# Banks' Catering to Fintech

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**Abstract**

How do banks respond to Fintech's competition in the aftermath of the Fintech wave? We find that banks cater to fintech-enabled money market funds (MMFs) by offering Negotiable Certificates of Deposits (NCDs) with appealing yields. However, in 2017, the China Securities Regulatory Commission (CSRC) implemented a *provision* that restricted the fund family from holding more than 10% of a single bank's equity in its financial products, including deposits. This *provision* introduces a shock to MMFs' demand for NCDs. By utilizing this shock to design a quasi-experiment, we observe a subsequent decrease in the extent of banking catering activities. Additionally, banks that experienced a larger decrease in the concentration of MMFs' clients also exhibited a more significant decline in catering activities.

**JEL Code:** G21, G23, G31.

**Keywords:** Fintech; Money Market Funds; Negotiable Certificates of Deposits; Clientele Effects

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## 1. Introduction

Prior studies find that Fintech[1] diverts funds away from traditional bank deposits because its yields are not bound by interest caps like bank deposits (see Buchak, Hu, and Wei, 2021; Zhu and Lu, 2023). Since the introduction of *Yu'ebao* in 2013, Fintech-enabled Money Market Funds (MMFs) have experienced substantial growth by offering competitive market interest rates, along with the convenience of T+0 settlement and zero redemption fees. As a result, as shown in Figure 1, the assets under management (AUM) of MMFs ballooned from 0.7 trillion RMB in February 2013 to 8 trillion RMB in December 2020. Consistently, in 2013, the size of MMFs equals to merely 1.6% of household deposits, yet this ratio grows to 8.7% by December 2020. While banks could potentially counter the competition by introducing their own Fintech products for retail clients, not all banks possess the necessary resources to directly compete with MMFs. This is particularly evident for regional banks (Tier 2 banks). We find that these Tier 2 banks tend to cater to the demand of MMFs by offering NCDs with attractive yields. Moreover, we demonstrate that these catering activities heavily rely on the bargaining power of MMFs.

[FIGURE 1 ABOUT HERE]

In 2017, the China Securities Regulatory Commission (CSRC) implemented a *provision* that restricted the fund family from holding more than 10% of a single bank's equity in its financial products, including deposits. The implementation of the *provision* significantly impacted the demand for NCDs, as it compelled numerous MMFs to decrease their holdings of NCDs from their preferred banks (refer to Section 2.3). Therefore, we utilize this 2017 *provision* as a quasi-natural experiment to investigate banks' catering activities towards MMFs. Prior to the implementation of

[1] In line with Buchak, Hu, and Wei (2021), Fintech refers to Fintech-enabled MMFs in this paper.

the *provision*, we anticipate that both the supply and yield spreads of NCDs will increase in response to the demand from MMFs. This is evident at both the aggregate industry level and the bank level (especially within Tier 2 banks[2]). However, the *provision* resulted in a noticeable decline in banks' catering activities, particularly among Tier 2 banks. Furthermore, the concentration of MMF clients decreased after the implementation of this regulation, thereby significantly diminishing MMFs' bargaining power to negotiate for higher yields. As MMFs find the yields less attractive, they turn to seek alternative investment opportunities.

To test our expectations, we use two datasets that span from January 2015 to December 2020 to examine banks' catering activities[3]. The first longitudinal dataset is utilized to examine the aggregated level catering behaviors of the banking industry towards MMFs. Additionally, we find that the *provision* significantly reduced the supply of NCDs and *yield spread (AAA)*, while no such evidence is found for *yield spread (AA)*. The second dataset, a bank-year level panel dataset, allows us to investigate banks' catering behaviors at the individual bank level. Our findings offer strong evidence that banks are involved in activities related to catering for both quantity and yields, with a specific concentration on Tier 2 banks. Following the implementation of the *provision*, banks experienced a significant reduction in their catering activities. The impact of this *provision* is more pronounced among banks that heavily rely on MMFs for funding. Furthermore, the *provision* also affected banks that experienced significant reductions in client concentration within fund families (or bargaining power).

A significant challenge in determining banks' financing decisions is endogeneity, as the supply and prices (yields) can have a reverse causality effect on demand. To mitigate the concerns of reverse causal effects, we employ several empirical strategies.

[2] Approximately, Tier 2 banks account for 40.4% of the total assets in China's banking industry, as of 2020.

[3] NCDs were first issued in December of 2013. **The starting point of our sample is determined by the first time when MMFs hold NCDs (Based on Shanghai Clearing House's data).**

First, we apply two-stage least squares analysis (2SLS) and fixed effects two-stage least squares (FE-2SLS) analysis to longitudinal and panel datasets, respectively. The instrumental variable is *equityFund,* which is constructed as the total AUM of Chinese equity funds managed by mutual funds scaled by the total AUM of mutual funds. *equityFund* meets the relevance and exclusive principle required for a valid IV. This is because, equity funds do not invest in NCDs[4] (*equityFund* meets the exclusion principle). Furthermore, *equityFund* is negatively related to the demand of NCDs[5]. In other words, the instrument variable can only affect the supply of NCDs and their yields (or, the dependent variables in our regressions) through the demand for NCDs (or, the variable we want to instrument out).

Second, Banks' funding decisions are highly influenced by liquidity pressure (Correa, Du, and Liao, 2020; Phelan, 2015). Thus, we incorporate the excess reserve ratio of the banking industry as an interaction term with the independent variable to capture the extent of banks' catering under specific circumstances. Third, banks' catering behavior towards MMFs varies depending on their position in the funding market. Therefore, we divide the panel dataset into three tiers (see section 3.2 for bank tier definition). We find that MMFs' clientele effects are primarily driven by *Tier 2 banks*. On one hand, *Tier 1* banks (18 national banks) have a strong ability to absorb deposits and can easily raise wholesale funding. Thus, those banks have fewer catering activities. On the other hand, NCDs issued by Tier 3 banks (banks rated below AA+) rarely meet the liquidity and safety requirements of MMFs. Thus, *Tier 3* banks are not targeted clients for MMFs. Fourth, by utilizing the *provision* to construct a quasi-experiment, we validate the differences in banks' catering behavior before and after the announcement and implementation of the *provision*. Fifth, banks' catering, in turn, enables MMFs to become large clients with strong bargaining power. In this case, we use the HHI index to measure the bargaining power of MMFs'

[4] From 2015 to 2020, NCDs account for 0.00% in equity funds portfolio.

[5] Bond prices normally fall in a typical bull stock market; therefore, fixed-income investors tend to switch their investments in bonds to cash or time deposits.

families based on their shareholdings and then group banks according to whether there are larger reductions in HHI after the *provision*.

Our study contributes to the existing literature in several ways. First, we contribute to the literature regarding the influence of FinTech on the traditional banking industry. On one hand, Fintech is expected to expand the provision of financial services to entities that are underserved by banks (Erel and Liebersohn, 2022). For example, Fuster et al. (2019) find that Fintech lenders exhibit higher efficiency in processing mortgage applications, and this increased efficiency does not come at the expense of default. On the other hand, Fintech directly competes with the traditional banking industry (Goldstein, Jiang, and Karolyi, 2019). For example, Hau et al. (2019) find that FinTech credit providers have a competitive advantage over traditional banks due to their cheaper distribution channels. Buchak, Hu, and Wei (2021) and Zhu and Lu (2022) reveal the crowding out effects of Fintech-enabled MMFs on bank deposits. Our paper is most closely related to Buchak, Hu, and Wei (2021). Their study examines the channels through which Fintech-enabled MMFs partially displace traditional retail deposits. They find that banks' primary response to Fintech's competition by introducing their own T+0 MMFs. However, we reveal that in the long run, banks tend to cater to MMFs for wholesale funding (Figure 2).

[FIGURE 2 ABOUT HERE]

Second, we contribute to the literature on clientele effects in financial markets. Existing literature suggests that preferred-habitat investors, who have different preferences for assets with specific characteristics, have influence on the markets in which they are engaged. The demand from preferred-habitat investors can cause a supply shock on products and lead to persistent effects on prices (Lugo, 2020). Prior literature has examined clientele effects in several aspects, including the stock market (Polk and Sapienza, 2008; Koijen and Yogo, 2019; Hirshleifer, Jiang, and DiGiovanni,

2020; KONDOR and PINTÉR, 2021; BADOER and JAMES, 2016), financial products design (Célérier and Vallée, 2017) and corporate bonds issuance (Lugo, 2020; GREENWOOD et al., 2010; Butler et al., 2022). Our study demonstrates that MMFs, as clients, have impacts on the supply and yields of the targeted financial products (NCDs). Furthermore,we extend clientele effect literature by illustrating that clients' bargaining power can affect the degree of suppliers' catering. Furthermore, we extend the literature on clientele effect by illustrating that clients' bargaining power can influence the extent of suppliers' catering activities.

The remainder of the article is organized as follows. Section 2 introduces the institutional background on China's financial system. Section 3 describes the two datasets used. Section 4 presents the empirical results. Finally, Section 5 concludes the paper with some final remarks.

## 2. Institutional Background on China's Financial System

### *2.1 The binding interest cap and the rise of MMFs*

A binding interest rate cap on household savings in China hampers investors from realizing market yields on bank deposits. Capping interest rates has the potential to lower the cost of capital and enhance profitability for commercial banks, thereby reducing the motivation for both banks and regulators concerned about their financial stability and profitability to pursue interest rate reforms (Buchak, Hu, and Wei, 2021).

In 2013, Alipay, a FinTech and big data company, reshaped traditional MMFs by introducing *Yu'eBao* with several unique features. First, unlike bank deposits, the yields of MMFs are not subject to the interests cap (Figure 3). Second, these Fintech-enabled MMFs allow for a minimum investment requirement as low as 1 RMB and have zero fees for both purchasing and redeeming. Additionally, FinTech also enables MMFs to operate seamlessly 24/7, allowing users to make online and offline purchases directly using their MMF shares. Apparently, Fintech-enabled

MMFs possess deposit-like features while offering market yield to their investors.

[FIGURE 3 ABOUT HERE]

These competitive advantages have led to the widespread adoption of fintech-enabled MMFs and substantial inflows into them. Consequently, the assets under management (AUM) of MMFs have experienced a rapid increase from 0.74 trillion RMB in 2013 to 8.05 trillion RMB in 2020. Moreover, during this period, the ratio of MMFs' AUM to household deposits has grown significantly from 1.6% to 8.7%.

### *2.2 Banks cater to MMFs with NCDs*

Current research reveals that banks respond to Fintech-enabled MMFs' competition by introducing their own *bao* products (bank distributed MMFs). According to Buchak, Hu, and Wei (2021), following the launch of *Yu'ebao* in 2014, more than 20 banks rapidly offered T+0 money market funds. However, this competing trend is not persistent, as indicated by the decrease in the share of bank-distributed MMFs from 27% to 17% in 2018 and further down to 14% in 2020 (Graph A of Figure 4).

