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Private banking development in China under two organizational structures: Economic analysis from an organizational innovation perspective

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Abstract

This paper investigates optimal decisions for private banking development in China under two innovative organizational structures—the big retail mode (BRM) and the independent development mode (IDM). Under the BRM, the retail and private banking divisions form a cooperative relationship wherein the former transfers high-net-worth customers to the latter. In addition, retail banking receives a share of private banking revenues. We investigate the optimal revenue-sharing ratio between the two divisions and the optimal effort by private banking to serve transferred customers within the cooperative relationship. The analytical results show that as the private banking division becomes more developed, the optimal revenue-sharing ratio decreases, and the private banking division's optimal effort to serve transferred customers decreases because it puts more effort into acquiring new customers. Under the IDM, the two divisions form a competitive relationship since they compete to acquire customers independently. We investigate customer acquisition efforts in this interdivisional competition. Optimal customer acquisition efforts by both divisions increase in potential assets and rates of return. This paper contributes to the literature by (1) analyzing financial innovation by private banks from an organizational perspective; (2) providing an economic analysis for private banking development in China.

Keywords: Competition, Cooperation, Innovative financial services, Optimal banking decisions, Organizational innovation, Private banking

JEL Classification: G2, G21, C72

Introduction

Private banking is an innovative financial mode comprising personalized financial and banking services that commercial banks offer to high-net-worth individuals¹ (Omarini 2017). Despite the COVID-19 pandemic, the wealth and number of high-net-worth individuals grew by approximately 9% globally in 2019;² further, the number of

¹ High-net-wealth individual: someone with a net wealth of over US\$1 million.

² Data Source: Capgemini World Wealth Report 2020 (<https://www.capgemini.com/news/research-world-wealth-report-2020/>).

ultra-high-net-worth individuals³ grew by 2.4% during 2020.⁴ This enormous wealth provides excellent opportunities to develop private banking. In China, private banking industry assets under management (AUM) increased by 22.11%, and the number of ultra-high-net-wealth individuals grew 21.55% annually from 2019 to 2021.⁵

Innovation of the organizational structure is a key feature of private banking development in China (Chen 2013). Private banking in China is affiliated with large commercial banks and functions as an internal department within banks (Wang and Guo 2022). The affiliation with commercial banks highlights the critical role of organizational structures, which affect resource allocation within organizations. Commercial bank managers must balance resource allocation to different divisions (including the private and retail banking divisions) by designing appropriate structures for better organizational performance (Ellman and Pezanis-Christou 2010). On the other hand, in other countries, most private banks are independently registered and developed as asset management institutions with the primary goal of increasing private banking business profits, so resource allocation among divisions is not a serious problem, and little attention has been paid to the organizational structure (Chen 2013). The organizational structures in China's private banking industry differ significantly from those in other countries and are thus their most innovative feature, according to *the Oslo Manual* (OECD and Eurostat 2018). Under such circumstances, China's private banking industry lacks guidance from other countries and academia about organizational innovation to better allocate resources. Considering both the prosperous development of private banking in China and the critical role of organizational structure in allocating resources within private banking, this paper focuses on optimal decisions for developing private banking in China from the perspective of organizational innovation.

Private banking in China is developed under two main types of organizational structures—the big retail mode (BRM) and the independent development mode (IDM). Under the BRM, the original retail banking division is in charge of developing both retail and private banking, and the two divisions form a *cooperative* relationship whereby retail banking transfers high-net-worth customers to and shares revenues with private banking. This revenue-sharing ratio (Liu et al. 2018) influences the private banking division's efforts to serve the transferred customers. If the original retail banking division takes an unreasonably large portion of the total revenue, the private banking division will derive little revenue and not make much effort to serve the transferred customers. This would result in customer churn and affect the original retail banking division's profits. Therefore, this study investigates two questions for the development stages of the private banking industry under the BRM: (1) What is the optimal revenue-sharing ratio between these two divisions? (2) Given the revenue-sharing ratio set by the retail banking division, how should the private banking division balance efforts to maintain transferred customers' loyalty and acquire more customers from the market?

³ Ultra-high-net-wealth individual: someone with a net wealth of over US\$30 million.

⁴ Data Source: Knight Frank The Wealth Report 2021 (<https://www.knightfrank.com/research/report-library/the-wealth-report-2021-7865.aspx>).

⁵ Data Source: China Private Banking Development Report 2021, China Banking Association and PBC School of Finance, Tsinghua University.

Under the IDM, the retail and private banking divisions develop independently, with the two divisions establishing a *competitive* relationship where they compete to acquire high-net-worth individuals. Compared with the BRM, no high-net-worth individual from the retail banking division is transferred to the private banking division under IDM. This forces the private banking division to develop its marketing and operational capabilities to compete for high-net-worth individuals in a fiercely competitive market. In this paper, we denote both divisions' activities as *efforts to acquire customers*. We examine the optimal efforts of both divisions and the impact of *customer loyalty to the retail banking division* on customer-acquiring competition between the two divisions.

First, we formulate a Stackelberg game (von Stackelberg 1934) to capture the leader–follower relationship between the retail and private banking divisions and investigate their revenue-sharing mechanisms under the BRM. In the game, the original retail banking division is the Stackelberg leader, and the private banking division is the Stackelberg follower. The Stackelberg game allows us to investigate optimal decisions in the cooperative relationship between the two divisions, including the revenue-sharing ratio and the private banking division's efforts to serve the transferred customers. We show that the development stage of the private banking division plays a fundamental role in these decisions, with a more developed private banking division reducing the revenue-sharing ratio of the retail banking division and efforts by the private banking division to serve the transferred customers. As the private banking division *develops*, its dependency on the retail banking division and the transferred customers becomes *weaker*, which *reduces* its incentive to serve the transferred customers and the retail banking division's bargaining power in deciding the revenue-sharing ratio.

Second, we formulate a static game with complete information to investigate the optimal efforts of both divisions under the IDM. We find that optimal customer acquisition efforts by both divisions increase in potential customer assets and rates of return. This implies that the intensity of market competition increases when customers become richer, and when the two divisions offer higher rates of return. In terms of customer loyalty, stronger customer loyalty to the retail banking division results in lower optimal efforts by both divisions. These impacts on optimal effort reduce competitive intensity, decrease the negative impacts of competition, and generate higher total profits for the two divisions.

