

# **Banks Asset, Money Creation, and Market Preferences: Evidence from Banks' Commercial Paper Issuance**

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This Version: December 2022

## **Abstract**

In this study, we empirically examine the market's preference for banks' money creation using the primary market data on Negotiable European Commercial Paper issuance in France. Our findings indicate that when money markets invest in banks' short-term debts, they prefer banks that keep their short-term debt independent from equity variations, i.e., separate their liquidity management from asset-liability management. We propose an agency problem as a potential explanation for this preference and present an empirical setting for observing the market's monitoring of this issue. We evaluate market preferences during the regulatory reforms of money market funds in France and the COVID-19 pandemic and find that they remain persistent. Additionally, we find that banks that have experienced restrictions in the short-term debt market signal the quality of their balance sheets through discretionary capital management.

Keywords: Short-term debt; bank capital structure; commercial paper; money market funds; regulation.

JEL classification: G21, G23, G28, G32, D82

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For their valuable comments and suggestions, I am grateful to Gilles Chemla, Serge Darolles, Pasquale Della Corte, Jerome Dugast, Zoran Filipovic, Rajna Gibson, Edith Ginglinger, Carole Gresse, Javier Gil-Bazo, Gyöngyi Lóránth, Tamara Nefedova, Marios Panayides, Fabrice Riva, Lian Shi, Katrin Tinn.

# **Banks Asset, Money Creation, and Market Preferences: Evidence from Banks' Commercial Paper Issuance**

## **1. Introduction**

In March and April 2020, the European commercial paper market had a run-like interruption. This episode, in particular, was not characterized by a decline in the Commercial Paper (CP) issuers' credit quality but rather a liquidity deficiency. The Money Market Funds (MMFs) had to maintain their Weekly Liquid Asset (WLA) levels, which led them to try to sell portions of their portfolio holdings in secondary markets. Facing the market request for liquidity, some banks bought back their CPs while others could not bid back their CPs, mentioning balance sheet constraints<sup>1</sup>. In this paper, we evaluate whether CP market investors, before these events, had examined the banks for these eventualities. We are especially interested to understand whether MMFs previously evaluated the issuing banks' likelihood of linking their CP issuances to their balance sheets before investing in them. Furthermore, if they were aware of the issuer's type, did they show their preferences when they bought banks' CPs in the primary market?

We investigate whether institutional investors that invest in the short-term debt of the banks monitor the issuing banks for the connection of their liquidity management operations to asset-liability management. Such a connection raises a specific agency problem between short-term creditors and shareholders. We describe this specific agency problem and the strategy to observe it in more detail. To observe whether the short-term creditors monitor the banks, we investigate a period of regulatory shock during MMFs reforms in France; during this period, MMFs had to reauthorize and commit to minimum WLA requirements and some other significant structural changes. Effectively the reforms have reduced the MMFs' abilities to participate in the CP market<sup>2</sup>; this has been an exogenous shock to the aggregate demand for short-term securities. During the MMFs reauthorization period, i.e., the second half of 2018, some banks have been less successful in issuing new CPs, while others have not been affected or even increased their monthly issuance. We compare the banks in this period to observe whether market participants, when they show preference, monitor the mentioned agency problem. Then, we evaluate the banks' reaction for gaining market confidence after the restrictions imposed by the MMFs. We evaluate how banks signal quality; specifically, we evaluate the accounting measurements that report critical information regarding banks' assets. Our findings suggest that the banks are likely to respond with discretionary asset management.

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<sup>1</sup> For further details about this event, refer to, <https://www.icmagroup.org/assets/documents/Regulatory/CP/ICMA-CPC-white-paper-The-European-Commercial-Paper-and-Certificates-of-Deposit-Market-September-2021-290921.pdf>

<sup>2</sup> For the related details and the literature on the unintended reduction of supply of liquidity due to MMF reforms refer to section 1.1, institutional background.

Furthermore, we extend the analyses of the two groups of banks and evaluate their performance in the CP market during the COVID-19 crisis and consequent flight to liquidity in the money markets. We are interested in understanding whether the observed market preferences could predict their actions during a crisis. Effectively, we evaluate the predictability of a bank facing market restriction during this episode, given that it had faced a similar problem during the MMF reforms.

Banks can raise liability because their creditors delegate investment monitoring. Banks' liabilities in a market economy are subject to market mediations through pricing, volume, or other features and optionalities. The banks' creditors invest in their liabilities because they have limited monitoring power over the profitable projects that receive banks' lending (Diamond and Dybvig (1983); Diamond and Rajan (2000); Diamond and Rajan (2001)). Among the banks' liabilities, short-term debt has the most exposure to market mediations, and due to its higher exposure to market mediation, could be susceptible to bank-run (Gorton (2020)). Recent literature underlines the similarity between short-term debt securities and demand deposits; e.g., Merton and Thakor (2019) offer a formal theory of the evolution of financial intermediaries' depositors and short-term investors. From a policy point of view, demand deposit claimants are the only group of short-term creditors protected by deposit insurance. However, they could also be considered the least informed in monitoring the banks efficiently (Gorton and Pennacchi (1990)). In this paper, specifically, we focus on the banks' commercial paper issuance, i.e., we analyze banks' CP issuance in the French CP, or Negotiable European Commercial Paper (NEU CP) program, 75% of the securities traded in the NEU CP market are in the primary market.

Short-term debt investors have uncertain consumption immediacies; thus, upon investment in banks' short-term debt securities, they perceive them to be money-like and preserve constant face value over short periods (Gennaioli, Shleifer, and Vishny (2013)). Failures to preserve the constant face value of short-term securities expose the security holders to possible frictions in the market, such as information asymmetry. By isolating cash flow information of the assets backing the short-term securities, banks could preserve securities' constant face value and disincentivize the securities holders from producing private information about their associated payoffs (Dang, Gorton, Holmström, and Ordoñez (2017); Dang, Gorton, and Holmström (2020); Dang, Gorton, and Holmström (2013)). Almost all types of Short-term debt issued by banks have this characteristic by promising safe portfolios of loans or bonds as collateral.

A bank run could occur when banks undertake riskier projects, e.g., by making riskier loans or investing in riskier bonds, or when they cannot diversify appropriately (Diamond and Dybvig (1983)). Banks must commit their own equity to insure the risk of their activities. However, an inherent agency problem arises between shareholders and creditors once equity is committed. While equity is intended to act as a safety buffer in case of nonperformance of the banks' investments, the preservation and augmentation of the

residual value of committed equity incentivize the shareholders and the bank's management through their compensation structures. Furthermore, through equity, managers have access to a capital buffer that includes discretionary items on the bank's balance sheet, e.g., managers could delay write-down, adjust loan loss provisions, or change the category of security holdings between trading, available for sale, or held to maturity within the allowed accounting and regulatory scopes for discretion.

Accounting measurements are essential governance tools (Plantin and Tirole (2018)). Banks' management could engage in risk transfer for the benefit of equity holders. In concept, if we consider a bank's balance sheet as a portfolio of long and short positions, as could be inferred from the bank's asset-liability management operations, it is possible to consider two ways in which banks could respond to equity volatility in order to maintain a stable level of equity. First, reducing the maturity mismatch between the two sides of their balance sheet. Although, reducing maturity mismatch is theoretically ideal but has limitations, and it is costly because one of the banks' main functions –and one of the primary sources of profitability of banks– is to transfer maturity. Second, adjust the equity buffer levels. This agency problem is more critical for the banks' short-term creditors. The main reason for this heightened cruciality for short-term creditors is that the cash from issuing short-term debt instruments is also reported as the average netted amount on the bank's balance sheet. Because the average netted liquid assets and committed capital, i.e., equity, are exposed to management's discretionary reporting, practically, there is a fluid boundary between items categorized as short-term debt and reported equity.

The management's incentives or other eventualities could sometimes tilt the mentioned fluid boundary toward preserving the residual value and artificially reporting a stable equity level. Such a treatment of short-term debt could reduce the reliability of the constant face value of short-term securities, i.e., they become information sensitive. Consequently, short-term market participants, if they observe such a treatment of the cash flows associated with their holding securities, value the bank's securities according to private information they could gather about the severity of the issuing bank's underlying investment deficiencies, and particularly the expected incentives and actions of the bank's management. This private information results in the securities' failure to hold constant value, making them uninvestable for short-term investors. In the extreme scenario, the uncertainty about the securities' value could lead short-term investors to run on their investments.

Kacperczyk, Pérignon, and Vuillemey (2021) describe the relationship between short-term securities' issuance and safe asset demand variations during stable and stress periods. Our findings align with their conclusion that short-term debt issuance decreases during market turmoil while confirming the partial resilience of this market, as previously Pérignon, Thesmar, and Vuillemey (2018), have found there was no market-wide freeze in the French certificates of deposit market during the 2008 to 2014 period. We find

that issuer's characteristics are an important determinant for funding dry-up. During stress periods, some banks face market constraints and reduced issuance. Yet, a replacement group of banks exists that partially replaces the supply reduction of safe asset securities, conceivably attributable to the decrease in the securities of the former group. Furthermore, complementing Moreira and Savov (2017), we find that the results are not just attributed to the credit quality, i.e., since the participating banks in the NEU CP program<sup>3</sup> have the highest investment ratings or are legally guaranteed under French law. We show that agency reasons could describe the assignment to one group of banks or the other when the issuers' credit qualities are almost undifferentiable.

Unlike the previous literature that explores the MMF capital flows during the crisis<sup>4</sup>, the access to the security and issuer level characteristics of all the banks' issuances in the NEU CP program allows us to evaluate security and issuers' characteristics when the market faces turmoil. We find that, in one class of securities, i.e., comparable credit banks' CPs, not all banks face similar market constraints during these periods. We show that whether a bank has been in the successful or unsuccessful group is not random. The banks in the two groups are inherently different in governing the CP proceedings; the banks that have been more prone to the discussed agency problem in their asset-liability management have been subject to an average decrease in monthly CP issuance.

Considering there are inherent endogeneities between different accounts on banks' financial reports, our identification strategy relies on the independent and exogenous, to management's discretion, reports of amounts and maturities of the banks' monthly CP issuances from Banque de France. Banque de France publishes the shelf registration information and the details of monthly NEU CP issuance amounts and their maturities. Additionally, we select a period of an exogenous regulatory shock to the aggregate demand for short-term securities. We investigate banks' average monthly CP issuance changes during the MMFs reforms. An externality of the MMF reforms implementation has been their reduced ability to participate in the CP market. We show that in the second half of 2018, i.e., MMFs reform period, banks that have been less successful in issuing new CPs were the banks that conceivably had the mentioned agency problem when governing CP issuance proceedings. We find that the other group of banks that have not been affected or positively affected by increasing average CP issuance significantly differ regarding the mentioned agency problem.

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<sup>3</sup> NEU CPs (ex-French CP) are negotiable debt securities issued to the bearer. They are registered on accounts with authorized intermediaries per the French legislation and regulations in force. The Monetary and Financial Code, under the authority of the Banque de France, governs this financial instrument. The NEU CP program only includes short-term securities with the highest ratings from competent agencies (A1+/P1/F1+) or a first demand guarantee (under French law).

<sup>4</sup> We refer to parts of this literature in section 1.1.

Furthermore, we use an alternative method of classifying banks that face market limitations. In this alternative method, we rely on the observable implication of the theoretical results of Brunnermeier and Oehmke (2013). They describe that when a borrower, i.e., a bank, cannot commit to an aggregate maturity structure, they might have incentives to issue shorter maturity debt to a specific group of investors. However, upon observing this possible favorable treatment, the other investors would demand their securities to be issued with shorter maturity. Brunnermeier and Oehmke (2013) remark that the opaqueness of the banks' balance sheet, frequent funding requirements, and the continuous activity in the CP market are significant barriers for banks to commit to a particular maturity structure. The agency problem we have described is similar to this inability –or unwillingness– to commit to a definite maturity structure. The discretionary adjustments that bank managers make to the reported equity level would artificially reduce the maturity mismatch in asset-liability management. This reach for lower equity variability results from lowering the conceptual equity's duration, eventually decreasing the equity sensitivity to interest rate risks. We show that although not all the bank's creditors might be informed or capable of monitoring and coordinating actions, institutional investors that invest in the bank's CPs monitor the favorite duration treatment of equity by the banks and act as predicted by Brunnermeier and Oehmke (2013).