[FIGURE 4 ABOUT HERE]

The alternative response for banks is to cater to MMFs with NCDs. NCDs are optimal products both for banks and MMFs. From the perspective of banks, in response to the Fintech wave, banks introduced NCDs for the first time in December 2013 to compensate for funding. As a form of wholesale funding, NCDs possess specific maturity periods that facilitate efficient and rational allocation of funds by banks. Notably, financing through NCDs enables banks to bypass reserve

requirements[6], thereby reducing collateral costs effectively. Specifically, starting from 2014, the implementation of new monetary policy tools such as the medium-term lending facility has gradually expanded. The implementation of this method for injecting base currency necessitates banks to furnish secure assets, such as government bonds, as collateral. Additionally, government bonds are also required as collateral for interbank lending of reserves. However, large banks have advantages in foreign exchange and primary market trading, along with sufficient reserves; whereas small and medium-sized banks are reserves borrowers and consequently face higher costs for collateral. Therefore, financing with NCDs can help reduce these costs.

From MMFs' perspectives, targeting assets should strike a balance between safety, liquidity and profitability. Therefore, as the major marketable short-term bonds in the bond market[7], NCDs naturally become optimal bond securities for MMFs (Figure 5 reveals that, excluding cash, NCDs constitute the largest component in MMFs' investment portfolio, accounting for approximately 45%. Following NCDs are policy bank bonds and treasury bills, each comprising less than 6%). Moreover, NCDs offer comparatively higher yields than Shibor (Shanghai Interbank Offered Rate) and Treasury bonds (Graph B of Figure 4). **Appendix A.2** provides a simple static model to prove that as long as the return on NCDs exceeds that of bank deposits, banks are motivated for quantity and yields catering.

[FIGURE 5 ABOUT HERE]

[6] The reserve requirement ratio ranged from 12.5%-20.5% for large-sized banks and 9.5%-18.0% for medium-sized banks between 2013 and 2020. source: CEIC, Federal Reserve Bank San Francisco (2017).

[7] The maturity of NCDs is equal to or less than 1 year, and the average maturity of the AAA NCDs index (931059.CSI) is approximately 0.45 years. Another type of short term bonds is commercial papers. However, the size of the commercial paper market was only 1.5 trillion RMB as of December 2017 ( at the mean time, the total AUM of MMFs is 6.7 trillion). Additionally, less than 12% of these commercial papers matured in less than 0.5 years.

### *2.3 The Announcement of the provision as a policy shock*

However, the interaction between risk-taking incentives and exposure to runs makes MMFs a crucial component of financial fragility (Cipriani and La Spada, 2021). Additionally, MMFs foster the competition between commercial and shadow banks (Xiao, 2019). Thus, to mitigate the risks associated with NCDs, regulatory authorities introduced the "*Provisions on the Administration of Liquidity Risk of Publicly Offered Open-End Securities Investment Funds*[8]" (The *provision*) .

The *provision*, formally implemented on 1 October 2017, grants mutual funds a six-month transition period. The *provision* restricts the fund family from holding more than 10% of a single bank's equity in its financial products, including deposits. In other words, the *provision* imposed restrictions on MMFs' investments in high yield NCDs and prompted MMFs to allocate a significant portion of their funds towards products offered by nationwide banks. Consequently, the *provision* led to a decline in MMFs' bargaining power due to the reduction of client base concentration, thereby further diminishing banks' motivation for catering (Figure 6 shows MMFs' bargaining power measure by HHI witnesses a significant decline since the end of 2017).

[FIGURE 6 ABOUT HERE]

The announcement of the provisions apparently had a profound impact on banks catering behaviors. Figure 7 displays the trends of *MMF*, *NTR*, and *Yield_spread (AAA and AA)* surrounding the policy shock. The introduction of the *provision* resulted in a significant decrease in *NTR* and *MMF*, which dropped from approximately 13.25% and 25% before the *provision* to 11% and 18% respectively by the end of 2020 (Graph A of Figure 7). Graph B of Figure 7 illustrates the

[8] Announcement No. 12 [2017] of the **China Securities Regulatory Commission**—Provisions on the Administration of Liquidity Risk of Publicly Offered Open-End Securities Investment Funds (中国证券监督管理委员会公告[2017]12 号——公开募集开放式证券投资基金流动性风险管理规定)

*Yield_spread* trend for NCDs issued by AAA and AA rated banks. Notably, there is a clear downward trend in *Yield_spread(AAA)* after the *provision*, while no such significant downward trend is evident in *Yield_spread (AA)*.

[FIGURE 7 ABOUT HERE]

## 3. The Data

We utilize longitudinal and panel datasets spanning from January 2015 to December 2020 to examine banks' catering activities. The definitions of variables can be found in Appendix A.1.

### *3.1 Longitudinal dataset.*

**MMFs data.** The sample spans from January 2015 to December 2020, with the starting point determined by MMFs' holdings of NCDs for the first time. The data on all outstanding bonds (including NCDs) and their holder structures were sourced from SHANGHAI CLEARING HOUSE and China Central Depository & Clearing[9].

**Bond market data.** Four variables, *DSL*, *Credit_spread*, *TYield_1Y* and *Term_spread* are used to control for interest rate conditions. Data on these four control variables is obtained from NATIONAL INTERBANK FUNDING CENTER. Additionally, *EPU* is used to measure economic uncertainty and macroeconomic fluctuations (see Jurado et al., 2015). Table 1 shows the summary statistics of the longitudinal dataset.

[TABLE 1 ABOUT HERE]

[9] Debts are custodies by three institutions (SHANGHAI CLEARING HOUSE(上海清算所), China Central Depository & Clearing (CCDC, 中央国债登记结算有限责任公司), China Securities Depository and Clearing (CSDC, 中国证券登记结算有限责任公司). While CCDC is the primary custodian for all bonds custodied by CSDC.

### *3.2 Panel dataset*

**NCDs data and MMFs data.** The issuance details of NCDs are required to be disclosed prior to public release. Thus, we acquired the issuance data (including the amount and yields of NCDs) from RESSET and computed the aggregated issuing amount and weighted yields (yields are weighted by NCDs size). Subsequently, we integrated bank-level NCDs issuance data with fund holding details obtained from RESSET.

**Firm characteristics data and macroeconomic data.** To analyze the heterogeneity of banks catering to MMFs, we construct a panel dataset covering the period from 2015 to 2020. The dataset is constructed at the bank-year level, and the frequency is determined by the banks' reporting availability in China. Our sample comprises 263 distinct banks (with 1482 observations) and covers 93.58%-99.84% of the total size of the commercial banking industry from 2015 to 2020, as compared to the data disclosed by CBIRC. The more detailed information regarding our sample construction and a comparison between our dataset and the indicators disclosed by CBIRC can be found in **Appendix A.3.** In order to avoid inference problems caused by outliers, we winsorize the continuous variable at 1% and 99% level. We also control the logarithm of GDP at the provincial level, which originates from the National Bureau of Statistics of China.

**Bank Tiers data.** We introduce three dummy variables for a subset of observations based on bank ratings and whether the bank is a national bank. For banks with multiple ratings in the same year, we selected the rating that aligns with the Announcement of Bond Listing and Trading (source: CHINA INTERBANK FUNDING CENTER). In detail, *Tier 1* is assigned a value of 1 for the 18 nationwide banks under direct supervision by CBIRC, and a value of 0 otherwise. *Tier 2* is set to 1 if bank $i$ is not a national bank and has a rating of "AAA" or "AA+" in year $t$, and 0

otherwise. Most MMFs require a minimum rating of 'AAA' or 'AA+' due to the level of risk and liquidity involved. Additionally, since 2018, MMFs are prohibited from holding bonds issued by banks with ratings below 'AA+'. *Tier 3* equals to 1 if bank *i* is not a national bank and is rated below 'AA+' in year *t*, and 0 otherwise. Table 2 shows the summary statistics of the panel dataset.

[TABLE 2 ABOUT HERE]

## 4. Results

### *4.1 Aggregated industry level results*

#### *4.1.1 Full sample*

This section presents empirical evidence of banks catering to MMFs using a longitudinal dataset. The instrumental variable is the *equityFund,* which is constructed as the total AUM of Chinese equity funds managed by mutual funds scaled by the total AUM of mutual funds. *equityFund* meets the relevance and exclusive principle required for a valid IV. The data on the AUM of equity fund and mutual funds origins from Asset Management Association of China. $Eq.\ [1]$ and $Eq.\ [2]$ presents the first and second stage regression of 2SLS model.

**(Stage 1)**

$$MMF_t = \alpha_3 + \alpha_4 equityFund_t + \sum_j \gamma_j\, Controls_{j,t} + \delta_t \quad (Eq.\ [1]),$$

**(Stage 2)**

$$Y_t = \alpha_1 + \alpha_2 MMF_t + \sum_j \beta_j Controls_{j,t} + \varepsilon_t \quad (Eq.\ [2]),$$

where, $Y_t$ refers to $NTR_t$ and $Yield\_spread_t$, respectively. $Controls_{j,t}$ is the $j^{th}$ control variable in month *t*.

The regression results of $Eq.\ [2]$ (the second stage) are presented in Table 3 and the results of $Eq.\ [1]$ (the first stage) results is in **Appendix A.4.**

[TABLE 3 ABOUT HERE]

The dependent variable in columns (1) and (2) is *NTR*, which serves as a measure of banks' quantity catering. In column (1), we control for a linear time trend and additional control variables, while in column (2), we further incorporate quarterly dummies. Similarly, the dependent variables in column (3) and (4), as well as column (5) and (6), are *Yield_spread(AAA)* and *Yield_spread(AA)*, respectively. These variables serve to measure banks' yields catering. In column (3) and (5), time trend and other control variables are controlled, while in column (4) and (6), quarterly dummies are included to address seasonality issues. The estimated coefficients for $equityFund_t$ in the first stage are negative and highly statistically significant, with T-values ranging from -4.45 to -9.74 **(Appendix A.4)**.

In the second-stage regression, the coefficients of *MMF* are positive and significant at 1% confidence level in both column (1) and (2). This implies that the demand for NCDs by MMFs leads to a substantial increase in the supply of NCDs within the bond security market, thereby indicating a clear quantity catering response from banks. However, the coefficients of *MMF* in columns (3) to (6) are insignificant. This is attributed to the greater resilience of yield (price) compared to NCDs demand, resulting in a significant disparity in *Yield_spread* before and after the provision. Additionally, the immediate adjustment in NCD yields also offers valuable insights into the effectiveness of the *provision* in curbing banks' catering activities.

*4.1.2 Evidence from the provision*

The *provision* enables us to establish a quasi-natural experiment for investigating banks' catering behavior towards MMFs. We provide additional empirical evidence of banks' catering to MMFs by incorporating the interaction term of *Post* $\times$*MMF,* where *Post* is a dummy variable that equals 1 after the transmission period of the *provision*

and 0 before the announcement of this policy. Other variables are defined as Appendix A.1.

Table 4 presents the second stage results of instrumental variable estimation. The coefficients of *MMF* remain significantly positive in both column (1) and (2). Furthermore, the coefficients of *Post* × *MMF* in both models are significantly negative at the 1% level, indicating that after the policy shock, banks quantity catering activities are less pronounced.

In column (3) to (6), we obtained some very interesting results. Despite the insignificance of *MMF*, the *Post* × *MMF* estimators exhibit negative and significant effects on *Yield_spread (AAA)* in columns (3) and (4), but does not have significant impact on *Yield_spread(AA)* in columns (5) and (6). This reveals at least two facts: First, there is a significant reduction in AAA banks' catering activities after the *provision*. Second, MMFs rarely hold NCDs issued by AA rated banks; therefore, a decrease in demand from MMFs does not affect the yields of these NCDs.