This study contributes to the literature in the following ways. First, it complements studies of financial innovation in the banking literature by analyzing organizational innovation for private banks. Second, this study adds to the banking literature by providing an economic analysis of the private banking industry. Third, an industrial organization perspective is used to study decisions under two private banking organizational structures in China and optimize the key decisions that influence the profits of each banking division in the cooperative relationship under BRM and the competitive relationship under IDM. We introduce organizational structure and demonstrate its essential role in studying the private banking industry. Fourth, under the BRM, we introduce a revenue-sharing mechanism into the cooperative relationship⁶ and design the optimal

⁶ As noted in Mortimer (2008), Leroux (2008) and Poblete (2015).

revenue-sharing ratio between the two banking divisions in private banking studies. Finally, the analysis under different organizational structures also provides guidance for practitioners in making wise decisions.

The remainder of the paper proceeds as follows. “[Literature review](#)” section provides a literature review. “[Big retail mode](#)” section proposes a Stackelberg model to analyze the optimal revenue-sharing ratio and optimal effort in serving transferred customers to maintain customer loyalty under the BRM. “[Independent development mode](#)” section presents an analysis of optimal efforts and the impact on competition of customer loyalty to the retail banking division under the IDM. “[Survey-based empirical analysis](#)” section presents a survey-based empirical analysis, and “[Conclusions and policy implications](#)” section concludes the study and proposes several future directions.

Literature review

Private banking

As the wealth and number of high-net-worth individuals have rapidly increased, the private banking industry for wealth management has grown strongly (Somnath et al. 2018). The private banking industry is important for economic development and credit systems (Anan'Ich 1988) and attracts much attention from academia. The literature on private banking focuses on investment and asset management (e.g., Collardi 2012), operations management and regulations (e.g., Ghalenooie and Sarvestani 2016; Shah and Jan 2014), and risk management and risk control (e.g., Brown et al. 2017; Samet et al. 2018). For example, Wu et al. (2010) examine business performance evaluations for private banks. Collardi (2012) examines investments and asset management decisions in private banking. Ghalenooie and Sarvestani (2016) investigate operations management and regulatory issues. Samet et al. (2018) study risk management and risk control of private banks. The private banking literature lacks a formal analysis of private banking innovation, development, and competition, as well as their consequences.

Contrary to the scarce analysis of private banks, formal analyses of central and commercial banks⁷ are well known in the banking literature. The studies on central banks focus on optimal monetary policy and central bank instruments (Curdia and Woodford 2011; Schabert 2015; Williamson 2016; Bech and Monnet 2016; Jun and Yeo 2021). Studies on commercial banks investigate the macroeconomic consequences and microeconomic operations of banks (e.g., Zhu and Wang 2019; Desalegn and Zhu 2021; Ye et al. 2022). The macroeconomic perspective focuses on the role of banks in promoting economic growth (Cetorelli 2009; Huang 2018). The microeconomic perspective, originating from industrial organization economics, studies banking competition and its impacts, such as corresponding credit practices (e.g., Dell'Ariccia and Marquez 2004; Cetorelli and Strahan 2006) and capital accumulation in society (Cetorelli and Peretto 2012). While these contributions offer a deep understanding of the banking industry, our knowledge of development and competition in the private banking industry is limited. Research on private banks' organizational innovation issues is relatively scarce. China's

⁷ They are referred as “banks” in the literature and are defined as “institution(s) whose current operations consist in granting loans and receiving deposits from the public” (Freixas and Rochet 2008).

private banks lack theoretical guidance on related management decision-making under their two organizational structures.

Financial innovation in the banking literature

Most research on financial innovation in the banking literature focuses on the impacts of financial technology that may disintermediate the banking sector (Broby 2021; Zhao 2021). For example, Guo and Liang (2016) investigate the application of blockchain in banking and find that it promotes weakly intermediated scenarios and thus enhances efficiency. Nazari Tehrani and Mashali (2020) focus on developing e-banking channels to increase bank market share. Moreover, a few studies investigate product innovation in the banking market (Bu et al. 2020). Some scholars also develop forecasting models to predict the financial market (Xie and Wang 2018; Li and Zhou 2021). In addition to financial technology and product innovation as typical financial innovations, organizational innovation is also important for banking development (Chen et al. 2017). However, the analysis of organizational innovation is scant. This study fills the gap by analyzing the financial innovation of private banks from an organizational perspective.

Impact of organizational structure

Despite scant research on the impact of organizational structure for private banks, strong evidence exists that organizational structure plays an important role in the development of different organizations (Sah and Stiglitz 1985; Athey and Roberts 2001; Ellman and Pezanis-Christou 2010; Christensen and Knudsen 2010). Scholars from various fields have paid significant attention to factors that might influence the choice (Harris and Raviv 2002; Mintzberg 1980; Stole and Zwiebel 1996), design (Athey and Roberts 2001; Ivanov 2010), and impact of various organizational structures on organizational performance (Beath et al. 1998; Christensen and Knudsen 2010; Ellman and Pezanis-Christou 2010). Ellman and Pezanis-Christou (2010) note that the choice of organizational structure influences employee incentives, in turn influencing organizational performance.

Regarding the banking literature on organizational structure, Chen et al. (2017) explore the impact of organizational structure on banking innovation based on a comparative study of Citibank and ICBC. The banking literature has paid little attention to how organizational structure influences optimal decisions about customer acquisition and loyalty. Within the context of private banks, this question is worth investigating because the two organizational structures play important roles in decision-making and generate distinct problems. Specifically, under the BRM, in which the original retail banking division transfers high-net-worth customers to and shares the revenues of transferred customers with the private banking division, the sharing ratio influences the private banking division's efforts to serve the transferred customers to maintain customer loyalty (Chia-Chi and Jung-Sung 2018; Hung-Che et al. 2019; Mainardes et al. 2020) and acquire new external customers. The higher the original retail banking division's proportion of revenue-sharing, the lower the private banking division's incentive to serve the customers transferred to it, which impairs customer loyalty and creates customer churn. Under the IDM, the retail and private banking divisions face competition for customers, and each division contributes to advertising to acquire new customers. For banks that

choose the IDM to develop private banking, bank managers must learn the competitive outcomes of customer acquisition. Our research not only fills the research void on the impact of organizational structures on the decisions of private banks but also provides informative guidance for practitioners to make wise choices under two different organizational structures.

Cooperative relationship and revenue sharing

Under the BRM, the retail and private banking divisions cooperate, and the core problem is the revenue-sharing ratio for the cooperative strategy between the original retail banking division and the private banking division. The revenue-sharing mechanism has been documented as playing a key role in cooperative relationships in many settings (Yan and Cao 2017) and can help coordinate partner relationships (Cachon and Lariviere 2005; Leroux 2008), promote cooperation (Moulin and Shenker 1992; Poblete 2015), and improve efficiency (Maniquet and Sprumont 1999).