In our second analysis, we augment our market reaction analyses during the MMF reforms' demand shock by evaluating scattered instances in which some banks issued CPs that fell significantly shorter in maturity than their routine maturity of CP issuances. We specifically look for banks' CP issuances that resulted in an abnormal reduction of average outstanding CPs' portfolio maturity. For this analysis, we identify these instances based on the fact that the average outstanding CPs portfolio maturity would decline by 30 days if a bank did not issue any CP in a particular month; an issuance similar to the bank's routine practice would cause a reduction in average outstanding CP maturity of less than 30 days. However, if the bank faces the market limitation for an unusual maturity reduction, the average maturity of outstanding CPs anomalously decreases. Our findings indicating that CP market participants limit banks with maturity reduction add another dimension through which the markets demonstrate their preferences. We find that whether a bank has an instance of a drastic decrease in maturity in any of its monthly CP issuances - i.e., belonging to the "urgent issuer" group - is not random but rather determined by its behavior in managing the CP proceedings. In line with the previous results, we find that the banks in the urgent issuer group are those whose governance style had undermined short-term creditors' claims and passed CP issuance proceedings to adjust equity variations.

Next, we evaluate the banks' reaction to the demand interruptions following the MMF reforms. During the second half of 2018, MMFs had to go through the reauthorization and commit to the new WLA requirements as part of the reforms. The interruption of regular flows to the CP primary and secondary

markets as an externality of reforms resulting from limiting market participation has heightened the existing market frictions. One explanation for this intensified friction could be the revealed information about the cash holding of the market participants to each other. Malherbe (2014) analyzes the agents' behavior in the secondary market for securities with information asymmetry; the revealed information about cash holding of other market counterparts in his model worsens the adverse selection problem. The aftermath of the MMF reforms did not correspond to a widespread liquidity dry-up; nevertheless, it is conceivable that MMFs, unwantedly hoarded cash. During this period, some MMFs had shown preferences toward the securities of banks that had better isolated the related cash flow information of CP proceeding from their equity fluctuations. Hence when returning to the market, participants realize the existence of the information conceivably even if they did not monitor previously for the same issues. Recovering from a period of heightened market uncertainty requires initiatives and actions to alleviate the heightened frictions. Managing market expectations is the fundamental policy response to crises (Gorton (2015)). However, this specific episode of the MMF reforms did not correspond to a crisis. Hence, there was no or minimal incentive for the central authorities, up to our knowledge, to coordinate actions<sup>5</sup> after the MMF reforms.

In the absence of coordinated actions from central authorities, individual banks that have experienced a decrease in average CP issuance had to address the increased information asymmetry and restore market confidence by managing expectations. Diamond and Rajan (2000) describe that when the bank's capital structure is financed partially by equity, the optimal capital structure trades off three effects of equity, first, the information rents, e.g., those resulting from better monitoring, collection, or diversification skills, second, its buffer against shocks, and third, the ability and willingness to sustain loans portfolio. In their model, higher relative equity serves the purpose of renegotiation in bad times. In contrast, a bank's rigid capital structure consists of *the right quantity* of relative short-term debts and loans, and it is more susceptible to the risks of running in *bad times*. Although, a capital structure with a higher proportion of short-term debt may reduce the informational rent of a less secure bank. Nevertheless, a higher level of equity serves an insurance-like function, as it cannot be negotiated for immediate recovery. As previously noted, the period of reform for MMFs did not coincide with adverse economic conditions –i.e., bad times, but rather was a period of market slowdown due to the implementation of new regulations. Therefore, individual banks arguably needed to exert efforts to restore the market's confidence. One potential means of signaling to the market could be the demonstration of sufficient provisions to ensure the safe recovery of short-term creditors.

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<sup>5</sup> e.g., Gorton (2015) reviews a historical account of the policy responses to banking crisis; or in pre-fed era Gorton and Tallman (2016) coordinated action of the clearinghouses to suppress demand for specific bank information and divert it to demand for systematic risk information.

Previous literature points out several motives for the banks' managers to favorably adjust the discretionary items, e.g., to reflect better their outlooks and future strategies or to meet regulatory or market expectations<sup>6</sup>. We analyze whether banks respond to the lack of confidence in the short-term debt market with discretionary accounting adjustments. Banks, when facing the market discipline, to signal the quality of their unobserved loans portfolio to the market, adjust the values of insurance-like items on their balance sheet –these items, too, eventually would be measured as constituents of equity. For demonstrating higher quality through the described insurance-like mechanism, banks would likely channel the raised discretionary provision values to items that signal capital adequacy corresponding to the risk of lending activities. We perform diff-in-diff analyses and compare the difference of the net impaired loans to equity between the two bank groups and their response after MMF reforms, a lower value of which shows lower non-performing loans against available equity. We also assess the changes of other highly anticipated ratios of the loan loss provision over gross and impaired loans. We find that the banks that have faced market restrictions reported fewer losses against the equity levels, and this ratio seems persistent. Specifically, our observations contradict that banks write off a considerable portion of their non-performing loans or initiate significant new loans. The consistent banks' total assets also have been observed by Pérignon, Thesmar, and Vuillemeys (2018), although they interpret consistent asset levels with banks' ability to evade fire sales. However, a holistic view of changes in banks' accounts makes it more plausible that banks select to signal through discretionary capital management and not real capital management.

Next, we evaluate whether the market participants meet such treatments favorably when there are other confounding problems, i.e., we evaluate markets' reaction to bank CP issuance during the COVID-19 crisis. Allen and Carletti (2008) show that when markets face liquidity crises, asset prices better reflect their liquidity than expected distant cash flows. A central part of their argument is that mark-to-market accounting might not be a proper method for measuring the assets of financial institutions when the financial markets are illiquid. Plantin, Sapra, and Shin (2008) highlight the illiquid nature of a large portion of banks' assets and argue that mark-to-market could lead to inefficient sales in bad times. In an information

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<sup>6</sup> Huizinga and Laeven (2012), examples of some of the most common discretionary asset level adjustment, delaying write-downs, loan loss provisions, and categorization of holding securities between possible options, i.e., trading to AFS to HTM. Beatty and Liao (2014) provides a survey of Banks' discretionary accounting literature. Shen and Chih (2005) compares the severity of earnings management (EM) in banking industry in 48 countries. Cheng and Warfield (2005) outline signaling to equity investors as an incentive for EM, Cheng, Warfield, and Ye (2011) finds the same in banking industry. Balboa, López-Espinosa, and Rubia (2013) finds a nonlinear dynamics of discretionary accruals. Hutton, Marcus, and Tehranian (2009) finds the relationship between banks' EM and their stock return predictability and crashes. Huizinga and Laeven (2019) find procyclicality and discretion of banks accounting practices in Euro area, and BIS (2021) WP 39, provides a thorough literature review on the procyclicality of loan loss provisions and practices, including incurred loss recognition and discretionary accounting, <https://www.bis.org/bcbs/publ/wp39.pdf>. Moreover, the literature highlights that banks with better corporate governance practices are associated with less discretionary accounting, e.g., Fan, Jiang, Zhang, and Zhou (2019) finds less EM associated with the presence of women on the banks' board of directors.



economics framework, Plantin and Tirole (2018) argue that more mark-to-market accounting reduces the informativeness of the price signals and dries up liquidity. Eventually, it is more costly for banks with deteriorated signaling power to overcome agency problems.

Another recent empirical finding suggests the persistence of mutual funds and ETFs' outflow across consistent assets during the stress episode (Sushko and Turner (2018)), i.e., mutual funds and ETFs run on the same assets when faced with stress. We add MMFs to this possible persistence of preference. We find that whether a bank has been subject to reduced CP issuance during the regulatory changes of 2018 significantly predicts the bank's position during the COVID-19 period. The explaining channels could be the low signaling power of banks' actions after the first regulatory shock, i.e., MMFs perceived a group of banks to have more significant potential agency problems, and hence the following actions of banks have been perceived as discretionary accounting. A second explaining channel could be the persistent MMF investing preferences during stress periods. We find that the same group of banks identified as having the worse governance of the CP proceedings faced limited security issuance during the COVID-19 crisis.

### **1.1. Institutional Background**

Money Market Funds are among the primary consumers of commercial papers; they hold CPs along with other short-term debt securities, e.g., treasury bills and certificates of deposit, to produce MMF unit shares, a liquid, transferable, and cash-like instrument. MMFs are one of the essential parts of the shadow banking system, mainly because they buy short-term money market instruments issued by financial intermediaries (Gennaioli, Shleifer, and Vishny (2013); Schmidt, Timmermann, and Wermers (2016)). The fragility of the shadow banking system during the great financial crisis sparked concerns about regulating these lightly regulated institutions (Gorton and Metrick (2010)). In 2013, European Commission (EC) proposed the rules for Undertakings for Collective Investment in Transferable Securities (UCITS) MMFs<sup>7</sup>. The EU parliament eventually signed off the initial proposal as MMF Regulation (EU) 2017/1131<sup>8</sup>, which became applicable in July 2018. Similarly, the US Securities and Exchange Commission (SEC) announced the new MMF regulations in 2014 and started implementing them in 2016.

These regulations, motivated by the run on funds backed by Lehman Brothers CPs and the consequent turmoil, aimed to reform the markets to reduce the probability of future MMF runs. The reforms in the EU and the US regulations have important shared features. Among the critical regulatory features that have affected MMFs profoundly are minimum weekly liquid assets, the liquidity-triggered redemptions gates

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<sup>7</sup> For more details on implementation instructions and timeline, [https://eur-lex.europa.eu/procedure/EN/2013\\_306](https://eur-lex.europa.eu/procedure/EN/2013_306)

<sup>8</sup> <https://eur-lex.europa.eu/eli/reg/2017/1131/oj>

and fees, and limitations on the MMFs that could operate under the Constant Net Asset Value (CNAV MMFs) feature, i.e., a general preference toward Variable Net Asset Value (VNAV MMFs). Hence as is also pointed out in previous studies, eventually, these reforms resulted in MMF units becoming less money-like. Nevertheless, the outcome of these regulations might not be as were originally in regulators' purview. Baghai, Giannetti, and Jäger (2022) find that the MMF reforms in the US unintentionally reduced the supply of safe liquid assets for investors and increased the sensitivity of the prime MMFs flows to performance. Li, Li, Macchiavelli, and Zhou (2021), contrary to the desired goal of these sets of regulations in mitigating the run risk, argue that applying gates and fees and liquidity restrictions caused the investors in MMFs to run preemptively when faced with a crisis. They find evidence that the proximity to liquidity restrictions, i.e., the weekly liquid asset measures that were the hard target for regulators, was associated with increased outflows during the COVID-19 crisis. Cipriani and La Spada (2021) estimate a premium of 20 to 30 basis points for the money-likeness and show an outflow of more than one trillion USD from Prime to government MMFs after similar reforms were implemented in the US in 2016. Fricke, Greppmair, and Paludkiewicz (2022) find significant crossflows from US investors into European prime MMFs, after the reform regulations in the US during the almost two years regulatory gap, i.e., until similar regulations were implemented in the EU.

We find that the NEU CP issuance volume declined during the second half of 2018 when MMF reforms were implemented, and they had to reauthorize and comply with the new regulation. A decline in MMFs' ability to issue MMF units and to keep within the required WLA meant that they had to reduce their less liquid securities holdings, e.g., CPs with limited secondary markets. We find that market participants for banks' CPs have shown a specific preference during this period. Our results complement Moreira and Savov (2017) and Baghai, Giannetti, and Jäger (2022) findings. However, it is doubtful that the NEU CP market participants targeted a certain credit quality of the issuers or sought higher yields because, in our setting, the issuers in the NEU CP program are relatively homogeneous in their credit quality, i.e., the NEU CP program targets only the highest credit quality issuers. However, our analysis suggests that other factors may be at play, regardless of the homogeneity of credit quality. Specifically, we identify two groups of banks, a first group that had diminished CP issuance in the primary market during this period; and a second group that had no change or increased CP issuance. We find that assignments to these groups appear not to be random. The latter are the banks that were more successful in keeping their liabilities more opaque (Gorton and Pennacchi (1990); Dang, Gorton, Holmström, and Ordoñez (2017)) by keeping the cash flow information of their CP issuances isolated from the insurance-like items which are constituents of the reported equity. Furthermore, we show that these preferences persist when faced with a crisis. We find that whether a bank had been subject to a decrease in CP issuance during the MMF reform implementation period significantly predicts its situation during the COVID-19 MMFs "flight to liquidity" period.