[TABLE 4 ABOUT HERE]

*4.1.3 Moderating effects of bank liquidity pressure*

The financing behavior of banks is significantly influenced by macroeconomic conditions and industry cycles. Therefore, NCDs, as short-term wholesale financing instruments, can effectively bridge the liquidity gap for banks during periods of limited liquidity. In line with this, we expect banks to rely more on wholesale funding during periods of higher liquidity pressure. Consistent with this rationale, we gauge bank liquidity pressure through the excess reserve ratio (Data source: the People's Bank of China).

Why banks hold excess reserve is a complex question (OGAWA, 2007). A plausible explanation is that a higher ratio of excess reserves generally indicates the

bank's increased availability of funds (Correa, Du, and Liao, 2020; Phelan, 2015). The interaction term is constructed as *excess_Reserve* × *MMF.* The results of the second stage IV regression are presented in Table 5. Several interesting facts can be found: First, upon controlling for *excess_Reserve*×*MMF*, the coefficients of *MMF* exhibit a positive and statistically significant association with both *NTR* and *Yield_spread(AAA)*, while it remains insignificant for *Yield_spread (AA)*. The results validate the quantity and yields catering of banks. Furthermore, in column (1) and (2), the coefficients of *excess_Reserve*×*MMF* exhibit a negative relationship with *NTR* and *Yield_spread(AAA)*, indicating that banks engage in more catering behavior under higher liquidity pressure.

[TABLE 5 ABOUT HERE]

### *4.2 Panel dataset*

The heterogeneity of banks and their position in the deposits market can significantly impact the validity of conclusions. To address this concern, we conducted a comprehensive evaluation of the effect of MMFs' clientele effects on banks at the bank-year level using Fixed Effect-Two-Stage Least Squares (FE-2SLS) models. Our findings are robust to heteroskedasticity.

#### *4.2.1 Bank-year level results*

The results of the Bank-year FE-2SLS regression for the full sample, Tier 1, Tier 2, and Tier 3 banks are presented in Table 6 (the second stage regression results can be found in **Appendix A.4**). The dependent variables, *NTL* and *Yield_spread*, are employed to capture the quantity and yields catering respectively. The independent variable is *MMF.* Notably, the number of observations for *NTL* is larger than that for *Yield_spread* because not all banks issue NCDs every year. Additionally, for Tier 3 banks, since approximately 90% of fund holdings have zero observations, we include

only those banks whose NCDs are held by MMFs at least once to ensure that the conclusion is not biased. In addition, the ratings of certain banks are not stable over the years. Therefore, for Tier 2 banks' sample, we only keep banks that have consistently in Tier 2 for a minimum of 3 years.

Panel A of Table 6 shows significant evidence for banks' quantity and yields catering for the full sample. In addition, we involve the *provision* as a policy shock and generate an interaction term of *Post* × *MMF*. P*ost* is a dummy variable that equals 1 after the implementation of the *provision* in 2017 and 0 otherwise. The findings have significant economic implications: First, banks respond to the demands of MMFs by issuing a larger amount of NCDs with competitive yields. Secondly, as a result of the *provision*, banks exhibit reduced incentives of catering to MMFs .

The findings are consistent among Tier 2 banks (Panel B of Table 6). However, there is limited evidence to suggest that Tier 1 banks (Panel C of Table 6) and Tier 3 banks (Panel D of Table 6) cater to MMFs.

Tier 2 banks are predominantly cater to MMFs due to their ability to offer a wide range of selectable NCDs with competitive yields, coupled with high levels of liquidity and low risk. While Tier 1 and Tier 3 banks do not cater to MMFs. This is because, on one hand, Tier 1 banks possess advantages in foreign exchange and primary market trading, along with sufficient reserves. Therefore, these banks do not need to compensate capital with wholesale funding. For instance, ICBC issues only 3.7 billion (RMB) NCDs in 2017, with a 4.01% weighted yield, whereas the annual average yield of Shibor (6-month) was 4.80% in the same year. On the other hand, NCDs issued by Tier 3 banks fail to meet the security and liquidity requirements of most MMFs. Consequently, in our sample for 2017, NCDs from Tier 3 banks accounted for less than 1% of MMFs' portfolio. Furthermore, since October 2017, holding NCDs issued by Tier 3 banks has been officially prohibited for MMFs.

[TABLE 6 ABOUT HERE]

*4.2.2 Evidence from the provision (Difference in differences models)*

As mentioned, the *provision* presents an ideal quasi-natural experiment for investigating banks' catering behavior. In this section, we employ the *provision* as a policy shock and establish sub-groups based on banks' reliance on MMFs for financing. To be specific, we initially compute a variable (*reliance*) by dividing the amount of bank *i*'s NCDs held by MMFs in year *t* by the total liabilities of bank *i* in year *t*. Subsequently, we rank banks based on their level of dependence on MMFs. Then we construct a dummy variable (*high_reliance*) that equals to 1 if the *reliance* of bank *i* in year *t* exceeds the 25th percentile of *reliance* and 0 otherwise. Finally, we construct the DID term equals to *high_reliance* × *post.* Considering the potential overlap between Tier 2 banks and banks heavily reliant on MMFs for financing, we present the results of the full sample in columns (1) and (2), followed by the results excluding Tier 2 banks in columns (3) and (4).

We employ the FE-2SLS approach in conjunction with Difference in Differences (DID) models. The second stage results are presented in Table 7. Our analysis reveals two key findings. First, we observe robust evidence of quantity and yields catering across all columns, indicating a consistent pattern throughout our study. Moreover, the DID terms exhibit significant effects across all columns, thereby validating that banks relying more on MMFs for financing display significantly reduced catering behaviors after the *provision*. Second, it is noteworthy that the p-value of both dependent variables and DID terms decrease from 1% in column (1) and (2) to 5% and 10%, respectively. This further confirms that Tier 2 banks play a primary role as participants engaging in catering activities.

[TABLE 7 ABOUT HERE]

*4.2.3 Difference in differences models based on the reduction of MMFs' bargaining power*

The relationship between MMFs and banks can be characterized as a business-to-business model, in which banks act as suppliers of financial products (NCDs) while MMFs serve as buyers. Previous research has demonstrated that buyers' bargaining power have impact on suppliers' financing strategies (see Loertscher and Marx, 2022; Brown et al., 2009). Therefore, to measure individual MMFs family's bargaining power, we follow Itzkowitz (2013) by generating Herfindahl–Hirschman index (*HHI*). *HHI* index equals to the sum of the squared market shares of individual MMFs families in all the NCDs shares held by MMFs. In addition, the *provision* restricted the fund family from holding more than 10% of a single bank's equity in its financial products, including deposits. Therefore, we divide the dataset into two subsamples based on the median reduction of HHI observed in 2017. To be specific, *treat* is a dummy variable that equals to 1 if the reduction of HHI is higher than the median and 0 otherwise. *post* is a dummy variable that equals 1 after the implementation of the *provision* and 0 otherwise.

Table 8 shows the results of the second stage result of the DID model by using FE-2SLS model. Column (1) and (2) shows the results of the full sample and column (3) and (4) shows the results of Tier 2 banks. Our findings provide significant evidence that a reduction in *HHI* leads to a decline in yield catering for both Tier 2 banks and the full sample, with t-values of *treat* × *post* equals to -3.33 and -1.75 respectively. However, we only have very limited evidence of the reduction in banks' quantity catering, with t-values of *treat* × *post* equaling -1.36 and -1.61 for Tier 2 banks and the full sample, respectively. This phenomenon is reasonable as some banks still need NCDs to compensate net stable funding.

[TABLE 7 ABOUT HERE]

## 5. Conclusion

This study examines how banks respond to the competition raised by Fintech in the aftermath of the Fintech wave. We find that banks tend to cater to MMFs by offering NCDs with attractive yields. Furthermore, such catering activities are primarily concentrated on Tier 2 banks, as well as those banks that exhibit a higher dependence on MMFs for financing. Additionally, using the 2017 *provision* as a quasi-experiment, we observe a subsequent decrease in the extent of banking catering activities. Also, banks experiencing significant declines in the concentration of MMF clients exhibit more pronounced reductions in catering activities. Identifying banks' strategic responses is crucial because the increasing funding costs associated with using NCDs can be a catalyst for changes in banks' risk-taking incentives and operating efficiency.

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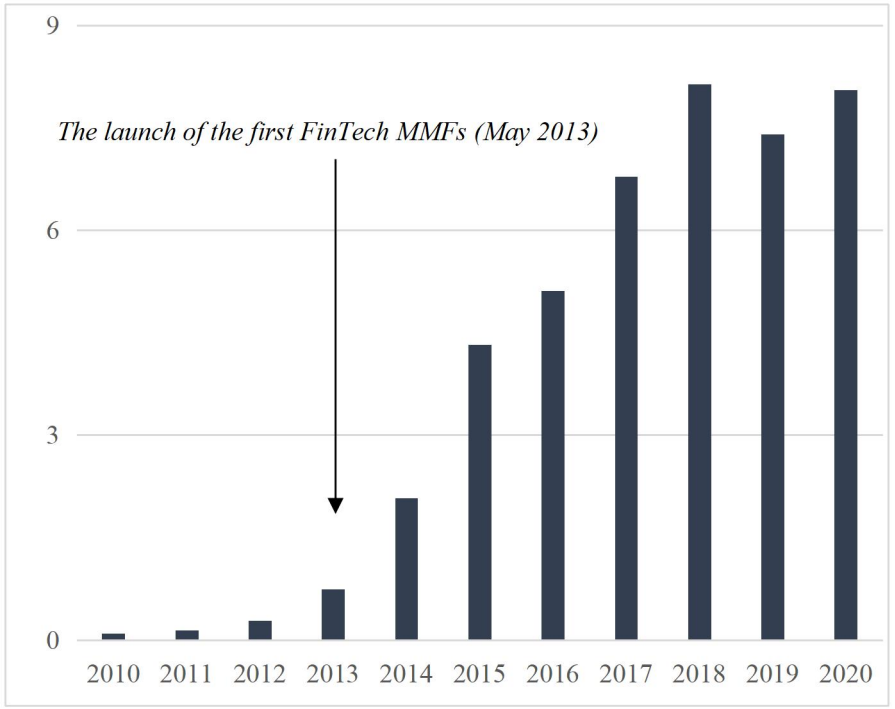
## Figures and Tables

**Figure 1: The rise of MMFs**

**Graph A: Total assets under management of MMFs**

This figure shows the AUM of MMFs (in trillion RMB) since 2010. The black arrow indicates the launch of the first FinTech-enabled MMF (*Yu'ebao*) in 2013.