One typical game-theoretic model for analyzing revenue-sharing questions is the Stackelberg game (Von Stackelberg 1934). In a Stackelberg game, one player acts as a Stackelberg leader and moves first, and the other player acts as a Stackelberg follower and moves after the leader. Many scholars build Stackelberg games to solve the revenue-sharing mechanism questions. For example, Cai (2010) builds a Stackelberg game between a manufacturer and a retailer and finds that the revenue-sharing mechanism improves the manufacturer-retailer supply chain performance in channel cooperation. Pei and Yan (2019) build a Stackelberg game to compare profit-sharing to reward points as cooperative strategies in the O2O (online to offline) competition. Based on Stackelberg games, Amrouche et al. (2020) introduce the mobile channels in cooperation between manufacturers and retailers and consider revenue-sharing cooperation an important cooperative strategy. In the banking literature, the usage of Stackelberg games is also common. For example, Wang et al. (2020) use Stackelberg games to investigate the interplay between a bank and a firm. Cao et al. (2022) build a Stackelberg game with quality investment and bank credit. Building on the literature, this paper builds a Stackelberg game to investigate the revenue-sharing mechanism within the context of private banking and provide guidance for developing the BRM.

This paper analyzes the problems private banks face under the BRM and the IDM by building game-theoretic models. To our knowledge, this theoretical paper is the first to address private banking development under two organizational structures. Meanwhile, this paper introduces revenue-sharing mechanisms into private banking research and designs the optimal revenue-sharing ratio between the original retail banking division and the private banking division. These contributions offer insights into the private banking industry.

Big retail mode

Under the BRM, the original retail banking division transfers high-net-worth individuals to and shares revenues from the transferred customers with the private banking division. Due to the organizational structure's affiliation relationship, customer sources for China's private banking are accumulated by existing retail banks. The development of the private banking division relies partly on customers transferred from the original retail

Table 1 Private Banking Division Operating Data of China Merchants Bank and China Construction Bank

Bank names\date	China Merchants Bank		China Construction Bank	
	Number of private banking customers	Total assets under management (trillion RMB)	Number of private banking customers	Total assets under management (trillion RMB)
June 2019	78,245	216.10	125,242	132.14
December 2019	81,674	223.11	127,211	134.85
June 2020	91,034	249.74	139,995	149.61
December 2020	99,977	277.46	142,739	151.00
June 2021	111,947	312.92	153,928	167.43
December 2021	122,064	339.39	160,794	178.00
June 2022	130,029	364.79	175,610	193.00

Data Source: Wind

banking division. In addition to the transferred customers, the private banking division takes measures to acquire new customers.

Commercial banks that have adopted the BRM for private banking development have achieved great success in China. Table 1 shows the total AUM and number of private banking customers of China Merchants Bank and China Construction Bank. China Merchants Bank was voted the “Best Private Bank for New Customer Segment” in 2019 by Global Finance, with 33% growth in AUM. As of June 2022, according to Wind, a reliable provider of China finance data, the total AUM of China Merchants Bank exceeded 306 trillion RMB and had achieved 17% growth compared with June 2021. Average year-on-year AUM growth for China Merchants Bank from 2012 to 2021 was 25.8%.

Model

We establish a Stackelberg model to analyze the BRM. The model involves two players, the original retail banking division and the private banking division. The timing of the game is as follows. In Stage 1, the original retail banking division—the Stackelberg leader—decides on the revenue-sharing ratio ($0 < z < 1$). For the revenue generated from transferred customers, the original retail banking division takes z of the total, and the private banking division takes $1 - z$ of the total. In Stage 2, the private banking division—the Stackelberg follower—decides on the effort e put into the transferred customers, and this effort e influences the transferred customers’ loyalty.

The private banking division should balance the efforts it puts into serving transferred customers and acquiring new customers. If the effort to serve transferred customers is large, indicating substantial resources and money spent on serving transferred customers, resources for acquiring new customers are affected. Thus, a trade-off exists between these two efforts. The allocation of efforts between the two customer groups influences the assets received from each customer group. Without loss of generality, we assume that the total effort to serve the two customer groups equals 1. Thus, the effort the private banking division puts into acquiring new customers from the market is denoted $1 - e$.

In addition to decision variables z and e , we introduce three parameters. Incremental assets are denoted as N , potential assets as A , and rate of return on investments as r .

The revenue generated by each division is determined by the incremental assets within a year.⁸ The incremental assets of retail banking division customers that are not transferred are denoted N_0 , the incremental assets of transferred customers are denoted N_{sp} , and the incremental assets of new private banking division customers are denoted N_m . Similarly, the potential assets of these three customer types are denoted A_0 , A_{sp} , and A_m , respectively. Here, we assume that the potential customer assets are exogenous and constant. Private banks can estimate these constants according to information about the customer groups.

The potential assets can be converted into incremental assets so long as the related division makes an effort toward its customers. Here, we assume $N_{sp} = eA_{sp}$, $N_m = (1 - e)A_m$. We denote the rate of return as r , the rate of return of the original retail banking division as r_s , and that of the private banking division as r_p . Because the private banking division's service is more advanced than that of the retail banking division, we assume $r_s < r_p$.

The original retail banking division's profits consist of revenue from nontransferred customers and revenue shared with the private banking division from transferred customers.⁹ For ease of exposition, we assume operational costs are zero. Moreover, since the cost of one client for the retail division is significantly lower than for the private banking division, we assume the costs for serving customers in the retail banking division are zero. Considering that we investigate the game between the retail and private banking divisions, we consider the cost differences rather than the absolute cost levels in the two divisions. Here, we derive the profits of the original retail banking division in Eq. (1):

$$\pi_s = N_0 r_s + z N_{sp} r_p = N_0 r_s + A_{sp} r_p z e. \quad (1)$$

The private banking division's profits equal the sum of the revenues from the transferred and new customers minus the cost. The cost of the private banking division is captured by its efforts to serve customers. Typically, the private banking division employs professional client managers who spend substantial time communicating with private banking division clients. These costs increase with the efforts put into related customers. Here, we assume a quadratic relationship, that the cost of serving the transferred customers to maintain their loyalty is $C_1 = e^2$, and that the cost of acquiring new customers is $C_2 = (1 - e)^2$. Hence, the private banking division's profits are derived in Eq. (2):

$$\pi_p = (1 - z) A_{sp} r_p e + A_m r_p (1 - e) - e^2 - (1 - e)^2. \quad (2)$$

We solve the game by backward induction. Given z , the private banking division decides on e . Solving the first-order condition of the private banking division's profits

⁸ For example, if a millionaire put \$100 million in a division in 2017 and added another \$50 million in 2018, then the revenue that the division generated in 2018 is calculated based on the incremental assets in 2018 of \$50 million.