## 1.2. Policy Implications

Our findings support the policy implication of the arguments of Gorton (2017) and Dang, Gorton, Holmström, and Ordoñez (2017) that banks are better off in short-term safe debt production when they can equitably disincentivize investors from generating private information. Banks that pass the information of their short-term debt proceedings to equity, which is suboptimally opaque, are less successful when the markets face turmoil and ought to show preference. Equity, unlike loans, generate no cash flow with certainty and, with the latest regulation, could result in unforeseen complications during restructuring negotiations and proceedings.<sup>9</sup> Our findings also support the policy suggestion of Kacperczyk, Pérignon, and Vuillemeys (2021) and their conclusions about the shortage of private safe assets during the market turmoil. We analyze monthly CP issuance of banks in the primary market during two major and successive events, first, during the MMF reforms, when markets faced a shock to the demand for safe assets, and second, during the COVID-19 crisis when market participants made a flight to liquidity. However, we differ from Kacperczyk, Pérignon, and Vuillemeys (2021) regarding the consequences of banks' short-term operations opacity; we find that the apparent collapse was not market-wide for all securities in the class, confirming the resilience of this market, similar to Pérignon, Thesmar, and Vuillemeys (2018) findings for 2008 to 2014 period. Although the asset class faced a drastic market-wide decline in volume in both instances, i.e., MMFs regulatory reforms and the COVID-19 crisis, liquidity did not dry up for all banks. Some banks suffered more, and others did not change or even increased their CP issuances. Our results suggest that the determinant of the success of one group and the failure of the other could be described by the opaqueness of short-term debt issuance operations and avoiding the agency problem between short-term and equity investors.

Another policy implication of our paper concerns the regulations that increase the propensity of market participants to generate information about other short-term debt market participants, e.g., removing the information veil between the MMFs. These regulations appear to result in complementarities, such as the investors' coordination suggested by Schmidt, Timmermann, and Wermers (2016). Due to the limitations of our data, which lacks detailed fund flows, unlike Li, Li, Macchiavelli, and Zhou (2021), we are unable to identify the characteristics of funds that were more likely to run. However, our results still suggest that the market restricted or favored the issuance of securities from the same group of identified banks during these two events, indicating that the market as a whole seems to have persistent and coordinated preferences toward a particular group of banks.

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<sup>9</sup> Directive 2012/30/EU COM/2016/0723 final - 2016/0359 (COD), article 12 and definition of "Equity holders' legitimate interest", and article 5 "debtor in possession".

Moreover, finally, our findings support the policies that suggest reconsidering the efficacy of an overwhelming focus on banks' equity during bank runs; e.g., Diamond (2018)<sup>10</sup> alludes to the inefficiency of the bail-in as a solution for short-term debt creditors. Considering the agency problem that we have described, some bank managers could tilt toward smoothing reported equity levels. We find that short-term creditors monitor banks' balance sheets and reporting styles. The contributed equity combined with fair value accounting could incentivize and enable some banks' managers to report to favor shareholders. Our findings show that this governance style faces short-term creditors' disciplines when they show preferences. A short-term debt due to negotiable rollovers would provide a more potent governance control tool for controlling the banks' risk-taking, and additionally, its constraints could be adjusted appropriately through inherent debt features, e.g., maturity (Brunnermeier and Oehmke (2013)).

## 2. Hypotheses

Market participants trade short-term debt with minimum friction as long as the traded securities equitably disincentivize the buyers to generate private information about their payoffs. If the issuer of short-term debt fails to disconnect the short-term securities proceeding from the banks' observable cash flows, then informed investors are likely to generate private information and form preferences beyond the publicly available characteristics of the issuers and securities. We suggest that one such private information could be the identification of the agency problem between the buyers of short-term debts and equity beneficiaries when the banks pass the information of the proceedings from short-term debt issuances to equity. Indeed, equity is deemed the insurance buffer for the risks of the bank's asset portfolio; however, from a short-term security investor's point of view, first, equity does not generate any cash flow, and second, it represents contingent uncertainties during a possible restructuring proceeding.

**Hypothesis 1.** *Money markets prefer banks that keep their short-term debt independent from equity variations, i.e., separate their liquidity management from asset-liability management.*

Banks that are unable or unwilling to isolate their CP issuance in the money market isolated from their equity variations are not optimally opaque and are less successful in generating money-like short-term debt. In this hypothesis, we analyze a possible empirical implication of Dang, Gorton, Holmström, and Ordoñez (2017) and Dang, Gorton, and Holmström (2013). Banks that pass the information of CP issuance proceedings' to equity accounts are not optimally opaque and hence are less successful in the money-like short-term debt production. Informed short-term debt investors, i.e., MMFs, monitor the banks for the

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<sup>10</sup> In his noble symposium lecture, <https://www.hhs.se/globalassets/swedish-house-of-finance/conferences-2018/nobel-symposium-on-money-and-banking-2018/bilder-people--dokument/documents/financial-intermediaries-and-liquidity-creation/diamond2.pdf>, and the recording on Swedish House of Finance, <https://www.youtube.com/watch?v=cfZdRZTzkiQ>.

possible agency problem. When investors face a selection, they show preference toward the banks that appear to have not treated equity more favorably. Investors would demonstrate their preference by limiting the issuance amount and shortening the issues' maturity.

**Hypothesis 2.** *Banks that face investors' limitations on their short-term securities issuances respond by adjusting the balance sheet items that show asset quality.*

Banks that face market discipline due to their governance of asset composition choices toward equity accounts to restore the short-term creditor's confidence would need to signal the quality of their portfolios by increasing the contingent reserves in their accrual accounting items. Banks could signal better quality through real capital management or discretionary capital management. Our findings suggest that the banks that faced money market limitations during MMF regulatory reforms adjusted the discretionary items.

**Hypothesis 3.** *Investors in the money market have persistent preferences.*

Market participants in the CP market, i.e., MMFs, are aware of possible faux quality signaling and have a persistent preference to avoid the banks that have not kept optimally opaque accounts. MMFs kept persistent preferences during the height of the Covid-19 crisis, i.e., they accepted less CP issuance from the same banks that had previously faced limitations during MMF reforms. When investors in the short-term debt market generate information about other counterparties, it will generate externalities such as complementarities in their actions and coordination. This coordination has also been observed empirically in other pooled investment vehicles, e.g., mutual funds and ETFs.<sup>11</sup>

### 3. Data

We use the granular data of the CP issuance by banks participating in the Negotiable European Commercial Paper (NEU CP) program. Banque de France publishes this data monthly. The NEU CP program has replaced the previous market securities in France with comparable structures<sup>12</sup>. The program, in addition to giving a new legal name to French commercial papers, i.e., NEU CP, merged the formerly certificates of deposits issued by credit institutions and commercial papers issued by non-financial corporations. The new securities comply with the latest European regulations, and they started replacing the older securities on 31 May 2016. The participating issuers and investors needed to adapt to new regulations and operational requirements, especially to move to a new digital multilateral platform for

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<sup>11</sup> Schmidt, Timmermann, and Wermers (2016) provide the theoretical background that reduction of information barrier between market participants could results to externalities such as coordinated runs. Sushko and Turner (2018) show persistence of mutual funds and ETFs outflow across assets during the stress episodes, we add MMFs.

<sup>12</sup> For an overview of related studies on the preceeding replaced programs see, Pérignon, Thesmar, and Vuillemeys (2018), and Kacperczyk, Pérignon, and Vuillemeys (2021).

primary and secondary placement and trading provided by NowCP.<sup>13</sup> The CP market in the EU consists of several domestic markets. During the period of our studies, the NEU CP Market is the second-largest CP program in the EU.<sup>14</sup> The maximum maturity of the NEU CP is one year with a minimum amount of EUR 150,000 or the equivalent amount in other currencies. As it is also characterized by Pérignon, Thesmar, and Vuillemeys (2018), and Kacperczyk, Pérignon, and Vuillemeys (2021), in the French market, the bulk of the short-term unsecured debts issued by banks are bought by money market funds (MMFs).

The sample covers 139 banks that have participated in the program; this is almost an exhaustive sample of issuing banks in the program and only excludes a few small banks that we could not match with their Legal Entity Identifiers (LEI). For each issuer, we observe the amount and average maturity of the CPs issued during the month and, in addition, aggregate outstanding CPs' amount and average residual maturity at the beginning and end of the month. We use the LEI to match the security issuance characteristics with the banks' balance sheet information from Fitch Connect. We provide details on the issue characteristics in Panel A of Table 1. The average outstanding amount of banks' CPs is 3.23% of their total assets, while the average monthly issuance is approximately 0.74% of their total assets. In Panel B, we provide information on the balance sheet of issuing banks. The NEU CP program only includes the issuers with the highest rating from competent agencies (A1+/P1/F1+) or a first demand guarantee under French law.

In Figure 1, we present the six-month rolling average of the aggregate NEU CP issuances throughout our study period. There was a notable decline during the second half of 2018 when the regulatory reforms of MMFs were implemented. The second period of turmoil is associated with the COVID-19 health crisis, during which MMFs run for liquidity. We use these two distinguishable exogenous shocks to the demand for short-term safe assets to identify the bank groups that have faced market preferences. Figure 2(A) presents the average monthly issuance for the two bank groups. We calculate each group's rolling average conditional on whether the banks in the group have experienced a decreased or increased average monthly issuance during the MMF reforms. In Figure 2(B), we present the results of a similar calculation, but the two groups of banks are identified during the COVID-19 crisis.

Additionally, a comparison of Figure 1 and Figure 2 suggests that despite the apparent changes in the aggregate CP issuance behavior, which is driven by the shocks to the aggregate demand for safe assets, there is a noticeable separation among the issuers. Further insight into this separation could be gained by

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<sup>13</sup> [https://publications.banque-france.fr/sites/default/files/media/2021/01/07/payments\\_market.pdf](https://publications.banque-france.fr/sites/default/files/media/2021/01/07/payments_market.pdf), "The bulk of NEU CP activity takes place on the primary market. Transactions on the secondary market correspond to around 25% of primary market transactions", according to the 2018 report by Banque de France.

<sup>14</sup> After the Euro Commercial Paper (ECP) market that has been historically the largest CP market centered in London and governed by English Law, <https://www.icmagroup.org/assets/documents/Regulatory/CP/ICMA-CPC-white-paper-The-European-Commercial-Paper-and-Certificates-of-Deposit-Market-September-2021-290921.pdf>

analyzing the cross-sectional heterogeneity of the banks in the two groups during these two events. We define deciles conditional on the increase or decrease during the two events. In Panel C of Table 1, we provide the average increase or decrease of banks' CP issuance in each decile, compared to the preceding year's average. Most of the banks that have participated in the NEU CP program have been French banks; however, there have been branches of foreign banks that have issued CP in the program. In Panel D of Table 1, we provide the details of changes in CP issuance by the banks' country of origin.

Our data permits our identification strategies. Fair value accounting, i.e., marking to market, is one of the significant characteristics of the bank's accounting. The possibility to report several items on the bank's balance sheet as determined by internal models permits the managers to apply their discretion to the extent that the regulator and accounting standards allow. Furthermore, reporting cash according to the accounting methods nets liquid assets, e.g., pooling customer deposits and proceeds from short-term debt securities issued. Banks could use internal models to analyze the maturity of their financial instruments and report the financial assets with expected cash inflows that net the outflows on liabilities. The endogenous observation of equity, short-term liabilities, and cash makes identification for outside observers impossible, even for the institutions that report details of their assets and liabilities with minimum discretion. One key element in our identification strategy is the exogenous observation of banks' CP issuances from the Banque de France reports; therefore, our data structure allows observations that are not subject to the discretion of banks' managers.