**Graph B: AUM of MMFs / household deposit (%)**

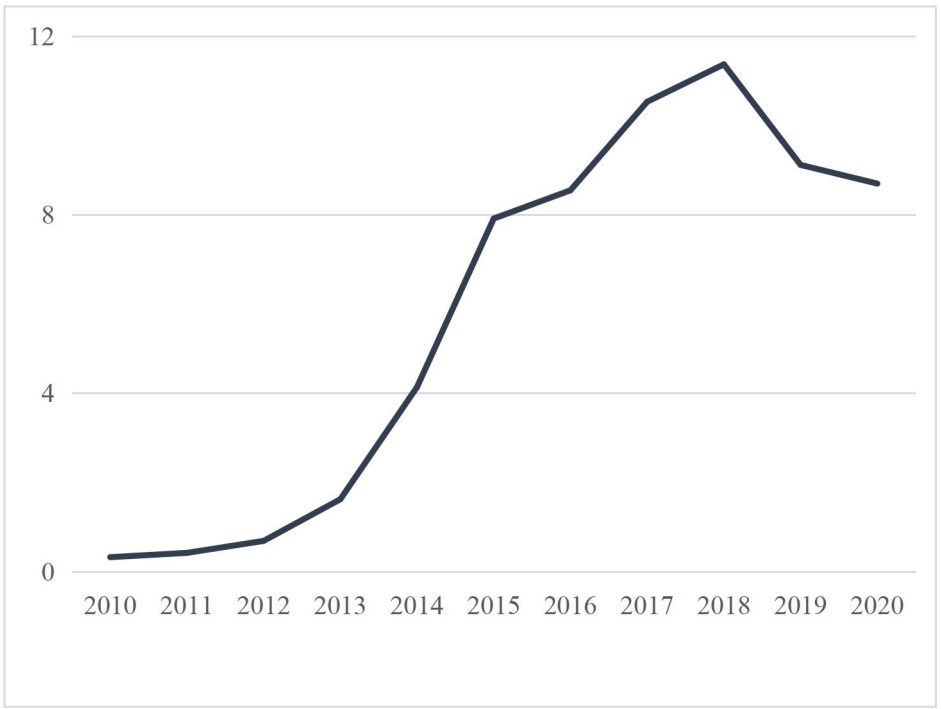


**Figure 2: Flow of deposits before and after the FinTech wave**

Before the FinTech wave, almost all the household deposits flow into bank deposits.

However, in the aftermath of the FinTech wave, MMFs divert funds away from the traditional banking system. Therefore, to compensate funding, banks cater to MMFs with NCDs. In other words, the capital that was shifted away by MMFs (partially) returns to the banking industry as wholesale funding.

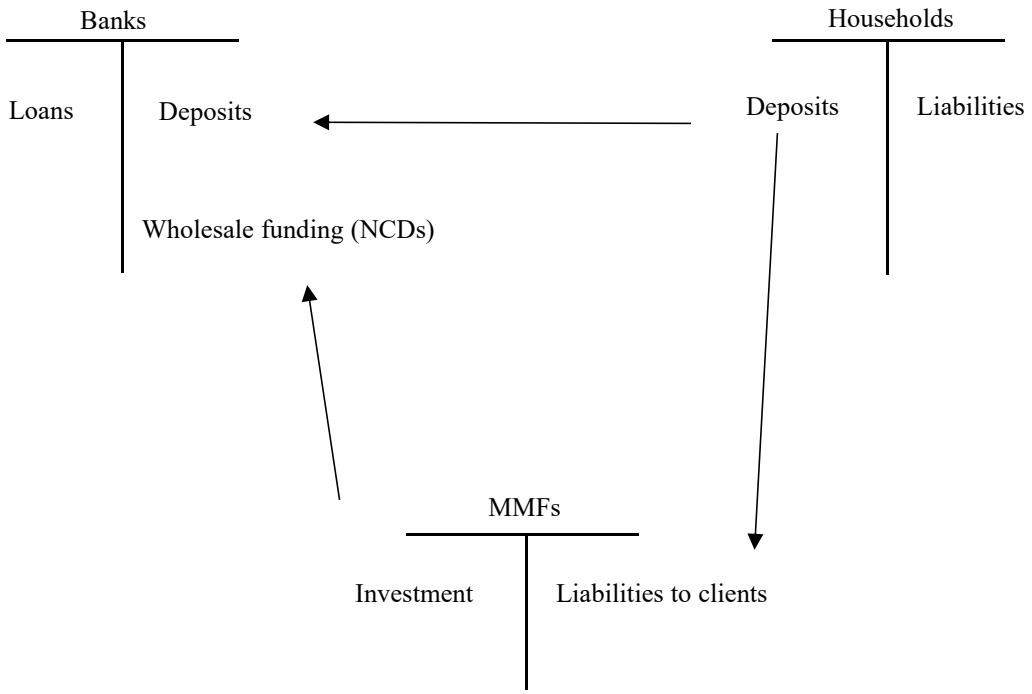


**Figure 3: MMFs offer attractive yields**

This figure shows the annual return of MMFs (30 days moving average) and 1-year time deposits rate.

All ratios are in percentage points.

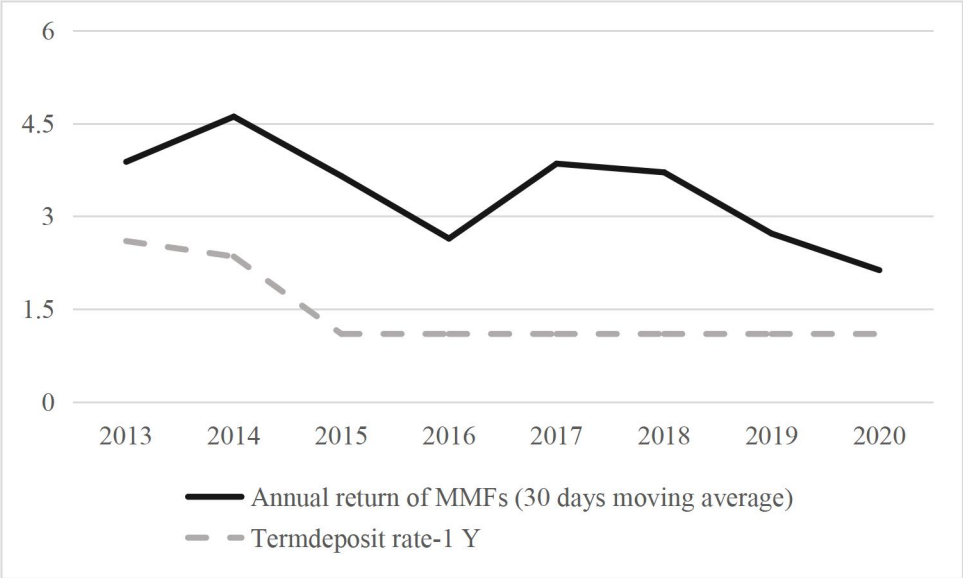


**Figure 4: shares of bank-distributed MMFs**

The graph depicts the trend of bank-distributed MMFs' market share within the MMFs industry. All ratios are in percentage points.

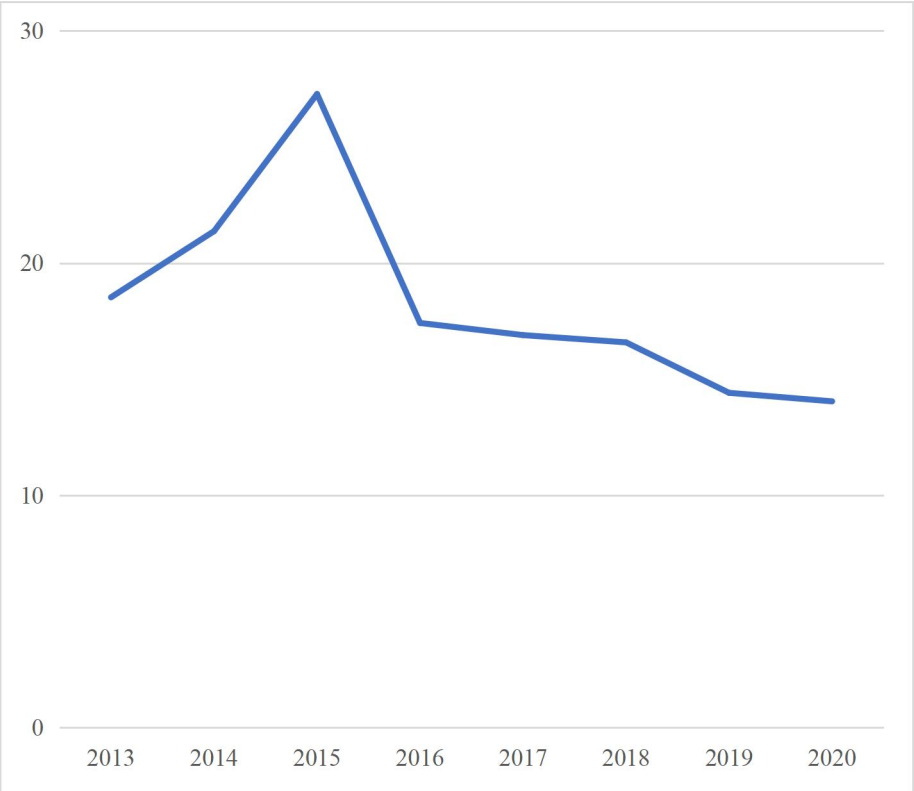
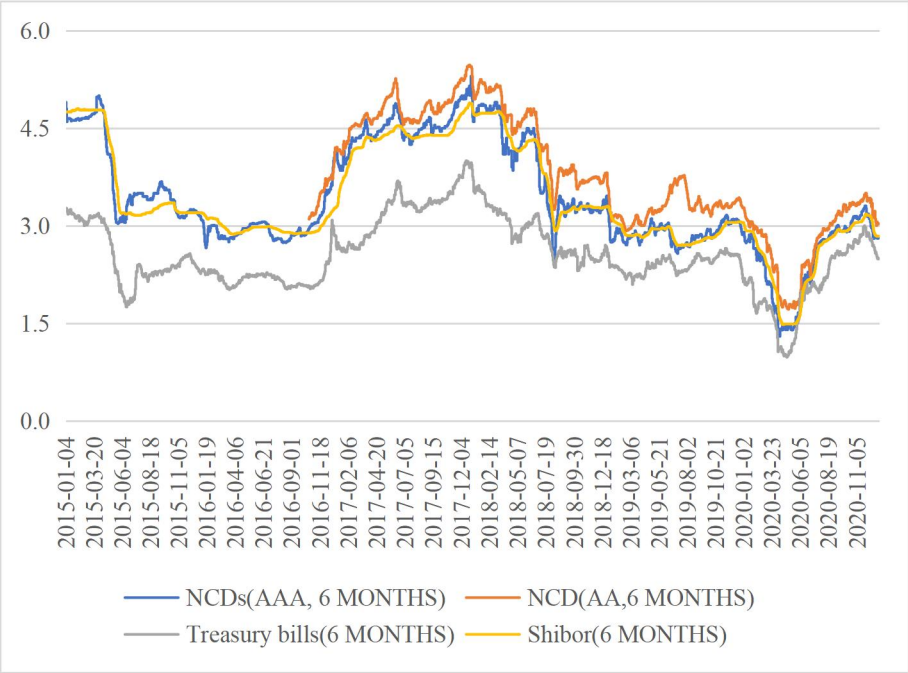


**Figure 5**

**Graph A: NCDs offer appealing yields**

This figure shows the 6-month Shibor yields, 6-month treasury bonds yields, and yields of NCDs issued by AAA and AA rated banks with a maturity of 6 months. Notably, the yield curve of NCDs issued by AA rated banks starts from October 2016. All ratios are in percentage points.