⁹ In this paper, we only consider the revenue generated from high-net-worth customers. The retail banking division transfers some high-net-worth customers to the private banking division and shares the revenue generated from the transferred customers. At the same time, the retail banking division generates revenue from the nontransferred high-net-worth customers. For ease of exposition, we do not consider the retail banking division's revenue generated from low net worth customers.

derives the profit-maximizing effort e to serve transferred customers to maintain customer loyalty:

$$e = \frac{(A_{sp} - A_m)r_p - A_{sp}r_pz + 2}{4}. \quad (3)$$

We find that the private banking division's effort to serve transferred customers to maintain customer loyalty decreases with the revenue-sharing ratio z . The more the retail banking division takes from total revenue, the less effort the private banking division makes to serve the transferred customers to maintain customer loyalty.

Substituting Eq. (3) into Eq. (1) and solving the first-order condition of the retail banking division's profits, we derive the optimal revenue-sharing ratio:

$$z^* = \frac{(A_{sp} - A_m)r_p + 2}{2A_{sp}r_p}. \quad (4)$$

Substituting Eq. (4) into Eq. (3), we derive the optimal effort of the private banking division:

$$e^* = \frac{(A_{sp} - A_m)r_p + 2}{8}. \quad (5)$$

In the following propositions, we provide several interesting results for the equilibrium revenue-sharing ratio and effort.

Proposition 1 *The equilibrium revenue-sharing ratio of original retail banking division z decreases with the rate of return of the private banking division r_p , but increases with the difference in the potential assets between the transferred customers and new customers, $A_{sp} - A_m$.*

When the rate of return of the private banking division is high, the original retail banking division should reduce its sharing ratio, which motivates the private banking division to make greater effort to serve transferred customers to maintain customer loyalty. In this way, the private banking division generates more revenue from transferred customers. At the same time, the original retail banking division generates more revenue because of the increased effort.

The difference in potential assets between transferred and new customers, $A_{sp} - A_m$, indicates how much the private banking division relies on transferred customers from the original retail banking division. In Proposition 1, sharing ratio z increases with the difference, indicating that greater reliance by the private banking division on the retail banking division results in a larger sharing ratio. This result arises because transferred customer revenue is presently the core capital for the private banking division to develop its business. Hence, the private banking division chooses to serve transferred customers well despite receiving only a small portion of the profit. However, as private banking develops, the difference $A_{sp} - A_m$ becomes smaller, and the retail banking division should set a lower z to stimulate the private banking division to serve transferred customers.

Proposition 2 *The equilibrium effort that the private banking division makes to serve transferred customers to maintain customer loyalty e increases with its rate of return r_p and the difference in the potential assets between transferred and new customers $A_{sp} - A_m$.*

Proposition 2 shows that a larger rate of return for the private banking division results in its stronger reliance on transferred customers and its greater effort in serving transferred customers to maintain customer loyalty.

Equilibrium analysis of three private banking development stages in China

Private banking in China has been developing for 10 years. Compared with the development of private banking in developed countries with a history of more than 100 years, private banking in China is still in its initial stage. Here, we define the three development stages of China's private banking.

Starting stage

From 2007 to 2009, China's private banking divisions were intensively established, and the private banking industry was very immature. We define this stage as the “starting stage” of China's private banking industry. In this stage, retail banking divisions were much stronger than private banking divisions in terms of AUM and contributions to total bank profits. The development of private banking faced various problems, such as a skilled labor shortage, unreasonable organizational structures, and single product lines. The private banking division had to seek help from the retail banking division. In this stage, the potential assets from new customers are smaller than those from transferred customers, that is, $A_{sp} > A_m$.

Semimature stage

From 2011 on, China's private banking division quickly learned from foreign private banks and began to enhance its management capabilities to develop private banking through cooperation with foreign private banks, overseas study, and product innovation. During this stage, private banking development also relied on customers from the retail banking division. Compared with the “starting stage,” private banking divisions in this stage developed independent marketing capabilities. In addition, the potential assets from new customers are assumed to nearly equal those from transferred customers, that is, $A_{sp} = A_m$.

Mature stage

The third stage defined in this paper is a hypothetical stage of future private banking industry development in China, namely, the “mature stage.” In this stage, China's private banking divisions will have greatly improved customer relationship management capabilities and established professional teams to serve more customers. In addition, competition within the private banking market will be more intense, and customer switching will be more frequent. The potential assets from new customers are greater than the potential assets from transferred customers, that is, $A_{sp} < A_m$.

Now, we conduct an equilibrium analysis under these three stages. In the starting stage, $A_m < A_{sp}$. We summarize the results in Lemma 1.

Lemma 1 *In the starting stage of China's private banking industry, the equilibrium revenue-sharing ratio z^* decreases with A_{sp} and r_p . The equilibrium effort of the private banking division to serve transferred customers e^* increases with A_{sp} and r_p .*

In the semimature stage, $A_m = A_{sp}$. Substituting $A_m = A_{sp}$ into Eqs. (4) and (5), we formulate z^* and e^* in Eqs. (6) and (7) and summarize the main results in Lemma 2:

$$e^* = \frac{1}{4}, \quad (6)$$

$$z^* = \frac{1}{A_{sp}r_p}. \quad (7)$$

Note that Eq. (6) shows that the equilibrium effort of the private banking division to serve transferred customers to maintain customer loyalty is $e^* = \frac{1}{4}$. Thus, the private banking division's effort to acquire new customers equals $\frac{3}{4}$. This represents the relative private banking division effort put toward each customer group. In this stage, the private banking division puts much more effort into acquiring new customers than into serving transferred customers.

Lemma 2 *In the semimature stage of China's private banking industry, the equilibrium revenue-sharing ratio z^* decreases with A_{sp} . The equilibrium effort of the private banking division to serve transferred customers to maintain customer loyalty is $e^* = \frac{1}{4}$. The private banking division's effort to acquire new customers equals $\frac{3}{4}$. In this stage, the private banking division puts much more effort into acquiring new customers than into serving transferred customers regardless of the revenue-sharing ratio z^* .*

Compared with the results in the starting stage, we derive Lemma 3.