## **4. Results**

### **4.1. Short-term Debt Amount and Investor's Preference**

In this section, we evaluate hypothesis 1; the MMF regulation reforms provide us with an event during which the MMFs, as the main customers of the commercial papers, have reduced demand for short-term safe assets and revealed their preferences toward the characteristics of the banks that have not faced limitations. This setting, in particular, enables us to test whether the assignment of the banks to the group that faced market limitations during MMFs regulation reform is statistically different from the other group for our hypothesis. The group of banks that faced market limitations had a reduced amount of CP issuance during this specific period, while the other group of banks did not face the market limitations, i.e., the average amount of monthly CP issuance did not change or, for some of them, even increased. In hypothesis 1, we propose that banks in the former group positively pass the CP issues proceedings to the equity accounts. Effectively these banks appear to finance some part of their asset-liability management with short-term debt to report less interest-sensitive balance sheets by adjusting their equity levels.

Additionally, our identification strategy relies on the exogenous observation of banks' monthly CP issuance amount. This exogenous observation allows us to observe the relation of the actual amount of cash that enters the bank from CP issuance independent of the management discretions in the balance sheet reporting. The bank's management decides to invest the proceeding for the current treasury management and costs related to maintaining the loan portfolios. Alternatively, they could use the available cash to adjust the items sought for the assurance of the residual value of the balance sheet, e.g., the bank's equity level adjustments to appeal to the equity market or to avoid regulators' scrutiny. In the latter case, the management discretion would be classified as part of the equity in the manager's report. Thus we expect that when a bank uses CP proceedings to adjust the discretionary equity items, the exogenous CP amount observation to be positively correlated with the reported equity. The logic behind the identification methods that we use to evaluate hypothesis 1 is that if the two groups of banks are not different in this respect, then the assignment of the banks to the group that has faced market restriction and the alternative group should be random, or at least the statistical difference between the two groups should not be significant.

We select the second half of 2018, during which MMFs revealed their preferences due to limitations on their market participation during the new reforms' implementation, noting that the MMFs are one of the major investors in the NEU CP market. During these reforms, some banks have been disadvantaged due to MMFs monitoring for the explained agency problem. To assign the banks to each group, we compute their average six-month monthly issuance amount in the second half of 2018; and compare it to the previous one-year average. We assign a bank to the "Decreased Average" group, i.e., the group that has faced market limitations during MMF reforms if they have less average monthly issuance during this period. We use two specification methods for identification. First, we use the conventional selection model suggested by Heckman (1976),

$$y_{it} = X_{it}\beta_1 + u_{it}, \quad (1)$$

$$I_i^* = Z_i\gamma + \epsilon_i, \quad (2)$$

$$I_i = 1 \Rightarrow y_{it} = y_i \text{ if } I_i^* > 0, \text{ otherwise } y_{it} = 0. \quad (3)$$

We report the result of the basic Heckman selection specification in Panel A of Table 2. We use the Heckman model on two selected subsets of the whole sample. Importantly, our sample is almost representative of the entire population, missing only a few very small banks that we could not match their LEI number. The identification logic behind this specification is that the observer—we—selects a subset of the population with a biased outcome, e.g., the banks that had faced market limitations when the demand for short-term safe assets was reduced due to an exogenous regulation—knowing that the representative subsample is biased a priori. After the Heckman selection correction, the outcome could be interpreted such



that if the econometrician's selected sample represented the entire population, then what would be the unbiased estimation of the coefficients of the interested variables for the population? An economic interpretation of this set of results would be if all the banks were similar to one group, bad or good, and the selected sample was representative, what relation would we expect between the specific variable of interest and the outcome?

In column 2 of Table 1, the positive and significant coefficient of equity shows that the banks that face market limitations are positively using the CP issuance proceedings to adjust their equity levels, i.e., showing the specific agency problem we have explained. The same coefficients for the banks in the group that did not face market limitations are negative and less significant. When we limit our sample to exclude COVID-19, i.e., the period before 2020, the results for the first group, in column 4 of Table 1, become more prominent and with similar statistical significance, and the results for the second group slightly decrease and with no statistical significance. These results also follow the interpretation of theories for successful banks in short-term safe asset generation<sup>15</sup>, i.e., that the banks are less successful in generating short-term debt when they are unable or unwilling to withhold the information about assets that are backing their short-term debt.

In our second analysis, we use the switching simultaneous equation model described by Maddala (1986) and Song (2004). This model specification allows analyzing the exogenous event and bank balance sheet affecting MMF decisions as reflected in the changes in CP issuance. One benefit of using the switching simultaneous equation model is that it permits empirically analyzing endogenous and exogenous variables that affect the assignment to a group. The formal representation of the model is as follows,

$$y_{Rit} = X_{Rit}\beta_1 + \zeta_i + u_{Rit}, \text{ estimated using GLS, and } \zeta_i \text{ is bank fixed effect,} \quad (4)$$

$$y_{Uit} = X_{Uit}\beta_2 + \zeta_i + u_{Uit}, \text{ estimated using GLS, and } \zeta_i \text{ is bank fixed effect,} \quad (5)$$

$$I_i^* = Z_i\gamma + \epsilon_i, \quad (6)$$

$$I_i = 1 \Rightarrow y_{Ri} = y_i \quad \text{if } I_i^* > 0, \quad (7)$$

$$I_i = 0 \Rightarrow y_{Ui} = y_i \quad \text{if } I_i^* \leq 0, \quad (8)$$

where,  $y_i$  is the ratio of CP issuance amount of bank  $i$  over total assets, and  $X_{it}$  is a vector of endogenous and exogenous variables relating to the bank and the issuing characteristics. The subscript group  $\{R\}$ , in Equation 7 indicates the conditional assignment of the bank to the group that has faced market limitation,

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<sup>15</sup> An empirical implication of Dang, Gorton, Holmström, and Ordoñez (2017)

i.e., “restricted,” while the subscript group  $\{U\}$ , in Equation 8 indicates the conditional assignment to the other group, i.e., “unrestricted.” Equation 4 describes the conditional distribution of the monthly issuance amount of the bank  $i$  conditioned on whether this bank is in group  $\{R\}$  and shows the relation with endogenous and exogenously observed banks and issues’ characteristics. The variable  $I_i^*$  determines the underlying selection equation that determines the assignment group for bank  $i$ .

We report the result of the switching simultaneous equation model specification in Panel B of Table 2. The interpretation of this specification is that the assignment of a bank to one group or another is not random, and the coefficients of the variable of interest describe the relation of the conditional distribution of banks in one group with the exogenous and endogenous variables of interest. The coefficients in columns 2 and 4 confirm the results described in the previous basic Heckman model. The banks that have faced market limitations are the banks that have a positive and significant relation between their CP issuance amount and equity levels. In columns 3 and 5, we have limited the interval to exclude the COVID-19 period. The results are the same and slightly better in the direction that more strongly confirms our first hypothesis.

In Panel C of Table 2, we slightly modify the model specification to evaluate whether the difference between the coefficients of interest for the two groups is significant. We create a dummy variable that takes the value of one if the bank has faced a reduction of average CP issuance during the MMF regulatory reforms and zero for the other group. In the first specification, in column 2, we include the interaction of this dummy variable with the equity ratio. The positive and significant coefficient of the interaction term in column 2 indicates that, indeed, the difference between the two groups is positive and statistically significant. In column 3, we present a model specification without a first stage, i.e., no correction for the assignment. This specification is inherently equivalent to a fixed effect model to estimate the difference in the coefficient of a continuous variable between the two groups. The results from this more parsimonious model replicate exactly the interaction term’ coefficient in magnitude and statistical significance. Columns 4 and 5 show similar results when we remove the COVID-19 period from our sample.

## 4.2. Short-term Debt Maturity and Investor’s Preference

In this section, we present an alternative method to classify the banks that have faced market limitations. The selection of bank groups follows the theory<sup>16</sup> that when banks are unable or unwilling to keep a maturity structure and offer one group of investors a lower maturity, other investors also request their securities to be issued with shorter maturities. The agency problem we evaluate in hypothesis 1 is equivalent to shortening the conceptual duration of equity. When banks adjust the level of equity to report a smoother

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<sup>16</sup> Brunnermeier and Oehmke (2013)

level, in effect, the apparent sensitivity of equity to the interest rate variations appears to be lower, or equivalently the apparent conceptual duration of equity appears to be lower.

We use a set of alternative events staggered in our study interval in which the market participants have revealed their preferences by reducing the maturity of the CP securities of banks. We exploit the staggered anomalies observed in the banks' average residual maturity of outstanding issues. When an issuer does not offer a new CP issue in a specific month, the residual maturity of the outstanding issues reduces by approximately 30 days. However, if a bank issues CPs in any month according to its usual schedule, the expectation would be that the residual maturity as weighted average increases, or we expect it to reduce by less than 30 days depending on the new issues' size and maturity, noting that average original maturity of issues is around 130 days. If a bank faces market limitations, the CP would be issued in urgent conditions and with shorter maturity than its usual schedule.

We use the anomalies in which a new issue causes a severe decrease in the average maturity of the residual outstanding issues. Effectively, for our identification purpose, we define these events when the new issue not only does not increase the average maturity but even causes the average residual maturity to shorten by more than 30 days, i.e., we use a reduction threshold beyond 45 days. In such events, the bank has faced significant limitations from the market for issuing CPs. In the specific event month, the issued CPs have drastically distorted the maturity of the existing portfolio of outstanding CP issues detrimentally. We mark banks who issued any of their CPs in urgent conditions as "Urgent Issuers." We restrict the time interval for identifying urgent issuers to before Covid-19 and identify banks with at least one urgent issue during this period.

In Panel A of Table 3, we present the comparison results of the two groups of urgent and non-urgent issuers banks using the switching simultaneous equation model specification. The distributions of banks between the two groups are slightly unbalanced compared to the previous section. However, confirming the result of the previous section, in column 2, the positive and significant coefficient indicates that urgent issuer banks are the banks that have been more prone to the specific agency problem we have discussed. The same coefficient for non-urgent issuers is statistically insignificant. The results are more robust when we limit the period of our analyses to exclude the COVID-19 period; we present these results in columns 3 and 5.

Furthermore, similar to the previous section, in panel B of Table 3, we present the result of analyses of whether the difference between the two groups is significant. We define a dummy variable that takes the value of one if the bank is an urgent issuer and zero for non-urgent issuers. Similar to the specification described in section 4.1, we present these results with adjustment for the selection bias and without

correction, i.e., equivalent to a fixed effect model. In both specifications, we confirm that the difference between the urgent and non-urgent issuers indicated by the interaction term is positive and significant. This pattern is consistent with the result of the similar analyses we have presented in section 4.1: the banks that have faced an anomalous reduction of their issued CPs' maturity are the banks that have not successfully isolated the specific information of their CP issuance proceedings from the details of their balance sheets.

The results in sections 4.1 and 4.2 show that the expert investors observe that the bank is using the proceedings from short-term debt to adjust the equity levels; equity is not the optimal investment asset to back the securities offered as safe assets to the CP investors with unforeseen immediate liquidity needs. Hence, investors show preference by limiting the maturity of the securities that banks offer. The results confirm that the investors show preference through maturity and volume of securities. To further expound on the concept, in retrospect, a creative way for the banks to facilitate CP issuance and keep the CP isolated from their balance sheets and regulatory capital requirements have been to resort to asset-backed commercial papers. Ignoring the insatiable exuberances that had led to the notoriety of these instruments – especially at the height of the financial crisis of 2007-2008– one could interpret the widespread popularity of ABCPs as the investors' interest in over-collateralized pure-loan balance sheets; i.e., backed by CMBSs, RMBSs, CDOs, and other ABSs characterized by having no equity and the SPV entities being bankruptcy remote from the banks' balance sheets and equity operations.