**Graph B: MMFs' portfilio allocation**

This graph shows the (median) portion of NCDs, Time Deposits, Policy Bank Bonds, and Treasury Bonds within MMFs' portfolios. All ratios are in percentage points.

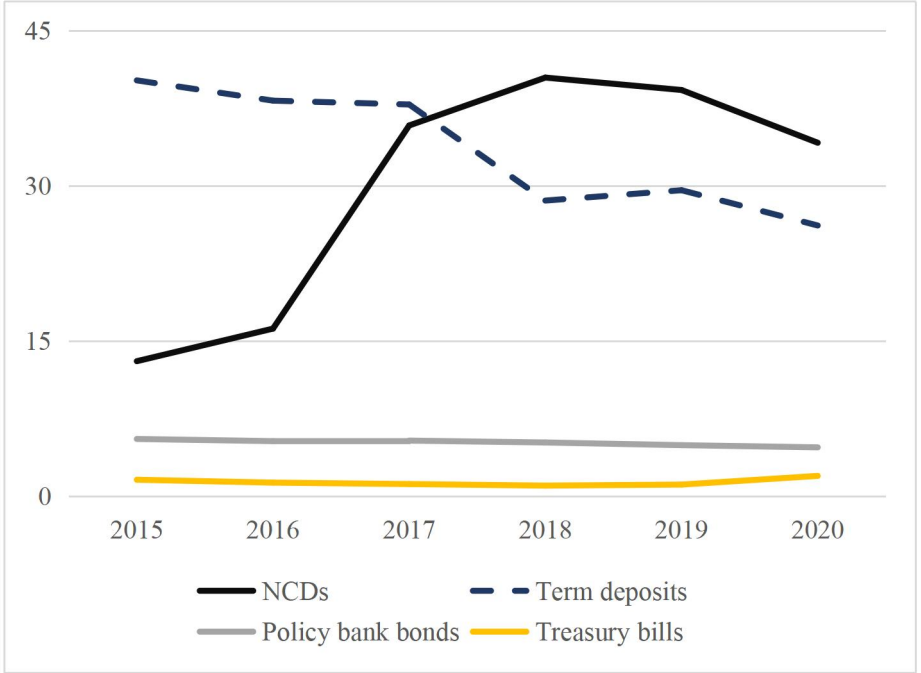


**Figure 6: Average HHI of MMFs' bargaining power**

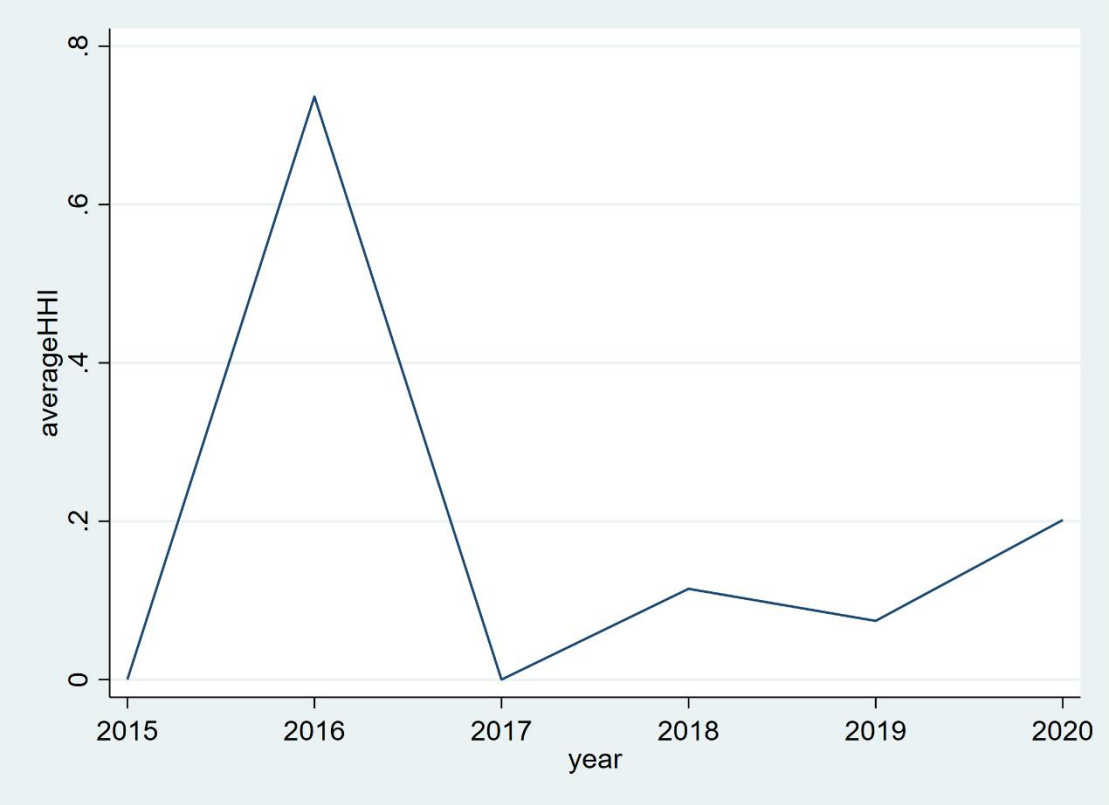
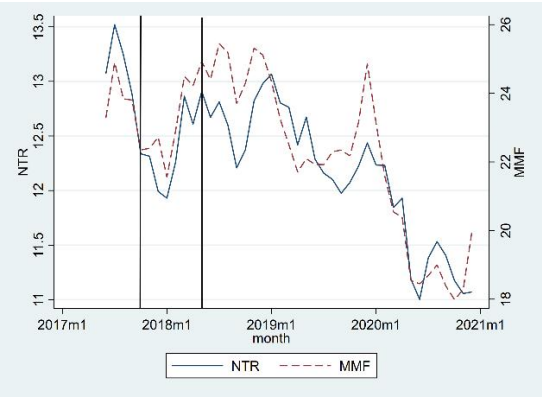



**Figure 7: The trend of *MMF*, *NTR*, and *Yield_spread* around the *provision***

Graph A and Graph B illustrate the trends of *MMF, NTR*, and *Yield_spread* of NCDs issued by AAA and AA rated banks around 2018. In Graph A, the dash line represents *MMF*, while the solid line represents *NTR*. Graph B shows the *Yield_spread* trends of NCDs issued by AAA and AA rated banks respectively. Notably, there is a clear downward trend in the *Yield_spread (AAA)* after the *provision* announcement, while no significant downward trend is found in the *Yield_spread (AA)*. The two vertical black lines represent the announcement of *provision* and the end of the 6-month transmission period.

**Graph A**




**Graph B**

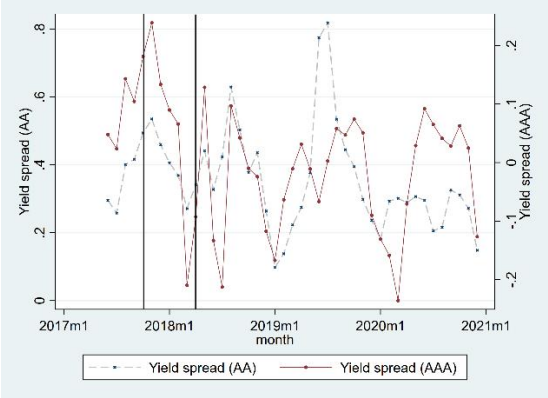


**Table 1**

**Summary statistics of longitudinal dataset.**

This table presents descriptive statistics for the variables included in the monthly time-series dataset. The dataset covers the period between January 2015 and December 2020 (72 observations).*Yield spread (AA)* has 50 observation because the data starts from November 2016.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| VARIABLES | N | mean | sd | min | max |
| *NTR* | 72 | 10.52 | 3.10 | 2.180 | 13.52 |
| *Yield spread (AAA)* | 72 | 0.0158 | 0.144 | -0.284 | 0.490 |
| *Yield spread (AA)* | 50 | 0.374 | 0.149 | 0.0979 | 0.818 |
| *MMF* | 72 | 18.36 | 7.22 | 0.00 | 25.45 |
| *TYield_1Y* | 72 | 2.63 | 0.52 | 1.15 | 3.79 |
| *Term_spread* | 72 | 0.61 | 0.31 | 0.09 | 1.86 |
| *Credit_spread* | 72 | 1.42 | 0.44 | 0.80 | 1.82 |
| *DSL* | 72 | 23.01 | 7.807 | 1.302 | 32.86 |
| *EPU* | 72 | 6.00 | 0.65 | 4.41 | 6.88 |

**Table 2**

**Summary statistics of panel dataset**

This table presents descriptive statistics for the variables included in the firm-quarter panel dataset. The dataset includes 263 banks between 2015 and 2020.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| VARIABLES | N | mean | sd | min | max |
| *NTL* | 1,482 | 0.157 | 0.171 | 0 | 0.745 |
| *Yield_spread* | 1,198 | 0.177 | 0.623 | -1.651 | 2.522 |
| *MMF* | 1,482 | 0.0860 | 0.202 | 0 | 0.919 |
| *LOANDEP* | 1,482 | 0.688 | 0.123 | 0.254 | 1.062 |
| *adequacy* | 1,482 | 13.66 | 2.065 | 2.330 | 21.21 |
| *NPL* | 1,482 | 1.898 | 1.172 | 0 | 8.478 |
| *leverage* | 1,482 | 9.916 | 2.707 | 1.752 | 17.38 |
| *ROA* | 1,482 | 0.784 | 0.339 | -0.536 | 1.791 |
| *size* | 1,482 | 25.47 | 1.635 | 21.67 | 30.73 |
| *lnGDP* | 1,482 | 10.54 | 0.714 | 7.606 | 11.62 |
| *HHI* | 1,482 | 0.135 | 0.277 | 0 | 1 |
| *term_spread* | 1,482 | 0.506 | 0.231 | 0.0900 | 0.780 |
| *credit_spread* | 1,482 | 1.331 | 0.299 | 1.004 | 1.808 |

**Table 3: Banks' catering and MMFs demand in NCDs (aggregated industry level evidence)**

The following table displays the coefficients of *Equation 2*(the second stage) regression. The dependent variable in columns (1) and (2) is *NTR*, which serves as a measure of banks' quantity catering. In column (1), we control for a linear time trend and additional control variables, while in column (2), we further incorporate quarterly dummies. Similarly, the dependent variables in column (3) and (4), as well as column (5) and (6), are *Yield_spread(AAA)* and *Yield_spread(AA)*, respectively. These variables serve to measure banks' yields catering. In column (3) and (5), time trend and other control variables are controlled, while in column (4) and (6), quarterly dummies are further included to address seasonality issues. The first stage regressions as *Equation 1* are listed in appendix A.3. Table 1 provides definitions for variables. The results use robust standard errors and t-statistics are in brackets. Starred coefficients indicate statistical significance at one percent (***), five percent (**), and ten percent (*).

