549607	0	1
RATE	0.3548387	0.4795707	0	1
DISC	0.8870968	0.1484312	0.4	1

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Table A4. Correlation matrix

	BSHARE	TOB	TOC	NOB	BSIZE	ROEA	ROAA	NIM	LDR	SOWN	FOWN
BSHARE	1.0000										
TOB	-0.0000	1.0000									
TOC	0.0000	-0.4721	1.0000								
NOB	-0.0000	0.9062	-0.3148	1.0000							
BSIZE	0.8522	0.2403	-0.1376	0.2119	1.0000						
ROEA	0.3098	0.1829	-0.1064	0.1716	0.5736	1.0000					
ROAA	0.0643	0.2052	-0.1159	0.1908	0.3647	0.8407	1.0000				
NIM	0.1015	0.0748	-0.0203	0.0797	0.3206	0.6482	0.7914	1.0000			
LDR	0.2649	0.2677	-0.0960	0.2522	0.2319	0.1225	0.0483	0.2155	1.0000		
SOWN	0.7872	-0.0304	0.0276	-0.0206	0.4851	-0.0045	-0.2183	-0.1638	0.1495	1.0000	
FOWN	-0.0111	0.0174	-0.0193	0.0097	0.0901	0.3015	0.4805	0.2626	-0.3179	-0.0707	1.0000