#### **4.3. Bank's Response to the Short-Term Debt Market Limitations**

In this section, we test our second hypothesis. Here we set up a diff-in-diff specification. Here, the identification strategy is that the application of MMF reforms affected the banks' CP differently depending on how the market perceived them. The specific period that we test this hypothesis is after the period of the MMFs reforms. By the beginning of 2019, all the MMFs underwent reauthorization and adaption of the new regulations. During this period, some banks issued lower CP amounts. Once the markets recovered, the prior information asymmetry between the banks and investors and between investors had altered. Some investors have shown preferences for certain banks and limited their purchases from other banks. It was up to the banks that faced the market restrictions to recover the market confidence about the quality of their assets. We test whether the banks signaled their asset quality by adjusting the items that ensure the quality of their loan portfolio. For identification, we define a dummy variable that takes the value of one for the banks that, during the MMF reforms, faced a reduction of their CP issuance amount, i.e., the treated group. We create an interaction term with the time-domain dummy variable equal to one after 2019. The time-domain dummy defines the market's recovery from the regulatory slowdown and the time that treated banks needed to signal

$$Bank\ Signaling_{it} = \beta_0 + \delta_1 Bank\ Type_i + \delta_2 After\ MMF\ Reform$$

$$+ \delta_3 Bank\ Type_i \times After\ MMF\ Reform + \beta_1 X_{it} + \iota_i + \tau_t + \epsilon_{it} \quad (9)$$

where  $Bank\ Signaling_{it}$  are the outcome variables that the banks in the signaling group use to show quality. We capture the bank and month fixed effects in the model specification, respectively, by  $\iota_i$  and  $\tau_t$ . We evaluate the variables banks could use to signal different aspects of their operations. In columns 1 and 2, we test the two basic ratios. Any abnormal adjustment to the discretionary items on the balance sheet would eventually appear on the equity ratio of the bank. In column 1 of Table 4, we test whether there is a general increase in the equity ratio; an increase in the equity ratio would confirm that some constituent items of the equity have increased. The estimated  $\delta_3$  is positive and significant, consistent with the signaling through equity.

Next, in column 2 of Table 4, we evaluate whether the banks' loaning activity has changed. If the banks reach for higher constant cash flows through more loaning activity, the risk of higher regulatory capital requirements increases, possibly while lacking an essential financing source, i.e., reduced average CP amounts. There is a distinction between real capital management, i.e., timing the investment of the excess resources under management discretion, and accrual-based capital management. The estimated  $\delta_3$  is insignificant, confirming the often cited in the literature "trade-off" between real and accrual-based discretionary capital management. In contrast to our finding to signal through real capital management operations, some parts of the retained reserves could be used to initiate new loans. In such a case, signs of estimated  $\delta_3$  would have been expected to be negative and significant in column 1 and positive and significant in column 2.

In column 3 of Table 4, we evaluate the provision for non-performing loans net of loan loss provisions as a portion of equity. The banks that have faced CP market restrictions have reported a lower provision for the net non-performing loans as a portion of the equity. The estimated negative and significant  $\delta_1$  indicate that they have reported a better quality of loans portfolio by reporting better loan loss coverage by equity, i.e., a critical ratio for bank capital adequacy evaluation is common equity tier 1 (CET1). However, a lower value of this ratio could signify that equity's residual value is higher, in line with our findings in sections 4.1 and 4.2, possibly indicating the existence of the underlying agency problem we have discussed. This ratio has not significantly changed after this group of banks faced short-term market restrictions. In fact, in column 4 of Table 4, the estimated insignificant  $\delta_1$  and  $\delta_3$  indicates no change of the equity capital assigned to insure the loan losses as a ratio of the gross loans, i.e., the loan loss provisions over gross loans difference and changes are both insignificant.

One critical fact is that the classification of non-performing loans on banks' balance sheets is not progressive and straightforward. When an obligor fails to pay the bank, the specific obligation would be classified as non-performing. However, it is possible to classify the rest of the obligations of a customer as a performing loan until 20% of the debt is more than 90 days past due. Furthermore, after the banks have exposure to a non-performing loan, there is still the possibility that exposure to exit the non-performing classification and be reclassified as performing after an analysis of the financial condition and payment patterns of the non-performing consumer<sup>17</sup>. Again similar to the ratios in columns 1 and 2, signaling consistent with the removal of the mentioned agency problem through real capital management would have resulted in a positive and significant change in estimated  $\delta_3$  in column 3, i.e., banks could write off more non-performing loans resulting in operationally safer remaining assets but inevitably less equity.

Finally, in column 5 of Table 4, we evaluate how the banks that had faced market restrictions reacted to non-performing loans through accrual accounting practices. The estimated positive and significant  $\delta_3$  combined with the insignificant results in columns 1 and 4, indicates that although the promised equity against the gross loaning operation had not changed significantly in those accounts, the loan loss provisions against the impaired loan have increased significantly both statistically and in magnitude. These results align with the well-known accounting practices recognized in accounting literature and policymakers<sup>18</sup>.

#### 4.4. Investor's Persistent Preference

In this section, we test hypothesis 3. To do so, we investigate the predictability of a bank's reduction of CP issuance, knowing the prior assignment of the banks during the MMF regulation reforms. Effectively to show that the preferences persist more accurately, we define deciles of CP issuance reduction amount during the MMF reforms period. The banks with the highest CP reduction are in the first decile, i.e., faced the worst market limitations. The banks face progressively less restriction toward the tenth deciles, the banks with the least reduction of CP issuance amount. For the COVID-19 period, like the previous method, we identify the banks that have reduced CP issuance in the first half of 2020, compared to the average of one year during 2019. Furthermore, we similarly define deciles of CP issuance reductions.

In panel A of Table 5, we present the result of a quantile regression where the outcome variable is the decile of the bank during the COVID-19 period. The implication of our hypothesis that the preferences persist would be that the observed decile of the bank during the MMF reforms could predict the observed

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<sup>17</sup> For a detail guide on treatment of non-performing loans under EU regulation 575/2013 refer to ECB, [https://www.bankingsupervision.europa.eu/ecb/pub/pdf/guidance\\_on\\_npl.en.pdf](https://www.bankingsupervision.europa.eu/ecb/pub/pdf/guidance_on_npl.en.pdf), and the legislation body, <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex%3A32013R0575>

<sup>18</sup> <https://www.bis.org/bcbs/publ/wp39.pdf>

decile of a bank during this period. For brevity, the results are presented for the second, fourth, Median, sixth, and eighth deciles. All the coefficients are positive and significant. Figure 3 presents the coefficients graphically; although predictability is statistically significant for all deciles, the best predictive region is between the fourth and eighth decile.

In panel B of Table 6, in an alternative specification, we use the continuous reduction of the average issuance amount during COVID-19. Effectively, this specification is a quantile regression where the outcome variable is the continuous variable of the banks' reduction in average CP issuance amount. We have defined the decile of the independent variable such that the first decile indicates the banks with the most reduction of CP issuance during the MMF reforms. We expect the progressive increase of estimation decile of the coefficients of the dependent variable to be relatively more negative, indicating less reduction moving from the most reduction decile group to the groups that were in the least reduction quantiles during MMF reforms. Effectively, we confirm this relation by the coefficients for the fourth, Median, sixth, and eighth deciles. Our observation in the second decile, which is the group with the worst outcomes during MMF reforms, is an exception. One reason for this exceptional observation might be that some of the banks in the worst decile did not fully recover from the reduced CP issuance after the CP reform period. Furthermore, complementing our explanation, the observation for the same decile in Panel A confirms that if a bank was in the worst decile during MMF reforms, it is highly predictive to be in the worst reduction decile group during COVID-19. Like our previous finding in panel A of Table 5, the best predictivity is observed between the fourth and eighth deciles. The coefficients decrease uniformly from the lowest decile to the highest decile. Noticeably, the coefficients keep their significance, indicating high predictability, and their magnitudes uniformly decrease.

## 5. Conclusion

In this paper, we use a unique setting in the French CP market to understand and evaluate the success of banks in producing short-term private debt. Benefiting from the similarity of the banks' credit ratings in this setting allows us to examine the distinction between the banks in their governance style. Accounting measurements could be an essential tool to reveal the governance style of the banks. The bank's balance sheet's discretionary accounts measurements render the boundary between equity and short-term claimants liquid. Banks could select to favor shareholders through discretionary accounting measurements by smoothing residual value. We show that the market participants monitor banks for this agency problem, and when they face limitations, reveal their preferences and select to restrict the CP issuance of banks whose governance suffers from the proposed agency problem. Furthermore, we show that disciplined banks, in response to short-term creditors, select to signal the quality of their assets through accrual asset management techniques; in contrast, we find no evidence to support real capital management. Finally, we show that the

short-term debt market participants have persistent preferences and limit the issuance of the same banks when the market liquidity suffered due to the COVID-19 crisis.



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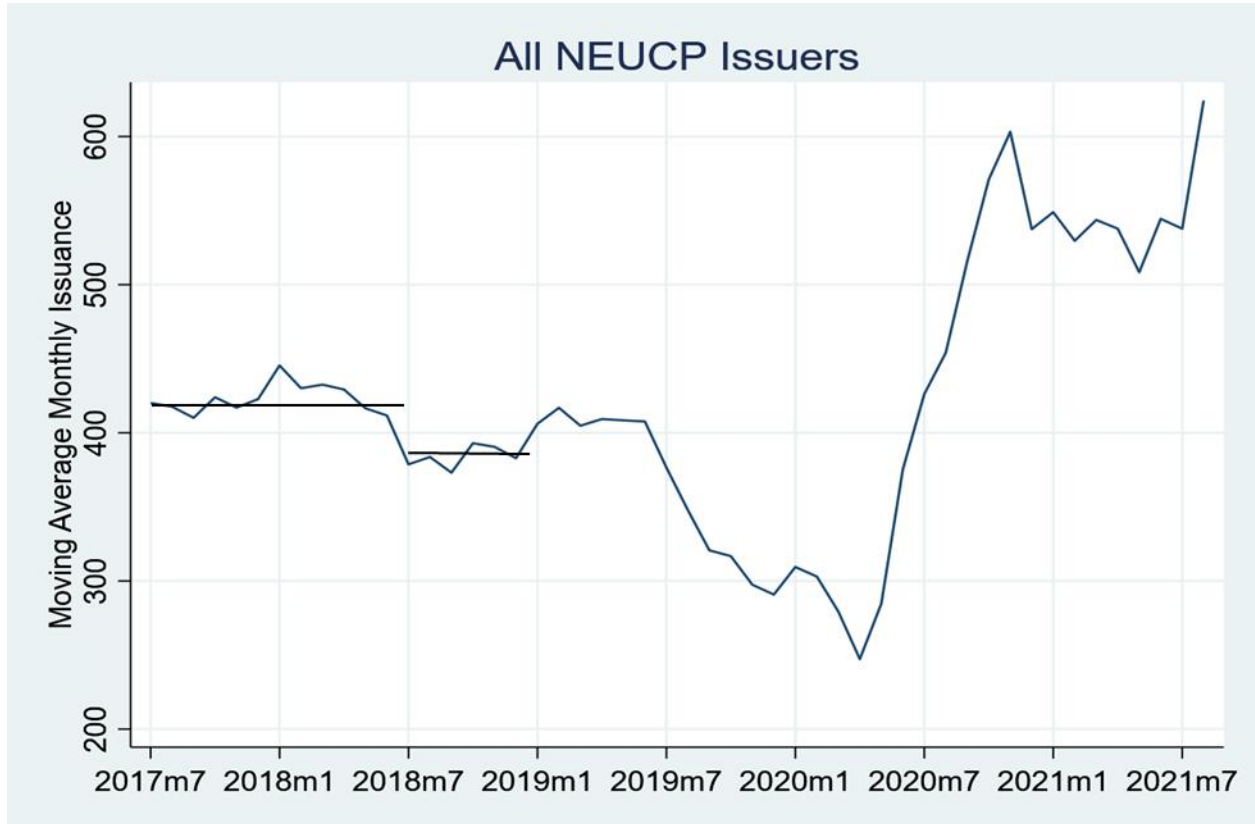
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**Figure 1**