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | NTR | NTR | *Yield_spread(AAA)* | *Yield_spread(AAA)* | *Yield_spread(AA)* | *Yield_spread(AA)* |
| *MMF* | 0.3655*** | 0.3729*** | 0.0074 | 0.0047 | -0.0075 | -0.0106 |
| | (13.10) | (14.88) | (1.30) | (0.76) | (-0.54) | (-0.71) |
| *Tyield_1Y* | 0.1405 | -0.0184 | 0.0702 | 0.0213 | 0.1608 | 0.1389 |
| | (0.57) | (-0.07) | (0.92) | (0.29) | (1.30) | (0.97) |
| *term_spread* | 0.0060 | -0.2121 | 0.0978 | 0.0275 | 0.1822 | 0.1668 |
| | (0.01) | (-0.49) | (0.73) | (0.21) | (0.98) | (0.74) |
| *DSL* | 0.0210 | 0.0061 | -0.0025 | -0.0022 | 0.0032 | 0.0301 |
| | (1.13) | (0.35) | (-0.44) | (-0.57) | (0.19) | (0.62) |
| *Uncertainty* | 0.5209** | 0.4859** | 0.1213** | 0.1024* | 0.0894 | 0.1189 |
| | (2.51) | (2.19) | (2.14) | (1.85) | (1.21) | (1.46) |
| *credit_spread* | 0.9179*** | 1.0782*** | 0.1178 | 0.1843** | -0.1543 | -0.0178 |
| | (3.55) | (3.97) | (1.50) | (2.60) | (-1.25) | (-0.14) |
| *Year trend* | YES | YES | YES | YES | YES | YES |
| *Quarterly dummy* | NO | YES | NO | YES | NO | YES |
| *Constant* | -582.5974** | -467.9656** | 128.3023* | 89.8485* | 155.6085 | -147.6451 |
| | (-2.33) | (-2.14) | (1.97) | (1.80) | (1.08) | (-0.30) |
| Observations | 72 | 72 | 72 | 72 | 50 | 50 |
| R-squared | 0.974 | 0.977 | 0.180 | 0.310 | 0.336 | 0.421 |

**Table 4 : Using the 2017 *provision* for identification (aggregated industry level evidence)**

The following table shows the coefficients of the second stage regression. We provide additional empirical evidence of banks' catering to MMFs by incorporating the interaction term of *Post*×*MMF,* where *Post* is a dummy variable that equals 1 after the transmission period of the *provision* and 0 before the announcement of this policy. The dependent variable in columns (1) and (2) is *NTR*, which serves as a measure of banks' quantity catering. In column (1), we control for a linear time trend and additional control variables, while in column (2), we further incorporate quarterly dummies. The dependent variables in column (3) and (4), as well as column (5) and (6), are *Yield_spread(AAA)* and *Yield_spread(AA)*, respectively. These variables serve to measure banks' yields catering. In column (3) and (5), time trend and other control variables are controlled, while in column (4) and (6), quarterly dummies are further included to address seasonality issues. The results use robust standard errors and t-statistics are in brackets. Starred coefficients indicate statistical significance at one percent (***), five percent (**), and ten percent (*).

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| VARIABLES | *NTR* | *NTR* | *Yield_spread(AAA)* | *Yield_spread(AAA)* | *Yield_spread(AA)* | *Yield_spread(AA)* |
| *MMF* | 0.3702*** | 0.3774*** | 0.0077 | 0.0034 | -0.0055 | 0.0020 |
| | (19.18) | (21.58) | (1.34) | (0.54) | (-0.12) | (0.04) |
| *Post × MMF* | -0.0602*** | -0.0575*** | -0.0111*** | -0.0105*** | 0.0001 | -0.0029 |
| | (-6.95) | (-7.62) | (-3.88) | (-3.41) | (0.01) | (-0.28) |
| *Tyield_1Y* | 0.7201*** | 0.5885** | 0.1818** | 0.1354* | 0.1170 | 0.0857 |
| | (3.20) | (2.54) | (2.30) | (1.87) | (0.86) | (0.58) |
| *term_spread* | 1.0727*** | 0.8833** | 0.2920** | 0.2090 | 0.0848 | 0.0826 |
| | (2.68) | (2.20) | (2.00) | (1.45) | (0.43) | (0.35) |
| *DSL* | 0.0250* | 0.0124 | -0.0014 | 0.0000 | 0.0003 | 0.0176 |
| | (1.74) | (1.05) | (-0.25) | (0.00) | (0.01) | (0.27) |
| *Uncertainty* | 0.6252*** | 0.6081*** | 0.1509** | 0.1529** | 0.1256 | 0.2018 |
| | (3.34) | (2.95) | (2.30) | (2.57) | (0.80) | (1.35) |
| *credit_spread* | 0.5135** | 0.6323** | 0.0402 | 0.0927 | -0.1959 | -0.0500 |
| | (2.16) | (2.38) | (0.44) | (1.11) | (-1.45) | (-0.35) |
| *Year trend* | YES | YES | YES | YES | YES | YES |
| *Quarterly Dummy* | NO | YES | NO | YES | NO | YES |
| *Constant* | -1,139.2808*** | -996.9216*** | 25.9081 | -6.8839 | 218.7786 | -14.1592 |
| | (-6.15) | (-6.24) | (0.39) | (-0.13) | (1.35) | (-0.02) |
| Observations | 68 | 68 | 68 | 68 | 46 | 46 |
| R-squared | 0.984 | 0.986 | 0.371 | 0.499 | 0.356 | 0.425 |

**Table 5: Moderating effects of bank liquidity pressure on banks' catering (aggregated industry level evidence)**

The following table shows the coefficients of the second stage regression. The interaction term is constructed as *excess_Reserve* ×*MMF. excess_Reserve* is the excess reserve ratio disclosed by PBOC. We control for year trend and quarterly dummies in all the models. The results use robust standard errors and t-statistics are in brackets. Starred coefficients indicate statistical significance at one percent (***), five percent (**), and ten percent (*).

| | (1) | (2) | (3) |
|---|---|---|---|
| VARIABLES | *NTR* | *Yield_spread (AAA)* | *Yield_spread (AA)* |
| *MMF* | 0.4562*** | 0.0308** | -0.0207 |
| | (9.79) | (2.17) | (-0.54) |
| *excess_Reserve × MMF* | -0.0527*** | -0.0165*** | 0.0032 |
| | (-2.71) | (-3.15) | (0.38) |
| *Tyield_1Y* | 0.0724 | 0.0497 | 0.1541 |
| | (0.28) | (0.70) | (0.98) |
| *term_spread* | 0.0279 | 0.1027 | 0.1808 |
| | (0.07) | (0.78) | (0.79) |
| *DSL* | 0.0165 | 0.0011 | 0.0241 |
| | (1.22) | (0.31) | (0.51) |
| *Uncertainty* | 0.7602*** | 0.1882*** | 0.0942 |
| | (3.73) | (3.96) | (0.97) |
| *credit_spread* | 0.8368*** | 0.1087 | -0.0413 |
| | (3.34) | (1.42) | (-0.25) |
| *Year trend* | YES | YES | YES |
| *Quarterly dummy* | YES | YES | YES |
| *Constant* | -548.0760*** | 64.7695 | -72.7988 |
| | (-3.22) | (1.31) | (-0.15) |
| Observations | 72 | 72 | 50 |
| R-squared | 0.982 | 0.334 | 0.462 |

**Table 6: Banks' catering and MMFs demand in NCDs (bank-year level evidence)**

The coefficients of the second stage regression are shown in the following table. The results of the first stage are listed in Appendix A.5. Panel A, Panel B, Panel C, and Panel D provide evidence on banks' quantity and yields for the full sample, Tier 2 banks, Tier 1 banks, and Tier 3 banks respectively. *Post* × *MMF* is the interaction term, where *Post* is a dummy variable that equals 1 since 2018 and 0 otherwise. The values of *Post* × *MMF* for Tier 3 banks are missing because the *provision* forbid MMFs from holding NCDs issued by Tier 3 banks anymore( *Post* × *MMF =0)* . The results use robust standard errors and t-statistics are in brackets. The first stage results are listed in appendix A.5. Starred coefficients indicate statistical significance at one percent (***), five percent (**), and ten percent (*). All the models are clustered by bank.

| | **Panel A** | | **Panel B** | |
|---|---|---|---|---|
| | Full Sample | | Tier 2 | |
| | (1) | (2) | (7) | (8) |
| VARIABLES | NTL | Yield_spread | NTL | Yield_spread |
| *MMF* | 3.931*** | 0.049*** | 2.821*** | 0.029* |
| | (3.82) | (2.70) | (3.01) | (1.73) |
| *Post × MMF* | -3.025*** | -0.042*** | -2.312*** | -0.028* |
| | (-3.67) | (-2.86) | (-2.82) | (-1.91) |
| *size* | -0.038 | -0.182 | -0.626 | -1.134* |
| | (-0.31) | (-0.57) | (-1.53) | (-1.89) |
| *LOANDEP_C* | 1.167*** | 0.657 | 1.189** | 0.395 |
| | (3.19) | (0.93) | (2.05) | (0.39) |
| *adequacy* | 0.010 | 0.040 | 0.025 | 0.060 |
| | (0.98) | (1.43) | (0.95) | (1.55) |
| *NPL* | 0.011 | 0.081* | -0.020 | 0.126** |
| | (0.68) | (1.68) | (-0.44) | (2.01) |
| *leverage* | 0.004 | 0.016 | 0.014 | 0.011 |
| | (0.56) | (0.84) | (0.82) | (0.36) |
| *ROA* | 0.112 | -0.096 | 0.019 | -0.180 |
| | (1.42) | (-0.46) | (0.13) | (-0.63) |
| *lnGDP* | 0.581** | 1.740*** | 1.623** | 3.070*** |
| | (2.18) | (2.65) | (2.12) | (2.67) |
| Bank FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |
| Observations | 1,481 | 1,185 | 478 | 462 |
| R-squared | -14.681 | -1.024 | -11.281 | -0.367 |
| Unique banks | 262 | 231 | 80 | 79 |

| | Panel C | | Panel D | |
|---|---|---|---|---|
| | Tier 1 | | Tier 3 | |
| | (1) | (2) | (3) | (4) |
| VARIABLES | NTL | Yield_spread | NTL | Yield_spread |
| *MMF* | -0.626 | -0.014 | 1.260*** | 0.001 |
| | (-1.23) | (-0.64) | (3.86) | (0.19) |
| *Post × MMF* | 0.563 | 0.009 | - | - |
| | (1.32) | (0.47) | - | - |
| *size* | 0.158 | 0.112 | 0.183 | 1.142* |
| | (0.69) | (0.08) | (0.58) | (1.86) |
| *LOANDEP_C* | 0.393 | 0.581 | 0.590 | 0.120 |
| | (1.41) | (0.63) | (1.32) | (0.14) |
| *adequacy* | -0.045 | -0.195 | -0.008 | 0.074 |
| | (-1.10) | (-0.94) | (-0.32) | (1.44) |
| *NPL* | 0.026 | 0.468*** | 0.036 | 0.161** |
| | (0.53) | (3.89) | (1.27) | (2.22) |
| *leverage* | -0.049* | -0.088 | -0.003 | 0.042 |
| | (-1.72) | (-0.59) | (-0.22) | (0.88) |
| *ROA* | -0.253 | -0.381 | -0.270 | -0.911** |
| | (-0.86) | (-0.22) | (-1.17) | (-2.48) |
| *lnGDP* | 0.208 | 1.576 | -0.345 | -0.986 |
| | (0.82) | (0.99) | (-0.86) | (-0.86) |
| Bank FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |
| Observations | 106 | 101 | 169 | 158 |
| R-squared | -3.529 | -0.085 | -2.031 | 0.077 |
| Unique banks | 18 | 18 | 47 | 46 |