Lemma 3 *From the starting stage to the semimature stage, both the equilibrium revenue-sharing ratio z^* and the private banking division's equilibrium effort to serve transferred customers, e^* , decrease.*

Lemma 3 is consistent with the actual development of China's private banking industry. In the starting stage of private banking, because the private banking division relied mainly on the retail banking division, its main focus was to maintain transferred customers. At this time, the private banking division's dependence on transferred customers gives the retail banking division greater power to set a higher revenue-sharing ratio.

In the semimature stage, the retail banking division observes the development of the private banking division and believes that the private banking division's rich products and high-quality management teams could bring in more profits. Hence, the retail banking division tends to reduce its sharing ratio to encourage the private banking division to focus more effort on transferred customers. Meanwhile, the private banking division has greater control over transferred customers. These factors simultaneously reduce the

revenue-sharing ratio. In reality, the revenue-sharing ratio z in China tends to decrease to below 50%. Additionally, recently, z is rarely larger than 70% in China.

Lemma 4 *In the mature stage of China's private banking industry, $A_m > A_{sp}$, the private banking division's equilibrium effort to serve transferred customers, e^* , decreases with increases in A_m and r_p and instead devotes more effort to acquiring new customers.*

In the mature private banking stage, the private banking division no longer relies on transferred customers. As A_m increases, potential new customer assets increase. At this time, transferred customers are not very valuable for private banking development. More potential new customer assets result in less effort by the private banking division to serve transferred customers to maintain customer loyalty. Because the primary revenues are from new customers, a larger private banking rate of return, r_p , results in the private banking division deriving more revenue from new customers, further reducing its effort to serve transferred customers.

The three stages compared

The three stages in “[Equilibrium analysis of three private banking development stages in China](#)” section are consistent with the development of China's private banking industry. As the industry evolves, the relationship between potential assets A_{sp} and A_m changes. Comparing these three stages, we derive the following propositions.

Proposition 3 *The revenue-sharing ratio z changes with private banking development. The more developed the private banking division, the lower the revenue-sharing ratio of the retail banking division.*

Proposition 4 *The private banking division's efforts to serve transferred customers to maintain customer loyalty change with private banking development. A more developed private banking division makes less effort to serve transferred customers to maintain customer loyalty since it makes more effort toward acquiring new customers.*

Independent development mode

Unlike the BRM, in which the retail banking division supports the private banking division through transfers of high-net-worth individuals, in the IDM, the two divisions compete to acquire customers. In this case, the private banking division is independent of retail banking and can be accounted for separately. In reality, a private banking headquarters is set up at the head office level with the authority to operate independently. Some commercial banks, such as the Industrial and Commercial Bank of China, adopt the IDM to develop private banking.

The customer sources of the two divisions under the IDM differ from those under the BRM. The independence of the two divisions is relatively higher. Under the BRM, some private banking customers originate from the retail banking division. The private banking division's initial customer accumulation is primarily derived from that cooperation. Under the IDM, however, the private banking division must both open up a potential new market and compete with the retail banking division to acquire more customers.

In reality, while banks set different asset thresholds for private banking clients to allow transfer from the retail banking division to the private banking division,¹⁰ the transfer is not smooth due to internal competition. The retail and private banking divisions establish a competitive relationship because they are accounted for separately and tied to the size of their AUM (Huang and Wang 2013). The homogenization of financial products has intensified this interdivisional competition (Wang and Guo 2022). From a micro perspective, each customer manager in both divisions has a stable customer base, and no one is willing to give up their big clients to the other division.

The internal competition between the two divisions is documented by clients,¹¹ client managers, and division managers. For example, the manager of China Construction Bank in Beijing pointed out that internal competition between the two divisions happens frequently in the transfer problem (Lv 2014). The CEO of China Construction Bank's private banking division pointed out that the private banking division should deal with the relationship between other divisions and reduce internal competition (Liu 2019).

We assume that the potential assets of the current customers of both divisions are A_c and that the potential assets of new customers in both divisions are A_m . Hence, the total potential assets are $A_t = A_c + A_m$. We assume that the private and retail banking divisions' efforts comprise advertising, promotions, and market positioning, which are *efforts to acquire customers*, denoted b . These efforts are used to open up new markets, expand the scale of AUM, and increase market share (Ivanov 2010). We denote the retail and private banking divisions' efforts to acquire more customers as b_s and b_p , respectively.

Basic model

A higher effort results in a division acquiring more customers, that is, the derivation of a greater market share. Hence, the proportion that the private banking division can derive from potential assets is assumed to be $b_p - \alpha b_s$, where $\alpha > 0$ indicates the impact of one banking division's effort to acquire more customers than the other banking division. Correspondingly, the retail banking division possesses $b_s - \alpha b_p$ of potential assets.¹²

Based on the previous assumptions, the bank's costs are positively related to the effort to acquire new customers. We assume that the cost function of the private banking division is $C_p = b_p^2$ and of the retail banking division is $C_s = b_s^2$. Next, we discuss the profit functions of the two banking divisions. The total assets derived by the private banking division are $A_t(b_p - \alpha b_s)$. The primary responsibility of the private banking division is to help customers manage assets. Assuming that the private banking division's rate of return on investments is r_p , we assume that the private banking division's revenues equal the amount of managed assets times the rate of return, that is, $A_t(b_p - \alpha b_s)r_p$. The retail banking division's revenue equals $A_t(b_s - \alpha b_p)r_s$. Therefore, the private banking division's profit function, π_p , and the retail banking division's profit function, π_s , are given by the following expressions:

¹⁰ The asset threshold for private banking clients of Bank of China and China Construction Bank is 6 million RMB, the threshold for Industrial and Commercial Bank of China is 8 million RMB, and the threshold for China Merchants Bank is 10 million RMB.

¹¹ Please go to <https://www.zhihu.com/question/24516523/answer/2353307352> for details.

¹² Here, we assume that $b_p - \alpha b_s \in [0, 1]$ and $b_s - \alpha b_p \in [0, 1]$ to represent the market share.

$$\begin{cases} \pi_{p1} = A_t(b_p - \alpha b_s)r_p - b_p^2, \\ \pi_{s1} = A_t(b_s - \alpha b_p)r_s - b_s^2. \end{cases} \tag{8}$$

Both divisions maximize profits by optimizing their respective efforts. The first-order conditions for b_p and b_s are

$$\begin{cases} \frac{\partial \pi_{p1}}{\partial b_p} = A_t r_p - 2b_p = 0, \\ \frac{\partial \pi_{s1}}{\partial b_s} = A_t r_s - 2b_s = 0. \end{cases} \tag{9}$$

Solving Eq. (11), the optimal efforts of the two banking divisions are

$$\begin{cases} b_p^* = \frac{A_t r_p}{2}, \\ b_s^* = \frac{A_t r_s}{2}. \end{cases} \tag{10}$$

From these results, the following propositions are obtained.