**Moving Average Aggregate Monthly Commercial Paper Issuance Amount**

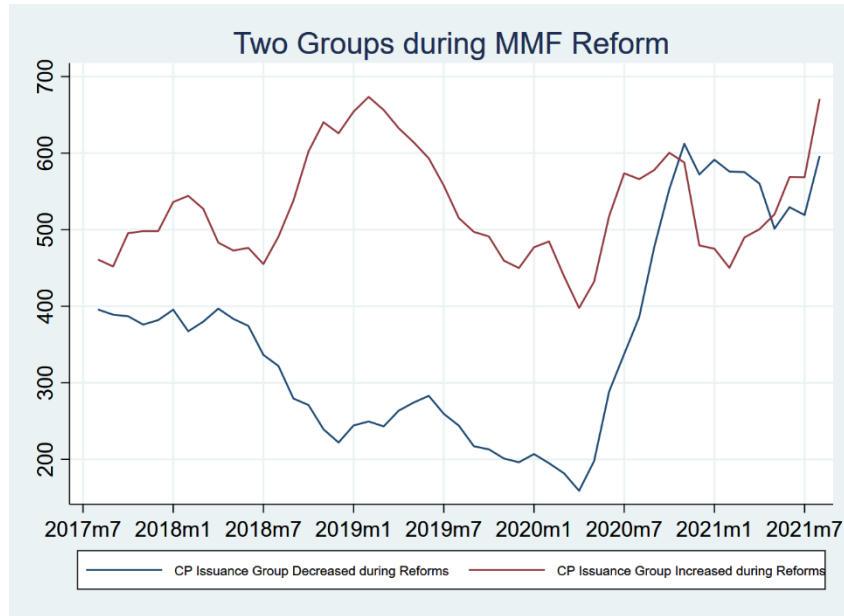
Each month, the aggregate amount of commercial papers (NEU CP) issued by banks is computed. The graph presents a six-month rolling average of the aggregated monthly CP amounts. The moving average method is only used for the smoothing and graphical presentation of the main market-wide events. We have used the monthly data for all the computations related to the individual banks. The graph clearly shows the decline in the moving average starting the second half of 2018 until the beginning of 2019. During these six months, the MMFs reforms were implemented. An externality of reforms was the limitation of the MMFs participation in the market and a decline in the aggregate amount of CPs issued by banks. Furthermore, the second episode of gradual decline in aggregate CP amount started in 2019 when the initial news about COVID-19 started to spread. The reflection instance in 2020 corresponds to the assurances the French government provided to support the economy unconditionally.



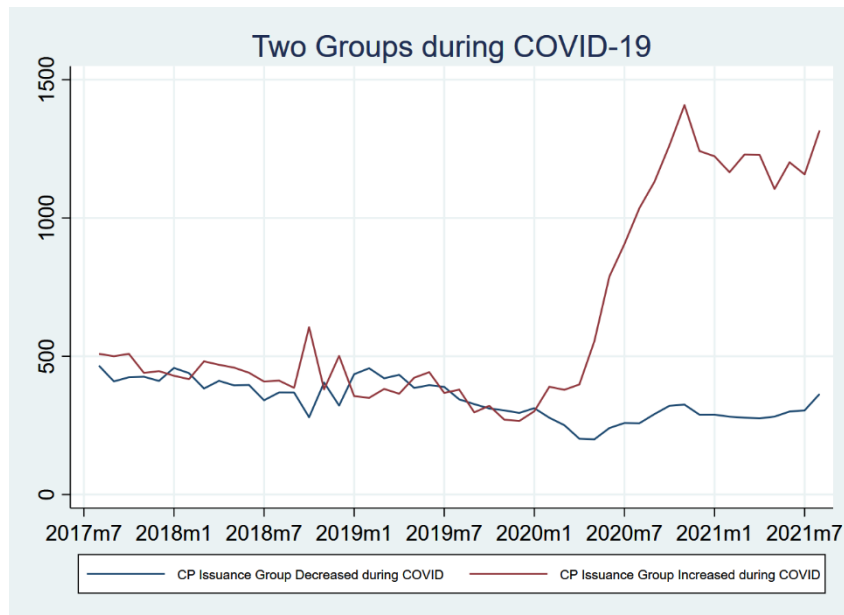
**Figure 2**

**Moving Average Aggregate Monthly Commercial Paper Issuance Amount**

Every month, we calculate the total amount of commercial papers (NEU CP) issued by banks. The graph shows a six-month rolling average of these monthly totals, broken down by whether the bank's average issuance has increased or decreased. Graph (A) shows that the MMF reforms are used to conditionally identify two bank groups based on their average monthly issuance changes in the second half of 2018. In Graph (B), the COVID-19 crisis is used to conditionally identify two bank groups based on their average monthly issuance changes during the period of increased liquidity demand, also commonly known as the “dash for cash episode.”



(A)

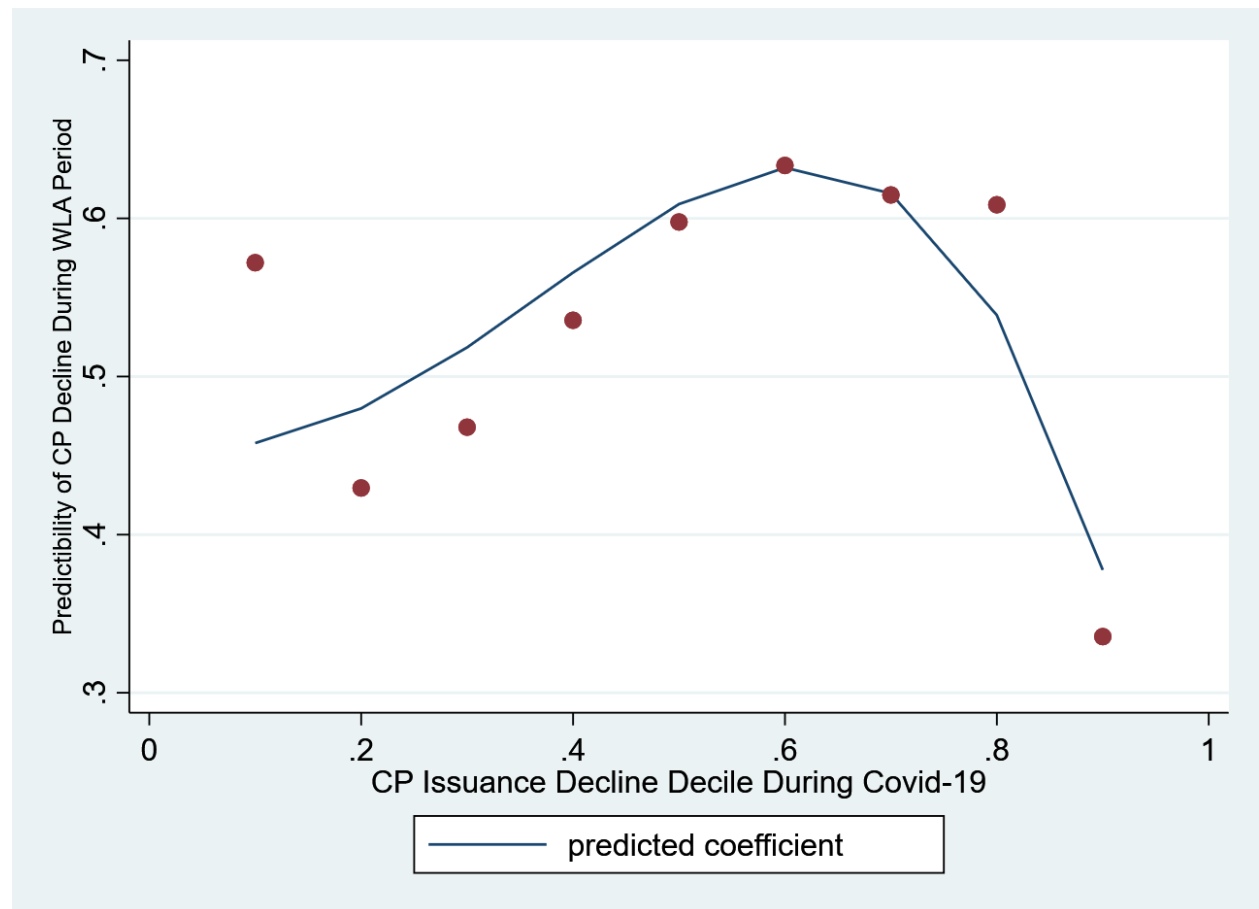


(B)

**Figure 3**

**Investors' Persistent Preference and Predictability**

This figure is a graphical presentation of the coefficients of quartile regression of the decile on decile reduction of CP amount during the MMF reform and the COVID-19 period. The positive coefficients indicate that if a bank has faced market restriction during the MMF reforms could significantly predict its situation regarding the outcome of CP issuance during the COVID-19 period. The belonging to the best decile, i.e., the tenth decile, during MMF reforms has been least predictive.



**Table 1****Summary Statistics**

The sample covers the NEU CP program from April 2016 until August 2021. Panel A describes the summary statistics of the details of the NEU CP issuance characteristics information, the source of these data is the monthly report from Banque de France. The ratios are reported over the last reported bank's total assets. Panel B is the financial data of all the banks that have participated in the program, and we only excluded a few small banks whose Legal Entity Identifiers (LEI) were unverifiable. Panel C presents the average change of the CP Issuance compared to the one-year average before the two events, i.e., MMF reforms and the COVID-19 crisis conditional on the bank being in the increased or decreased average CP issuance group. The banks are assigned to different deciles conditional on a decrease or increase in average CP issuance. The averages of changes in each decile are reported for both events. Panel D presents the average changes of the CP Issuance compared to the one-year average before the two events, i.e., MMF reforms and the COVID-19 crisis by the country of the bank.

**Panel A: NEUCP Issuance Characteristics**

Variable Name	Median	Mean	Max	SD	Number of Banks	Number of Observation
Issue Size in Month / Total (%)	0.0405	0.7338	31.5596	2.3465	139	6149
Outstanding Amount in Month / TA (%)	1.0213	3.2368	76.1414	6.6432	139	6149
Average Original Maturity of Issue (Days)	90	127.0085	365	138.422	141	5895
Average Original Maturity of Outstanding (Days)	332	290.2495	397.0583	94.77	142	6068
Average Residual Maturity of Outstanding (Days)	142	140.7988	363	74.4574	142	6068

**Panel B: Banks Balance Sheet Characteristics**

Variable Name	Median	Mean	Max	SD	Number of Banks	Number of Observation
Equity / TA (%)	7.92	8.65	18.59	4.81	139	6743
Net Loans / TA (%)	69.19	60.38	98.32	24.37	139	6743
Liquid Assets / TA (%)	15.34	20.5022	64.72	16.8455	139	6743
Growth of Gross Loans (%)	2.65	2.5944	21.11	8.7511	138	6702
Loan Impairment Charges / Gross Loans (%)	0.12	0.263	1.47	0.3925	135	6567
Interest Income / Avg. Earning Assets (%)	2.32	4.0789	18.62	4.6352	138	6685

**Panel C: Bank's Average CP Issuance Changes During the MMF Reforms and COVID-19**

Deciles	1	2	3	4	5	6	7	8	9	10	Aggregate
<b>Changes During MMF Reform</b>											
Average Reduction (EUR M)	-1744	-214.5	-76.47	-39.07	-23.75	-10.95	-5.48	-3.3	-1.42	-0.48	-236.8
Average Reduction / Equity (%)	-22.8	-17.51	-2.01	-3.94	-5.99	-5.19	-1.13	-1.3	-1.14	-0.2	-6.35
Average Increase (EUR M)	0.079	0.635	3.18	8.04	23.48	43.26	82.97	193.35	321.25	1301.5	167.1
Average Increase / Equity (%)	0.08	0.15	0.66	1.7	1.89	1.97	30.35	9.61	2.01	3.15	7.07
<b>Changes During COVID-19</b>											
Average Reduction (EUR M)	-1402.4	-241.3	-121.5	-64.87	-40.01	-26.19	-15.66	-4.57	-1.41	-0.4	-194.5
Average Reduction / Equity (%)	-5.26	-14.48	-11.51	-4.4	-9.81	-3.05	-5.3	-0.5	-0.94	-0.11	-5.56
Average Increase (EUR M)	0.44	0.92	1.5	2.39	5.22	8.45	23.34	156.94	418.19	1873.5	207.95
Average Increase / Equity (%)	0.38	0.86	0.43	0.58	0.26	5.43	8.52	5.48	7.09	19.99	4.47