**Table 7: Using the 2017 *provision* for identification (DID models)**

This table shows the second stage results of FE-2SLS by using difference in differences model. We construct the DID term equals to h*igh_reliance*×*post,* where *high_reliance* equals 1 if the *reliance* of bank *i* in year *t* exceeds the 25th percentile of *reliance* and 0 otherwise. *post* is a dummy variable that equals 1 after the implementation of the *provision* in 2017 and 0 otherwise.We present the results of the full sample in columns (1) and (2), followed by the results excluding Tier 2 banks in columns (3) and (4). The results use robust standard errors and t-statistics are in brackets. Starred coefficients indicate statistical significance at one percent (***), five percent (**), and ten percent (*). All the models are clustered by bank.

| | Full Sample | | Excluding Tier 2 banks | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| VARIABLES | *NTL* | *Yield_spread* | *NTL* | *Yield_spread* |
| *MMF* | 2.710*** | 0.031*** | 5.404** | 0.074* |
| | (3.86) | (2.67) | (2.05) | (1.67) |
| *high_reliance × post* | -64.538*** | -0.876*** | -305.523** | -4.504* |
| | (-3.37) | (-2.80) | (-2.12) | (-1.78) |
| *size* | 0.106 | 0.098 | 0.063 | 0.371 |
| | (1.10) | (0.36) | (0.78) | (0.98) |
| *LOANDEP_C* | 0.876*** | 0.213 | 0.307* | -1.235** |
| | (3.13) | (0.40) | (1.80) | (-2.33) |
| *adequacy* | -0.002 | 0.018 | -0.003 | 0.019 |
| | (-0.25) | (0.79) | (-0.34) | (0.62) |
| *NPL* | -0.003 | 0.056 | 0.019 | 0.071 |
| | (-0.23) | (1.34) | (1.35) | (1.36) |
| *leverage* | -0.003 | -0.002 | -0.009** | -0.004 |
| | (-0.51) | (-0.14) | (-2.01) | (-0.25) |
| *ROA* | 0.054 | -0.239 | -0.033 | -0.475*** |
| | (0.82) | (-1.38) | (-0.54) | (-2.74) |
| *lnGDP* | 0.247 | 1.055** | 0.039 | 0.307 |
| | (1.38) | (2.24) | (0.32) | (0.54) |
| Bank FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |
| Observations | 1,481 | 1,185 | 911 | 628 |
| unique banks | 262 | 231 | 196 | 162 |

**Table 8: Difference in differences models based on the reduction of bargaining power**

This table shows the second stage results of FE-2SLS by using difference in differences models. Column (1) and (2) shows the results of the full sample and column (3) and (4) shows the results of Tier 2 banks. *treat* is a dummy variable that equals to 1 if the reduction of *HHI* is higher than the median and 0 otherwise. *post* is a dummy variable that equals 1 after the implementation of the *provision* and 0 otherwise. Starred coefficients indicate statistical significance at one percent (***), five percent (**), and ten percent (*). All the models are clustered by bank.

| | Full sample | | Tier 2 banks | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| VARIABLES | *NTL* | *Yield_spread* | *NTL* | *Yield_spread* |
| *MMF* | 2.347*** | 0.026*** | 1.437*** | 0.004 |
| | (3.98) | (2.64) | (3.23) | (0.42) |
| *treat × post* | -8.594 | -0.153* | -8.879 | -0.299*** |
| | (-1.61) | (-1.75) | (-1.36) | (-3.33) |
| *size* | 0.083 | 0.050 | -0.092 | -0.360 |
| | (0.99) | (0.19) | (-0.60) | (-1.21) |
| *LOANDEP* | 0.446** | -0.403 | 0.352 | -0.047 |
| | (2.56) | (-0.99) | (1.44) | (-0.09) |
| *adequacy* | -0.004 | 0.016 | 0.005 | 0.051 |
| | (-0.62) | (0.76) | (0.45) | (1.63) |
| *NPL* | -0.007 | 0.042 | -0.021 | 0.153*** |
| | (-0.59) | (1.04) | (-0.66) | (3.21) |
| *leverage* | -0.009 | -0.016 | -0.001 | -0.034 |
| | (-1.60) | (-1.09) | (-0.07) | (-1.56) |
| *ROA* | 0.023 | -0.299* | -0.039 | 0.016 |
| | (0.42) | (-1.92) | (-0.34) | (0.09) |
| *lnGDP* | 0.057 | 0.750* | 0.104 | 1.634*** |
| | (0.41) | (1.79) | (0.36) | (3.20) |
| Bank FE | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES |
| Observations | 1,481 | 1,185 | 412 | 402 |
| Unique banks | 262 | 231 | 80 | 79 |

## Appendix

### *A.1 Variable definitions*

| **Panel A**<br>**Longitudinal dataset** | | |
|---|---|---|
| Variable | Data definition | Data source |
| **Dependent variables** | | |
| *NTR (%)* | The total amount of NCDs outstanding at the end of the month, scaled by to the total amount of bond securities outstanding at the end of the previous month. | SHANGHAI CLEARING HOUSE and China Central Depository & Clearing |
| *Yield_spread(AAA)(%)* | The difference between the yields to maturity of 6-month NCDs issued by AAA-rated banks and the corresponding 30-day moving average of Shibor for a duration of 6 months. | NATIONAL INTERBANK FUNDING CENTER |
| *Yield_spread(AA)(%)* | The difference between the yields to maturity of 6-month NCDs issued by AA-rated banks and the corresponding 30-day moving average of Shibor for a duration of 6 months. | NATIONAL INTERBANK FUNDING CENTER |
| **Independent variable** | | |

| | | |
|---|---|---|
| *MMF (%)* | The ratio between the amount of NCDs hold by MMFs and the total amount of NCDs outstanding. | SHANGHAI CLEARING HOUSE and China Central Depository & Clearing |
| **Controls** | | |
| *DSL (%)* | The ratio between the total amounts of 1-year Treasury bonds and the overall amount of Treasury bonds | China Central Depository & Clearing |
| *Credit_spread (%)* | Yields of 1-year AA rated commercial papers minus the yields of 1-year treasury bonds. | CBIRC |
| *TYield_1Y (%)* | The yields of 1-year treasury bonds. | CBIRC |
| *Term_spread (%)* | The difference between the yields of 10-year Treasury bonds and the yields of 1-year Treasury bonds. | CBIRC |
| *Uncertainty* | The natural logarithm of China EPU Index based on the South China Morning Post | Baker et al. (2013), Baker et al. (2016) https://www.policyuncertainty.com/china_epu.html |
| **Panel B**<br>**Panel dataset** | | |
| **Dependent variables** | | |
| *NTL (%)* | The total amount of NCDs issued by bank *i* in year *t* over total liabilities of bank *i* in year *t*. | RESSET |

| | | |
|---|---|---|
| *Yield_spread(%)* | The difference between the weighted yields of NCDs issued by bank *i* in year *t* and the annual average of Shibor with a 6-month duration. | RESSET |
| **Independent variable** | | |
| *MMF (%)* | The total amount of NCDs hold by MMFs divided by the total amount of NCDs issued by bank *i* in year *t*. | RESSET |
| **Controls** | | CSMAR and hand collected |
| *Leverage (%)* | Total assets scaled by total equity. | CSMAR and hand collected |
| *NPL (%)* | Non-performing loans scaled by total loans. | CSMAR and hand collected |
| *Adequacy (%)* | Capital Adequacy Ratio (core capital divided by weighted risk assets). | CSMAR and hand collected |
| *ROA (%)* | Net income scaled by total assets | CSMAR and hand collected |
| *Size* | End-of-year total assets (in log term) | CSMAR and hand collected |
| *LOANDEP* | Total loans divided by total deposits. | CSMAR and hand collected |
| *lnGDP* | The logarithm of province level GDP based on bank's headquarter location (in 0.1 billion RMB). | National Bureau of Statistics of China |

### *A.2: Banks catering with MMFs allocating more money into MMFs*

This section provides a simple static model to clarify a key conceptual issue of banks' quantity yields catering.

Suppose in an economy that only have banks and MMFs and both make decisions by realizing the maximum profit.

Given bank in China mainly rely on term deposits, NCDs and interbank market borrowing. Therefore, the cost of banks can be written as:

$$Cost_{banks} = R_{termdeposits} \cdot D_{termdeposits} + R_{NCDs} \cdot D_{NCDsupply} + C1\#(1)$$

Where, $R_{termdeposits}$ is the interest rate for term deposit, $R_{NCDs}$ is the yields a bank offers for NCD. $D_{termdeposits}$and $D_{NCDsupply}$ are the total amounts of term deposits and NCDs supply and $C1$ is the other cost, which be regarded as a constant here.

Equation (1) means the total cost of bank equals to the expense of interests of term deposits and NCDs and other expenses (interbank borrowing, dividend, management, to name a few) that can be regarded as constant (*C1*) in this case.

While the revenue for banks is

$$Revenue_{banks} = R_{Loan} \cdot \left[D_{NCDsupply} + (1 - r) \cdot D_{termdeposits}\right]\#(2)$$

Where, *r* is the reserve ratio and $R_{Loan}$ is the loan rate.

Suppose loans is the only source of income for banks. Therefore, we get the profit of banks by (2)-(1):

$$Profit_{banks} = R_{Loans} \cdot [D_{NCDsupply} + (1 - r) \cdot D_{termDeposits} - R_{NCDSupply} \cdot D_{NCDSupply} - R_{termDeposits} \cdot D_{termDeposits}]\#(3)$$

Suppose MMFs are risk-averse investors and mainly invest money in MMFs or term deposits (as shown in Figure 6). Thus, the profit for

MMFs can be represented as:

$$Profit_{MMFs} = R_{NCDs} \cdot \varphi \cdot D_{NCDsbuy} + (1-\varphi) \cdot R_{termDeposits} \cdot D_{termDeposits} \#(4)$$

Where, $R_{NCDs}$ is the return of NCDs, $\varphi$ is the ratio of NCDs in MMF's investment portfolio and $D_{termDeposits}$ is the term deposits of MMFs.

In the equilibrium, deposits demand equals to deposits supple, therefore,

$$D_{total} = D_{NCDSupply} + D_{termDeposit} + C2 \#(5)$$

Where, $D_{total}$ is the total deposits and *C2* includes other financing method with limited amounts.

Therefore, NCD supply can be written as:

$$D_{NCDSupply} = D_{Total} - \frac{Profit_{MMFs}}{R_{NCDs} \cdot \varphi + (1-\varphi) \cdot R_{termDeposit}} - C2 \#(6)$$

Therefore,

$$\frac{\partial D_{NCDSupply}}{\partial \varphi} = 0 - \frac{0 - \left(R_{NCDS} - R_{termDeposits}\right)}{\left(R_{NCDS} \cdot \varphi + R_{termDeposits} \cdot (1-\varphi)\right)^2} \#(7)$$

Which illustrates that as long is the return of NCDs is higher than term deposits, banks NCDs supply would increase with MMFs' increased demand in NCDs.