Proposition 5

- (1) Under the IDM, the optimal effort to acquire customers by the private banking division, b_p , is determined by the potential assets, A_t , and the private banking division's rate of return, r_p ; b_p increases with A_t and r_p .
- (2) Under the IDM, the optimal effort to acquire customers by the retail banking division, b_s , is determined by the potential assets, A_t , and the retail banking division's rate of return, r_s ; b_s increases with A_t and r_s .

Both the effort to acquire customers by the retail banking division, b_s , and by the private banking division, b_p , increase in A_t . This increase indicates that as social wealth accumulates and potential assets increase, the retail and private banking divisions should put greater effort into gaining market share, such as promoting their service system and brand and expanding their potential customers. In addition, b_s and b_p increase with the retail and private banking divisions' rates of return, respectively. This increase shows that a higher rate of return results in better asset management and more inputs for attracting assets, thus strengthening the banking division's ability to expand its asset scale.

Lemma 5 *The exogenous parameter α has no impact on both the private banking division's optimal effort, b_p , and the retail banking division's optimal effort, b_s .*

As shown in Lemma 5, the impact of one banking division's efforts on the other division, denoted α , represents the negative impact of competition between the two divisions and is unrelated to the latter banking division's effort.

Given the optimal efforts of the private and retail banking divisions, b_p and b_s , we derive the market shares of the retail and private banking divisions as $S_p = b_p - \alpha b_s = \frac{A_t}{2}(r_p - \alpha r_s)$ and $S_s = b_s - \alpha b_p = \frac{A_t}{2}(r_s - \alpha r_p)$, respectively.¹³ The difference in S_p and S_s is $S_p - S_s = \frac{A_t(1+\alpha)}{2}(r_p - r_s)$. Subsequently, we have the following lemma.

¹³ Combined with the previous assumption, we have $A_t(r_p - \alpha r_s) \in [0, 2]$ and $A_t(r_s - \alpha r_p) \in [0, 2]$.

Lemma 6 *The greater the α , the smaller the market shares of both the private and the retail banking divisions. Keeping other conditions the same, $S_p > S_s$ if $r_p > r_s$.*

We can see from Lemma 6 that the private banking division can attract more assets when it has a higher rate of return than the retail banking division in asset investment. In addition to the difference between their rates of return, the difference between S_p and S_s is positively related to α and total assets A_t .

In this section, the maximum profits gained by the two divisions are shown in Eq. (11):

$$\begin{cases} \pi_{p1} = \frac{A_t^2}{4} (r_p^2 - 2\alpha r_p r_s), \\ \pi_{s1} = \frac{A_t^2}{4} (r_s^2 - 2\alpha r_p r_s). \end{cases} \quad (11)$$

We denote the sum of the profits of the two divisions as $\pi_1 = \pi_{p1} + \pi_{s1}$. Then, π_1 is derived in Eq. (12):

$$\pi_1 = \frac{A_t^2}{4} (r_p^2 + r_s^2 - 4\alpha r_p r_s). \quad (12)$$

Proposition 6 *The total profit of the two banking divisions is $\pi_1 = \frac{A_t^2}{4} (r_p^2 + r_s^2 - 4\alpha r_p r_s)$. π_1 is negatively related to α and positively related to potential assets A_t .*

To some extent, α reflects the negative impact of competition between the two divisions. When one banking division increases its effort to acquire customers, with a larger α , the total profits of the two divisions become smaller. Hence, from the perspective of the entire bank, α is an internal friction effect parameter brought about by competition between the two divisions.

Under the IDM, the private and retail banking divisions develop independently and cultivate their customer bases and professional brands. In this way, each self-interested division pays close attention to its customer base and profits. On the one hand, this attention causes unnecessary internal friction and creates difficulties in cooperation between the two divisions. On the other hand, the competing divisions have similar internal functional units, and the overlap of these units wastes resources and reduces the total profits of the two divisions. The result and previous analysis suggest that the entire bank, which is in charge of both divisions, should take effective measures to reduce the negative effects of competition in customer acquisition. For example, the entire bank can develop policies to divide the customer base, guiding high-net-value individuals to the private banking division and attracting others to the retail banking division. The *China Private Banking Development Report 2021*, written by the China Banking Association and the PBC School of Finance at Tsinghua University, also suggested that private banking divisions should deal with internal competition between different divisions and improve internal integration capabilities within the organization, which is the core competitive advantage of private banking development.

Customer loyalty in the retail banking division

Customer loyalty plays an important role in financial institution development. Given the long development history of the retail banking division, many retail banking customers have gradually developed into higher-net-worth individuals. They depend on and are loyal to the retail banking division. Because of customer loyalty, some customers stay with the retail banking division even when the private banking division has been established (Board 2011; Chioveanu 2008), which creates difficulties for the private banking division when competing for customers. We assume customer loyalty to the retail banking division is w , where $w \in [0, 1]$. The higher the customer loyalty, the more that current customers will choose the retail banking division and, thus, bring more assets to the retail banking division. Then, the amount wA_c of assets will be brought to the retail banking division. The retail and private banking divisions will compete for the remaining $(1-w)A_c$ and the potential assets in the new market, A_m . These potential assets are denoted $A_k = A_c(1-w) + A_m$. Thus, the private banking division's profit, π_p , and the retail banking division's profit, π_s , are as shown in Eq. (13):

$$\begin{cases} \pi_{p2} = A_k(b_p - \alpha b_s)r_p - b_p^2, \\ \pi_{s2} = [A_c w + A_k(b_s - \alpha b_p)]r_s - b_s^2. \end{cases} \quad (13)$$

To maximize the profits of both divisions, we solve the first-order conditions of Eq. (13) and derive the optimal efforts of both divisions:

$$\begin{cases} b_p^* = \frac{A_k r_p}{2} = \frac{[A_c(1-w) + A_m]r_p}{2}, \\ b_s^* = \frac{A_k r_s}{2} = \frac{[A_c(1-w) + A_m]r_s}{2}. \end{cases} \quad (14)$$

Proposition 7

- (1) *The optimal effort of the private banking division, b_p , is negatively related to customer loyalty to the retail banking division, w , and positively related to the private banking division's rate of return, r_p , potential assets of current customers, A_c , and the potential assets of new high-net-worth individuals, A_m .*
- (2) *The optimal effort of the retail banking division, b_s , is negatively related to customer loyalty to the retail banking division, w , and positively related to the retail banking division's rate of return, r_s , the potential assets of current customers, A_c , and the potential assets of new high-net-worth individuals, A_m . Both b_s and b_p are unaffected by α .*

The stronger the customer loyalty to the retail banking division, the lower the efforts of the private and retail banking divisions. On the one hand, higher customer loyalty to the retail banking division results in fewer potential assets for the two divisions to compete for because more customers stay with the retail banking division. On the other hand, the stronger the customer loyalty to the retail banking division, the more obstacles the private banking division may face in development.