**Panel D: Average CP Issuance Changes During the MMF Reforms and COVID-19 by Country**

	France	Austria	China	Germany	Denmark	Finland	UK	Italy	Luxamburg	Netherland	Sweden
<b>Changes During MMF Reform</b>											
Average Change (EUR M)	-79.51	.	-400.83	-65.07	-10.00	-310.91	-131.48	145.15	-39.50	32.27	-315.38
Average Change / Equity (%)	-0.01	.	-0.01	0.00	0.00	-0.01	0.00	0.00	-0.12	0.01	-0.02
<b>Changes During COVID-19</b>											
Average Change (EUR M)	-86.56	88.41	5.48	-106.69	469.30	.	-64.06	-365.70	-57.05	-71.97	-350.62
Average Change / Equity (%)	-0.03	0.11	0.00	-0.01	0.11	.	0.00	-0.01	-0.17	-0.01	-0.03



Table 2

**Short-term Debt Amount Reduction and Investor's Preference During MMF Reforms**

Table 2 reports the results of a comparison between the two groups of banks during the MMF reforms. Group 1 consists of all the banks that, on average, have issued less commercial papers during this period. Group 0 consists of banks that have not changed the amount of commercial papers issued during this period. The MMF reforms have resulted in a general reduction of MMFs' participation in the market. With a lower demand for the banks' short-term securities, the MMFs have shown preferences for the securities they selected to purchase in the primary market. Panel A reports the results of the split sample Heckman correction analyses. The complete data is almost representative of the population with negligible missing, and by intentionally selecting a biased subsample and applying Heckman correction, we estimate the coefficient as if the subsamples were representative. Panel B presents the results of an endogenous switching model. This model specification permits empirical analyses of endogenous and exogenous variables that affect the assignment to a group. The results are reported for the second stage estimation using GLS and bank fixed effect. Panel C presents analyses of the significance of the difference between the estimated coefficients. We define a dummy variable equal to one for Group 1 and zero for Group 0. The interaction term with the estimated coefficient is presented for two specifications, a model with selection correction and a second model equivalent to a fixed effect model without first-stage correction. Statistics are reported in parentheses, and significance is indicated by \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

**Panel A: split Sample Heckman Correction Analyses**

	Group 1: Decreased average CP during MMF reforms				Group 0: Increased average CP during MMF reforms			
	Banks' CP Issuance				Banks' CP Issuance			
	Complete Interval		Excluding Covid-19		Complete Interval		Excluding Covid-19	
	Selection	Main	Selection	Main	Selection	Main	Selection	Main
Equity / TA	<b>-2.406</b> *** (-6.74)	<b>0.0479</b> *** (3.66)	<b>-2.797</b> *** (-6.47)	<b>0.0829</b> *** (6.64)	<b>1.634</b> *** (4.47)	<b>-0.191</b> * (-1.66)	<b>1.672</b> *** (3.8)	<b>-0.0174</b> (-0.56)
Net Loan / TA	<b>-2.624</b> *** (-17.59)	<b>-0.0174</b> ** (-2.13)	<b>-2.675</b> *** (-14.44)	<b>0.0204</b> *** (2.62)	<b>2.909</b> *** (17.94)	<b>-0.351</b> ** (-2.38)	<b>2.600</b> *** (13.27)	<b>-0.0747</b> ** (-2.33)
Average Residual Maturity of Outstanding	<b>0.000562</b> ** (2.54)	<b>-0.0000122</b> ** (-2.01)	<b>0.000387</b> (1.46)	<b>-0.0000194</b> *** (-3.73)	<b>0.000272</b> (1.2)	<b>-0.0000928</b> ** (-2.19)	<b>0.000885</b> *** (3.26)	<b>-0.000110</b> *** (-6.59)
Liquid Assets / Total Assets (%)	<b>-0.0313</b> *** (-14.36)	<b>0.000294</b> *** (2.7)	<b>-0.0318</b> *** (-11.77)	<b>0.000812</b> *** (8.24)	<b>0.0359</b> *** (15.4)	<b>-0.00418</b> ** (-2.24)	<b>0.0321</b> *** (11.41)	<b>-0.000679</b> * (-1.67)
Growth of Gross Loans (%)	<b>-0.00529</b> *** (-2.70)		<b>-0.0113</b> *** (-4.44)		<b>0.00231</b> (1.14)		<b>0.00903</b> *** (3.46)	
Loan Imp. Charges / Avg. Gross Loans (%)	<b>-0.228</b> *** (-5.32)		<b>-0.0837</b> (-1.49)		<b>0.133</b> *** (3.04)		<b>0.156</b> *** (2.76)	
Interest Income / Avg. Earning Assets (%)	<b>0.0169</b> *** (4.38)		<b>0.0132</b> *** (2.8)		<b>-0.00771</b> ** (-1.98)		<b>-0.00771</b> (-1.61)	
Mill's lambda		<b>0.0275</b> *** (4.74)		<b>0.00123</b> (0.22)		<b>-0.174</b> ** (-2.45)		<b>-0.0468</b> *** (-2.87)
Constant	<b>2.516</b> *** (17.25)	<b>-0.00947</b> ** (-2.24)	<b>2.613</b> *** (14.42)	<b>-0.0260</b> *** (-6.58)	<b>-3.039</b> *** (-19.26)	<b>0.518</b> ** (2.46)	<b>-2.894</b> *** (-15.12)	<b>0.135</b> *** (2.82)
Observations	6361	6361	4449	4449	6361	6361	4449	4449

Table 2 (Continued)

## Panel B: Analyzing endogenous and exogenous variables that affect the assignment to a group using endogenous switching model specification

	Selection	Group 1: Decreased average CP during MMF reforms		Group 0: Increased average CP during MMF reforms	
		Banks' CP Issuance		Banks' CP Issuance	
		Complete Interval	Excluding Covid-19	Complete Interval	Excluding Covid-19
		Main	Main	Main	Main
Equity / TA	<b>-1.077***</b> (-2.82)	<b>0.0529***</b> (2.61)	<b>0.0951**</b> (2.29)	<b>-0.0672**</b> (-2.36)	<b>-0.129***</b> (-2.94)
Net Loan / TA	<b>-2.749***</b> (-16.65)	<b>-0.00957</b> (-0.92)	<b>-0.00509</b> (-0.37)	<b>-0.0450**</b> (-2.27)	<b>-0.162***</b> (-5.68)
Average Residual Maturity of Outstanding	<b>-0.000201</b> (-0.84)	<b>0.00000592*</b> (1.78)	<b>0.00000724*</b> (1.66)	<b>0.00000719</b> (1.45)	<b>0.00000285</b> (0.43)
Liquid Assets / Total Assets (%)	<b>-0.0344***</b> (-14.53)	<b>0.000175</b> (1.24)	<b>0.000543***</b> (2.74)	<b>-0.0000515</b> (-0.22)	<b>-0.000398</b> (-1.31)
Growth of Gross Loans (%)	<b>-0.000576</b> (-0.28)				
Loan Imp. Charges / Avg. Gross Loans (%)	<b>0.0597</b> (1.3)				
Interest Income / Avg. Earning Assets (%)	<b>0.0164***</b> (4.09)				
Mill's lambda		<b>0.00506</b> (0.58)	<b>0.00629</b> (0.57)	<b>-0.0129</b> (-1.44)	<b>-0.00929</b> (-0.81)
Constant	<b>2.707***</b> (16.99)	<b>0.0772***</b> (14.2)	<b>0.0570***</b> (7.16)	<b>0.0565**</b> (2.17)	<b>0.112***</b> (3.49)
Bank FE		Yes	Yes	Yes	Yes
Observations	5893	3537	2116	2295	1369

Table 2 (Continued)

Panel C: Analyzing the significance of the difference between the estimated coefficients for two bank groups

	Selection	Banks' CP Issuance		Banks' CP Issuance	
		Complete Interval		Excluding Covid-19	
		Main	FE Model	Main	FE Model
Equity / TA	<b>-1.077***</b> (-2.82)	<b>-0.0596**</b> (-2.13)	<b>-0.0595**</b> (-2.13)	<b>-0.101**</b> (-2.43)	<b>-0.0967**</b> (-2.32)
Dummy Decreased Issuance During Reforms		<b>0.0654***</b> (21.33)	<b>0.0637***</b> (20.21)	<b>0.0615***</b> (13.64)	<b>0.0586***</b> (12.6)
Equity Ratio $\times$ Decreased Issuance During Reforms		<b>0.116***</b> (3.56)	<b>0.116***</b> (3.54)	<b>0.175***</b> (3.05)	<b>0.161***</b> (2.79)
Net Loan / TA	<b>-2.749***</b> (-16.65)	<b>-0.00751**</b> (-2.03)	<b>-0.00881**</b> (-2.52)	<b>-0.0257***</b> (-4.40)	<b>-0.0117**</b> (-2.34)
Average Residual Maturity of Outstanding	<b>-0.000201</b> (-0.84)	<b>0.00000727***</b> (2.77)	<b>0.00000712***</b> (2.71)	<b>0.00000696**</b> (1.99)	<b>0.00000805**</b> (2.3)
Liquid Assets / Total Assets (%)	<b>-0.0344***</b> (-14.53)	<b>0.000253***</b> (4.88)	<b>0.000263***</b> (5.33)	<b>0.000379***</b> (4.82)	<b>0.000505***</b> (6.54)
Growth of Gross Loans (%)	<b>-0.000576</b> (-0.28)		<b>0.0000705***</b> (2.61)		<b>0.000164***</b> (4.31)
Loan Imp. Charges / Avg. Gross Loans (%)	<b>0.0597</b> (1.3)		<b>-0.000858</b> (-0.94)		<b>-0.000456</b> (-0.30)
Interest Income / Avg. Earning Assets (%)	<b>0.0164***</b> (4.09)		<b>-0.000021</b> (-0.29)		<b>-0.0000708</b> (-0.80)
Mill's lambda		<b>0.00156</b> (0.66)		<b>0.0200***</b> (5.41)	
Constant	<b>2.707***</b> (16.99)	<b>0.00979***</b> (2.64)	<b>0.0117***</b> (3.11)	<b>0.00249</b> (0.47)	<b>0.00513</b> (0.94)
Bank FE		Yes	Yes	Yes	Yes
Observations	5893	5893	5893	3521	3521

**Table 3****Short-term Debt Maturity Reduction and Investor's Preference**

Table 3 reports the results of a comparison between banks with at least one urgent CP issuance and other banks. If a bank does not issue any CP in a month, the average residual maturity of outstanding CPs will decrease by approximately 30 days. The average maturity of CP issues is 127 days, and the median is 90 days; if a bank issues a CP in a month in a routine schedule, we expect the average residual maturity of outstanding CPs to reduce by less than 30 days or increase. We define an urgent issue when a CP is issued in a month, and it reduces the average residual maturity of outstanding CPs by more than 45 days; this is considerably different from the expectation and could indicate an urgent issuing behavior by the bank that faced market restriction through maturity reduction. The identification strategy is similar to the results presented in Table 2. Panel A presents the results of an endogenous switching model. This model specification permits empirical analyses of endogenous and exogenous variables that affect the assignment to a group. The results are reported for the second stage estimation using GLS and bank fixed effect. Panel B presents analyses of the significance of the difference between the estimated coefficients. We define a dummy variable as one for Urgent Issuers and zero for Non-urgent Issuers. The interaction term with the estimated coefficient is presented for two specifications, a model with selection correction and a second model equivalent to a fixed effect model without first-stage correction. Statistics are reported in parentheses, and significance is indicated by \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

**Panel A: Analyzing the significance of the difference between the estimated coefficients for urgent issuers and non-urgent issuers**