Similarly, from equation (1), we got

$$D_{NCDSupply} = \frac{Cost_{banks} - R_{termDeposits} \cdot D_{termDeposits}}{R_{NCDs}} \#(8)$$

Taking equation (8) to equation (5),

$$R_{NCDSupply} = \frac{(Cost_{banks} - D_{termDeposits} \cdot R_{termDeposits}) \cdot (R_{NCDs} \cdot \varphi + R_D \cdot (1 - \varphi)}{R_{NCDs} \cdot \varphi + R_D(1 - \varphi)D_{termDeposits} - Profit_{MMFs}} \#(9)$$

After simplifying and organizing, $\frac{\partial R_{NCDSupply}}{\partial \varphi} > 0$ if the return of MMFs is higher than term deposits.

### *A.3 More detailed data source and comparison with information disclosed by CBIRC*

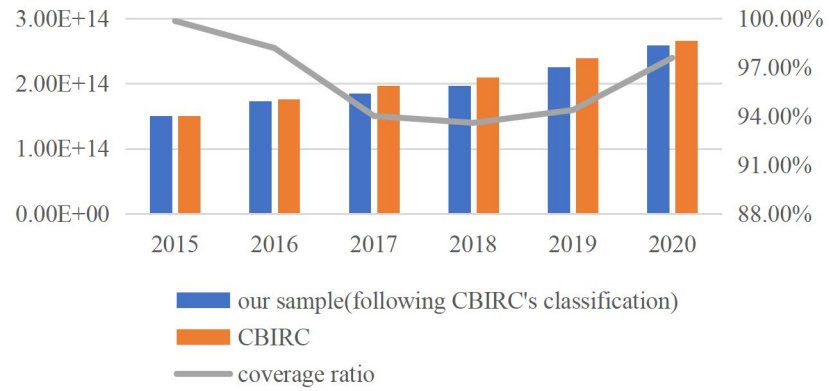
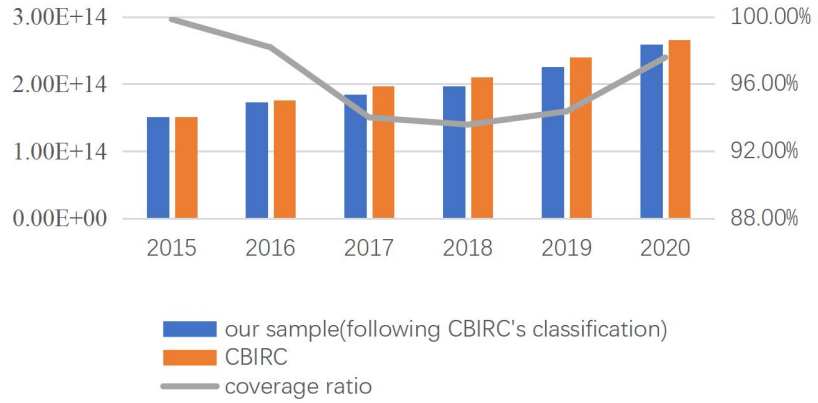
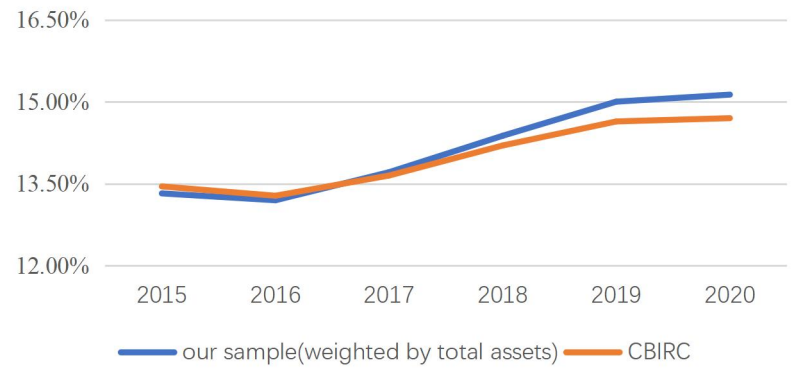
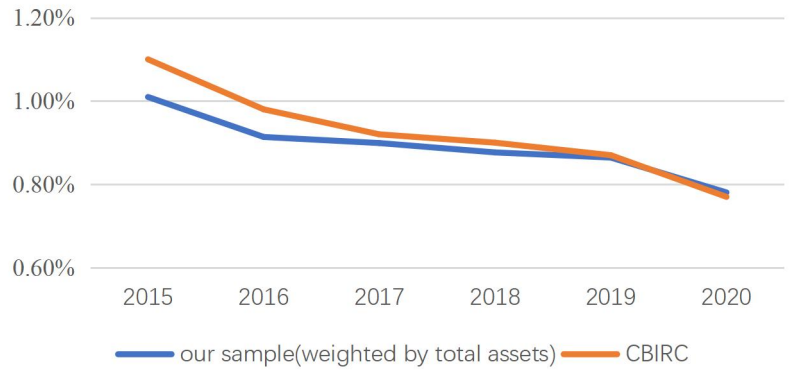
Table A.3.1: Our dataset

| | unique banks | observations |
|---|---|---|
| data from CSMAR | 478 | 2516 |
| added | 4 | 22 |
| lack data | -80 | -326 |
| policy banks | -3 | -18 |
| foreign bank | -32 | -173 |
| village banks(村镇银行及合作社) | -97 | -484 |
| privately-owned banks（民营银行） | 0 | 0 |
| less than 3 years of data or lack important data | -31 | -54 |
| In total | 263 | 1483 |

Table A.3.2: Bank types

| | Big 6 | Nationwide banks | City banks | Rural banks | Unique banks |
|---|---|---|---|---|---|
| 2015 | 6 | 12 | 113 | 106 | 237 |
| 2016 | 6 | 12 | 116 | 111 | 245 |
| 2017 | 6 | 11 | 118 | 122 | 257 |
| 2018 | 6 | 11 | 116 | 119 | 252 |
| 2019 | 6 | 12 | 116 | 121 | 255 |
| 2020 | 6 | 12 | 107 | 113 | 238 |

Table A.3.3: comparison with information disclosed by CBIRC

| Graph A: Total assets (in RMB) | Graph B: Total liabilities (in RMB) |
|---|---|
|  |  |
| **Graph B: Adequacy ratio** | **Graph D: ROA** |
|  |  |

## *A.4 First Stage regression results of 2SLS regression in Table 3*

This table shows the results of the first stage results of the IV regression for the longitudinal dataset. The instrument variable is *equityFund*.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | First Stage results of column (1) and (3) in Table 3 | First Stage results of column (2) and (4) in Table 3 | First Stage results of column (5) in Table 3 | First Stage results of column (6) in Table 3 |
| VARIABLES | *MMF* | *MMF* | *MMF* | *MMF* |
| *equityFund* | -75.6550*** | -76.2216*** | -171.1054*** | -168.9746*** |
| | (-9.74) | (-9.73) | (-4.62) | (-4.45) |
| *Tyield_1Y* | 1.8685 | 1.9524 | 0.9961 | 0.6320 |
| | (1.50) | (1.44) | (0.51) | (0.30) |
| *term_spread* | -1.9185 | -1.8858 | 0.0156 | -0.6568 |
| | (-0.79) | (-0.79) | (0.00) | (-0.18) |
| *DSL* | 0.0460 | 0.0417 | -0.0861 | 0.2297 |
| | (0.59) | (0.51) | (-0.37) | (0.53) |
| *Uncertainty* | 1.1567 | 1.2081 | 0.7057 | 0.8440 |
| | (1.25) | (1.22) | (0.63) | (0.76) |
| *credit_spread* | 2.3914** | 2.2673* | 0.5330 | 1.1563 |
| | (2.19) | (1.91) | (0.39) | (0.80) |
| Year trend | YES | YES | YES | YES |
| Quarterly dummy | NO | YES | NO | YES |
| Constant | -3,381.6028*** | -3,279.8660*** | -838.8321 | -4,101.1426 |
| | (-3.37) | (-3.31) | (-0.42) | (-0.97) |
| Observations | 72 | 72 | 50 | 50 |

## *A.5 First Stage regression results of FE-2SLS regression in Table 6*

This table shows the results of the first stage results of the IV regression for the panel dataset. The instrument variable is *equityFund*.

| | Full sample | | Tier 1 | | Tier 2 | | Tier 3 | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (1) | (2) | (1) | (2) | (1) | (2) |
| | *MMF* | *MMF* | *MMF* | *MMF* | *MMF* | *MMF* | *MMF* | *MMF* |
| *equityFund* | -0.009*** | -0.011*** | 0.018 | -0.053** | -0.011* | -0.011* | -0.039** | -0.039** |
| | (-3.83) | (-3.53) | (1.29) | (-2.40) | (-1.96) | (-1.95) | (-2.33) | (-2.22) |
| *Post × MMF* | 0.775*** | 0.796*** | 0.850*** | 0.934*** | 0.814*** | 0.829*** | - | - |
| | (25.87) | (27.01) | (13.31) | (36.19) | (22.94) | (25.95) | - | - |
| *size* | 0.056** | 0.083** | 0.221 | -0.087 | 0.164* | 0.159* | 0.115 | 0.103 |
| | (2.12) | (2.02) | (0.87) | (-0.50) | (1.86) | (1.78) | (0.92) | (0.76) |
| *LOANDEP_C* | -0.230*** | -0.264*** | -0.006 | 0.615 | -0.343** | -0.217 | -0.023 | -0.063 |
| | (-3.68) | (-3.40) | (-0.02) | (1.01) | (-2.07) | (-1.44) | (-0.08) | (-0.23) |
| *adequacy* | -0.005* | -0.006* | -0.053* | 0.037 | -0.010 | -0.023** | -0.004 | -0.006 |
| | (-1.88) | (-1.79) | (-1.68) | (1.38) | (-1.21) | (-2.38) | (-0.30) | (-0.51) |
| *NPL* | -0.005 | -0.005 | 0.049 | 0.217*** | -0.012 | -0.012 | -0.030** | -0.027* |
| | (-1.21) | (-0.60) | (0.78) | (5.16) | (-0.69) | (-0.68) | (-2.22) | (-1.73) |
| *leverage* | -0.000 | -0.003 | -0.071*** | -0.005 | -0.002 | -0.008 | 0.013 | 0.010 |
| | (-0.17) | (-1.00) | (-2.75) | (-0.32) | (-0.46) | (-1.58) | (1.34) | (0.98) |
| *ROA* | -0.029 | -0.053** | -0.442 | 0.184 | -0.032 | -0.038 | 0.130 | 0.070 |
| | (-1.63) | (-2.19) | (-1.47) | (1.08) | (-0.55) | (-0.71) | (1.14) | (0.59) |
| *lnGDP* | -0.167*** | -0.245*** | 0.315 | 0.093 | -0.478*** | -0.471*** | -0.099 | -0.106 |
| | (-3.54) | (-3.62) | (1.16) | (0.54) | (-2.79) | (-2.65) | (-0.52) | (-0.50) |
| *Bank FE* | YES | YES | YES | YES | YES | YES | YES | YES |
| *Year FE* | YES | YES | YES | YES | YES | YES | YES | YES |
| Observations | 1,480 | 1,184 | 106 | 101 | 476 | 532 | 169 | 158 |
| Unique banks | 262 | 231 | 18 | 18 | 103 | 113 | 47 | 46 |