We can see the phenomenon of a retail banking division with a good reputation building a strong customer base from the early development stage of the private

banking division. At the same time, the private banking division has a weak customer base, the concept of the private banking division is relatively new to customers, and its risk management and investment capabilities are immature. To enable the development of the private banking division, other divisions within the banking system should exist to provide customers to the private banking division and help it expand its customer base. The BRM mentioned in “Big retail mode” section is well adapted to this situation, ensuring the initial customer base needed to develop the private banking division.

Similar to “Basic model” section, we can conclude that the larger α is, the smaller the market share of the private banking division and the greater the market share of the retail banking division. In addition, the equilibrium profits of both divisions are shown in Eq. (15):

$$\begin{cases} \pi_{p2} = \frac{A_k^2}{4} (r_p^2 - 2\alpha r_p r_s), \\ \pi_{s2} = \frac{A_k^2}{4} (r_s^2 - 2\alpha r_p r_s) + A_c w r_s. \end{cases} \tag{15}$$

When considering customer loyalty, $A_k = A_c(1 - w) + A_m$, the equilibrium profit of the private banking division is affected by customer loyalty to the retail banking division. We can rewrite π_{p2} in the following expanded form:

$$\pi_{p2} = \frac{r_p^2 - 2\alpha r_p r_s}{4} (A_c^2 w^2 - 2A_c A_t w + A_t^2). \tag{16}$$

We calculate the partial derivative of π_{p2} with respect to w and obtain $\frac{\partial \pi_{p2}}{\partial w} = \frac{r_p^2 - 2\alpha r_p r_s}{2} (A_c^2 w - A_c A_t)$, which is negative when $w \in [0, 1]$.

Proposition 8 π_{p2} decreases with $w \in [0, 1]$ and is minimized when $w = 1$, that is, the current customers of the retail banking division are completely loyal.

The profit of the private banking division has a positive convexity relationship with customer loyalty to the retail banking division, implying that a change in the profit of the private banking division will be greater for an instantaneous *decrease* in customer loyalty to the retail banking division than for an instantaneous *increase* in customer loyalty to the retail banking division of equal size.

Compared with the equilibrium profit of the retail banking division in Eq. (15), besides an additional $A_c r_s w$, the potential assets in Eq. (15) change from A_t to A_k . For the retail banking division, having a more mature brand and stronger word of mouth results in greater customer satisfaction with asset management services, strengthening customer loyalty of the retail banking division. Under these circumstances, starting and developing a private banking division are also challenging.

The total profit of the two banking divisions is denoted $\pi_2 = \pi_{p2} + \pi_{s2}$, which is derived in Eq. (17):

$$\pi_2 = A_c w r_s + \frac{A_k^2}{4} (r_p^2 + r_s^2 - 4\alpha r_p r_s). \tag{17}$$

Proposition 9 *The total profits of the two banking divisions are negatively related to α and positively related to w .*

Although the customer loyalty of the retail banking division, w , creates difficulties for private banking division development, as indicated in Proposition 9, w improves the total profit of the two divisions. The rationale is as follows. Given that other factors remain equal, A_k is smaller when w is larger, which means that the common assets that both divisions compete for are smaller. When the two divisions compete for A_k , the internal friction effect parameter α determines the relative share of assets for both firms. The internal friction effect parameter, α , combined with total competing assets, A_k , has a negative effect on the total profits of both divisions. The profit loss caused by α is compensated by the increase in w from the smaller total competing assets, A_k . In other words, the customer loyalty of the retail banking division reduces the negative impacts of the internal friction caused by competition between the two divisions.

This interesting relationship between customer loyalty and internal friction effects not only establishes the competition between the retail and private banking divisions but also exists in other settings. Take competition between high-tech firms and traditional banks in the financial services market as an example. In today's digital age, the financial services market is becoming more diverse and competitive. Some digital giants, such as the Ant Group in China, have massive amounts of customer data and have developed financial services systems that can provide multiple online financial services and handle multiple client businesses simultaneously. The tremendous convenience provided by these high-tech firms raises customer expectations for digitalization. It is difficult for traditional banks to catch up with the rapid development of digitalization, however, putting them at a disadvantage, given the competition from these high-tech firms. Customer loyalty, however, compensates for the disadvantage of slower digitalization by traditional banks. Compared with high-tech firms, traditional banks have a much longer development history from which they have attracted and retained loyal customers. Loyal customers stick to traditional banks because of trust and solid relationships. This phenomenon not only buffers the negative impact of financial technology on traditional banks but also provides traditional banks with additional time and opportunities to develop and cultivate new customers.¹⁴ At the same time, from an overall industry perspective, customer loyalty reduces possible negative competitive effects, prevents excessive capture of market share by emerging technologies, and ensures stable development of the industry.

Survey-based empirical analysis

Survey design and descriptive results

To provide data for economic analyses under the BRM and IDM, we design two surveys for each mode and invite customer managers from the respective banks to complete the surveys. In each survey, we first collect personal information from the customer managers concerning gender, age, education level, and years of experience in private banking.

¹⁴ Data source: FinTech: Banking on customer loyalty: it takes more than a brand (<https://www.fintechmagazine.com/banking/banking-customer-loyalty-it-takes-more-brand>).

We then ask the customer managers questions about factors that influence their efforts in serving clients and acquiring new clients. For each question, customer managers choose one of the following five options to represent their attitudes: “strongly disagree,” “disagree,” “neutral,” “agree,” or “strongly agree.” As the private banking industry in China is still in its infancy, there are few customer managers for private banking clients. For the BRM survey, we received 24 responses. For the IDM survey, we received 20 responses. The descriptive results follow.

Of the 24 BRM responses, 14 are from female customer managers, and 10 are from male customer managers. Eight managers have a bachelor’s degree, and 16 have a master’s degree. Twenty-one managers (83.33%) have worked in private banking for more than 3 years, and among them, 13 (54.17%) have worked in private banking for more than 10 years. Of the 20 responses for the IDM, half were from male customer managers and half from female customer managers. Eight managers have a bachelor’s degree, and 12 have a master’s degree. All 20 managers have been working in the private banking industry for more than 3 years, and among them, 14 (70%) have more than 10 years of experience. From the descriptive results, we can see that most managers who answered our questionnaires are quite experienced and professional. Moreover, the research questions in our study focus on the optimal efforts of the private and retail banking divisions, which are internal incentive studies for individual customer managers. Therefore, the responses by customer managers in the two divisions about the factors influencing their efforts in serving customers and acquiring new customers are reliable to test our economic analysis in “[Big retail mode](#)” and “[Independent development mode](#)” sections.

Survey analysis

Based on the responses of the customer managers in the two surveys, we analyze the factors influencing their efforts in servicing customers and acquiring new customers.

For the BRM survey response, 87.5% of customer managers *agree/strongly agree* that they will put *more* effort into serving transferred customers if the retail banking division lowers its revenue-sharing ratio, which supports our assumption in the economic analysis. Of private banking customer managers, 91.66% *agree/strongly agree* that they will put more effort into serving transferred clients to maintain client loyalty as the private banking division’s rate of return increases. In addition, 79.16% of customer managers *agree/strongly agree* that they will put more effort into serving transferred clients if the potential assets of transferred clients are greater than those of new clients. Finally, 91.66% of customer managers *agree/strongly agree* that they will put *more* effort into acquiring new clients as the private banking department matures. Their responses, based on their banking experience, provide data support for our findings on their incentives and efforts to serve transferred clients (including Propositions 2 and 4).

For the IDM survey response, 75% of customer managers *agree/strongly agree* that they will put *more* effort into acquiring customers when the total potential assets of high-net-worth individuals *increase*. Of the customer managers, 80% *agree/strongly agree* that they will put *more* effort into acquiring customers with *increases* in the rate of return of the private banking division. In addition, 85% of customer managers *agree/strongly agree* that the competitive effect between the two banking divisions reduces the total profits of

both divisions. Finally, 65% of customer managers *agree/strongly agree* that the customer loyalty of the retail banking division helps the bank as a whole generate high profits. Their responses provide data support for our results regarding Propositions 7 and 9.

Conclusions and policy implications

This paper identifies and optimizes the key decisions of private banking development in China from an organizational innovation perspective. The study focuses on two relationships under each organizational structure: *cooperation* under the BRM and *competition* under the IDM. Under the BRM, the analytical results show that both the optimal retail banking division's revenue-sharing ratio and the optimal private banking division's effort to serve transferred customers decrease as the private banking division becomes more developed. Under the IDM, the optimal efforts of both divisions are shown to decrease as customer loyalty to the retail banking division increases. To our knowledge, this theoretical paper is the first to conduct an economic analysis of the private banking industry that demonstrates the impacts of organizational innovation on optimal decisions by private banking divisions.

This paper provides several informative policy implications for the private banking industry. First, we suggest that private banks under the BRM structure adjust the revenue-sharing ratio of the retail banking division according to the development stage of the private banking industry and the potential assets of the transferred customers. Specifically, a more developed private banking division results in a lower revenue-sharing ratio for the retail banking division, and the private banking division puts less effort into serving transferred customers. For a given development stage, if the potential assets of transferred customers increase, the private banking division should make more effort to attract assets to its division, and the retail banking division should thus reduce its revenue-sharing ratio to increase the private banking division's incentive. Further, the retail banking division should reduce its revenue-sharing ratio when the rate of return of the private banking division increases.

Second, we suggest that private banks under the IDM should evaluate potential customer assets and increase rates of return to incentivize efforts by the two divisions to acquire customers. Third, we suggest that the retail banking division should offer better customer services to increase customer loyalty because customer loyalty to the retail banking division reduces competitive intensity. The competitive effect between the two banking divisions, measured here by the impact of one banking division's efforts on the other banking division, reduces the total profits of both divisions. Such lost profits from internal friction caused by competition are compensated for by stronger customer loyalty to the retail banking division. Stronger customer loyalty to the retail banking division results in lower optimal efforts by both divisions but increases their total profits.

We now present the limitations of this paper and propose future research directions. One limitation is that this study does not theoretically compare the profits under these two organizational structures because of the difference in settings (parameters). A direction for future research is to analyze these two structures more uniformly so that profits are comparable. Future research can also analyze choices of organizational structure considering competition in the private banking industry, that is, which organizational structure is optimal

for heterogeneous private banks in a competitive context. Moreover, with the prosperous development of financial innovation, examining the impacts of fintech, such as blockchain technology, on the private banking industry under different organizational structures is also a promising research direction.

This study makes the following contributions. First, it contributes to the literature by analyzing the financial innovation of private banks from an organizational perspective. The analysis shows the impacts of organizational innovation on different banking divisions' incentives and demonstrates its essential role in private banking. Second, this study provides an economic framework for analyzing private banking. In contrast to the vast investigation of central and noncentral banks in the literature, private banking studies receive much less attention. Our analysis in this paper, motivated by China's innovative private banking practices, identifies and optimizes key decisions under different organizational structures, offering a map for further explorations of the private banking industry. Meanwhile, under the BRM, this paper introduces a revenue-sharing mechanism into the cooperative relationship between private banking divisions, thus offering informative insights for developing the private banking industry. Our research not only fills the research void in financial innovation by organizations and the private banking industry but also guides practitioners on wise decision-making under different organizational structures.

Abbreviations

BRM	Big retailing mode
IDM	Independent development mode

Acknowledgements

We thank the Editor and three anonymous reviewers for their suggestions.

Author contributions

HL and YB contributed to the methodologies, developed the model, and drafted the manuscript. ZGH participated in the model development and contributed to the discussion of the results conceived of the study. HQ and SYW conceived of the presented idea and supervised the findings. All authors provided critical feedback and helped shape the research, analysis, and manuscript. All authors read and approved the final manuscript.

Funding

This work was supported by the National Natural Science Foundation of China (Grant Nos. 72101281, 72192843, 71872171, 71988101), the National Social Science Fund of China (Grant No. 22VRC055) and Program for Innovation Research in Central University of Finance and Economics.

Availability of data and materials

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Declarations

Competing interests

The authors declare that they have no competing interests.

Received: 12 June 2022 Accepted: 27 July 2023

Published online: 08 August 2023

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