	Selection	Urgent Issuers		Non-urgent Issuer	
		Banks' CP Issuance		Banks' CP Issuance	
		Complete Interval	Excluding Covid-19 (after 2019H2)	Complete Interval	Excluding Covid-19 (after 2019H2)
		Main	Main	Main	Main
Equity / TA	<b>3.210***</b> (7.83)	<b>0.0333***</b> (3.55)	<b>0.0432**</b> (2.16)	<b>-0.00293</b> (-0.13)	<b>0.00102</b> (0.05)
Net Loan / TA	<b>-1.276***</b> (-9.04)	<b>-0.00867**</b> (-2.31)	<b>-0.0240**</b> (-2.41)	<b>-0.00411</b> (-1.00)	<b>-0.00780**</b> (-2.39)
Average Residual Maturity of Outstanding	<b>-0.000939***</b> (-3.79)	<b>0.00000304</b> (1.57)	<b>0.00000195</b> (0.78)	<b>0.00000984***</b> (2.96)	<b>0.00000667***</b> (2.73)
Liquid Assets / Total Assets (%)	<b>-0.0199***</b> (-9.19)	<b>0.0000622*</b> (1.88)	<b>0.000101**</b> (2)	<b>0.000385***</b> (5.57)	<b>0.000247***</b> (5.26)
Growth of Gross Loans (%)	<b>0.0233***</b> (10.61)				
Loan Imp. Charges / Avg. Gross Loans (%)	<b>-0.309***</b> (-5.90)				
Interest Income / Avg. Earning Assets (%)	<b>-0.0711***</b> (-12.86)				
Mill's lambda		<b>0.000414</b> (0.43)	<b>0.000139</b> (0.1)	<b>0.00526**</b> (2.43)	<b>0.00769***</b> (2.66)
Constant	<b>0.636***</b> (4.52)	<b>0.0021</b> (0.7)	<b>0.0114</b> (1.54)	<b>0.0704***</b> (16.2)	<b>0.0588***</b> (9.29)
Bank FE		Yes	Yes	Yes	Yes
Observations	6361	1699	1104	4662	3815

Table 3 (Continued)

Panel C: Analyzing the significance of the difference between the estimated coefficients for urgent issuers and non-urgent issuers

	Selection	Banks' CP Issuance		Banks' CP Issuance	
		Complete Interval		Excluding Covid-19 (after 2020)	
		Main	FE Model	Main	FE Model
Equity / TA	<b>3.210***</b> (7.83)	<b>0.00102</b> (0.05)	<b>0.000887</b> (0.05)	<b>-0.0395</b> (-1.22)	<b>-0.0389</b> (-1.21)
Dummy Urgent Issuer.1		<b>-0.0865***</b> (-25.03)	<b>-0.0842***</b> (-25.65)	<b>-0.0852***</b> (-16.43)	<b>-0.0793***</b> (-16.38)
Equity Ratio $\times$ Urgent Issuer.1		<b>0.0575*</b> (1.93)	<b>0.0581**</b> (1.99)	<b>0.123**</b> (2.08)	<b>0.0915</b> (1.6)
Net Loan / TA	<b>-1.276***</b> (-9.04)	<b>-0.00780**</b> (-2.39)	<b>-0.0100***</b> (-2.98)	<b>-0.0110**</b> (-2.47)	<b>-0.0148***</b> (-3.19)
Average Residual Maturity of Outstanding	<b>-0.000939***</b> (-3.79)	<b>0.00000667***</b> (2.73)	<b>0.00000617**</b> (2.53)	<b>0.00000813***</b> (2.59)	<b>0.00000789**</b> (2.52)
Liquid Assets / Total Assets (%)	<b>-0.0199***</b> (-9.19)	<b>0.000247***</b> (5.26)	<b>0.000249***</b> (5.29)	<b>0.000455***</b> (6.57)	<b>0.000478***</b> (6.83)
Growth of Gross Loans (%)	<b>0.0233***</b> (10.61)		<b>0.0000753***</b> (2.88)		<b>0.000162***</b> (4.5)
Loan Imp. Charges / Avg. Gross Loans (%)	<b>-0.309***</b> (-5.90)		<b>-0.000997</b> (-1.16)		<b>-0.000209</b> (-0.14)
Interest Income / Avg. Earning Assets (%)	<b>-0.0711***</b> (-12.86)		<b>-0.0000325</b> (-0.46)		<b>-0.0000561</b> (-0.67)
Mill's lambda		<b>0.0017</b> (1.2)		<b>0.00221</b> (1.17)	
Constant	<b>0.636***</b> (4.52)	<b>0.0786***</b> (25.43)	<b>0.0798***</b> (25.83)	<b>0.0721***</b> (15.52)	<b>0.0720***</b> (15.46)
Bank FE		Yes	Yes	Yes	Yes
Observations	6361	6361	6361	3815	3815

**Table 4****Banks' Response to the Short-Term Debt Market Limitations**

This table presents the results of analyzing the banks' response to the limitation imposed by CP market participants after the MMF reforms. We evaluate different accounts on banks' balance sheets to observe the signaling and the signaling method. The model specification for all the evaluated outcome variables is the same. We define two dummy variables. In all the models, we compare the changes in the accounts of banks that had a decreased average amount of CP issuance during the MMF period. The time dummy variable is one after the reform period deadline, i.e., the beginning of 2019. In all the estimations of differences, we excluded the COVID-19 period to prevent the related distortions. The t-statistics are computed with two robust methods, without clustering and clustered at the bank level; for brevity, only the former is presented. Statistics are reported in parentheses, and significance is indicated by \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

	Equity Ratio	Net Loan Ratio	Impaired Loans less Loan Loss Allowances / Equity (%)	Impaired Loans / Gross Loans (%)	Loan Loss Provisions / Gross Loans (%)	Loan Loss Provisions / Imp. Loans (%)
<b>After MMF Reform Implementation Dummy: 1</b>	<b>-0.00301*</b> (-1.68)	<b>0.00383</b> (0.89)	<b>-2.010**</b> (-2.27)	<b>-0.369***</b> (-3.34)	<b>-0.202</b> (-1.47)	<b>-1.729</b> (-0.63)
<b>Issuance Decreased During MMF Reform: 1</b>	<b>.</b> (.)	<b>.</b> (.)	<b>.</b> (.)	<b>.</b> (.)	<b>.</b> (.)	<b>.</b> (.)
<b>1. After Reform <math>\times</math> 1. Decreased During Reform</b>	<b>0.00437**</b> (2.15)	<b>-0.00708</b> (-0.97)	<b>0.212</b> (0.18)	<b>-0.0965</b> (-0.61)	<b>0.169</b> (0.75)	<b>7.486**</b> (2.19)
<b>Liquid Assets / Total Assets (%)</b>	<b>-0.000199</b> (-0.98)	<b>-0.00428***</b> (-4.38)	<b>-0.0597</b> (-0.53)	<b>0.002</b> (0.20)	<b>-0.00715</b> (-0.49)	<b>0.151</b> (0.37)
<b>Growth of Gross Loans (%)</b>	<b>-0.0000135</b> (-0.18)	<b>0.00143***</b> (3.13)	<b>-0.0599</b> (-1.44)	<b>-0.0295***</b> (-3.41)	<b>-0.0202**</b> (-2.37)	<b>0.0156</b> (0.09)
<b>Loan Imp. Charges / Avg. Gross Loans (%)</b>	<b>-0.000815</b> (-0.16)	<b>0.0121</b> (1.04)	<b>2.976*</b> (1.86)	<b>0.301</b> (0.80)	<b>0.282</b> (0.93)	<b>0.116</b> (0.02)
<b>Interest Income / Avg. Earning Assets (%)</b>	<b>0.0000666</b> (0.15)	<b>-0.004</b> (-1.23)	<b>-0.329</b> (-1.61)	<b>0.0205</b> (0.60)	<b>0.0414</b> (0.99)	<b>0.308</b> (0.74)
<b>Constant</b>	<b>0.0915***</b> (19.55)	<b>0.713***</b> (34.95)	<b>14.16***</b> (5.93)	<b>3.451***</b> (11.83)	<b>2.371***</b> (8.08)	<b>63.85***</b> (7.85)
<b>Bank FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Month FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Observations</b>	4652	4652	4218	4278	4433	4218
<b>Adjusted R<sup>2</sup></b>	0.021	0.16	0.067	0.037	0.038	0.03

**Table 5**

**Investors' persistent preference and predictability of CP reduction of banks during COVID-19**

This table presents the results for the persistence of preferences of the CP investors. Our analyses of the two events during which the market preferences are revealed. Due to the sparsity of the time domain repeated revealed preferences, the identification strategy utilize the cross-section of the CP issuance reduction. The banks that have faced a reduction of CP issuance amount during MMF reform are classified in deciles, the first decile indicating the banks that had the most reduction during the MMF reforms period, and the tenth decile had the least reduction in CP issuance. In Panel A, a similar classification of the banks that have reduced CP issuance amount during COVID-19 is done. The quantile regression results indicate the banks' quantile predictability during the COVID-19 reduction, given the quantile of the bank during the MMF reforms. All coefficients are positive and significant, indicating high predictability. The relationship is presented graphically in Figure 3. In Panel B, the CP issuance reduction is a continuous variable. A move from the first decile to the tenth decile during the MMF reform is negatively related to the reduction during COVID-19. As the first decile is the worst, the coefficients decrease progressively to better deciles. This relation is observed from the fourth decile onward. Statistics are reported in parentheses, and significance is indicated by \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

**Panel A: Analyzing the predictability of the COVID-19 CP reduction**

	Quantile regression on Quantile of CP Issuance Decline during WLA implementation Period				
	20th	40th	Median	60th	80th
<b>Decile of CP Decrease WLA Period</b>	<b>0.430***</b> (31.23)	<b>0.536***</b> (59.75)	<b>0.598***</b> (66.23)	<b>0.633***</b> (83.95)	<b>0.609***</b> (54)
<b>Equity / TA</b>	<b>-12.78***</b> (-13.03)	<b>-4.621***</b> (-8.17)	<b>-4.338***</b> (-7.55)	<b>-0.0682</b> (-0.14)	<b>-4.108***</b> (-5.32)
<b>Net Loan / TA</b>	<b>-1.780***</b> (-5.06)	<b>1.955***</b> (9.55)	<b>2.177***</b> (10.48)	<b>2.190***</b> (12.34)	<b>2.182***</b> (7.7)
<b>Average Residual Maturity of Outstanding</b>	<b>-0.00210***</b> (-4.21)	<b>0.000895***</b> (2.61)	<b>0.00139***</b> (3.82)	<b>0.000918***</b> (2.84)	<b>0.000677</b> (1.22)
<b>Liquid Assets / Total Assets (%)</b>	<b>-0.0448***</b> (-10.26)	<b>-0.0137***</b> (-4.83)	<b>-0.0138***</b> (-4.73)	<b>-0.0178***</b> (-7.26)	<b>-0.00726*</b> (-1.83)
<b>Growth of Gross Loans (%)</b>	<b>0.0597***</b> (12.58)	<b>0.0463***</b> (18.05)	<b>0.0448***</b> (16.85)	<b>0.0401***</b> (16.72)	<b>0.0566***</b> (12.43)
<b>Loan Imp. Charges / Avg. Gross Loans (%)</b>	<b>1.781***</b> (20.68)	<b>0.789***</b> (13.72)	<b>0.934***</b> (15.06)	<b>0.597***</b> (10.91)	<b>0.243***</b> (2.71)
<b>Interest Income / Avg. Earning Assets (%)</b>	<b>0.107***</b> (9.45)	<b>0.0535***</b> (8.53)	<b>0.0228***</b> (3.65)	<b>0.0163***</b> (3.14)	<b>-0.0218**</b> (-2.45)
<b>Constant</b>	<b>3.510***</b> (10.41)	<b>1.514***</b> (6.93)	<b>1.391***</b> (6.28)	<b>1.561***</b> (8.39)	<b>2.925***</b> (9.68)
<b>Observations</b>	2041	2041	2041	2041	2041
<b>Pseudo R<sup>2</sup></b>	0.271	0.311	0.314	0.318	0.248

Table 5 (Continued)

## Panel B: Quartile regression of the average CP issuance amount during COVID-19

	CP Issuance of Banks with Decreased Issuance during COVID-19				
	20th	40th	Median	60th	80th
Decile of CP Decrease WLA Period	<b>-0.0134***</b> (-5.99)	<b>-0.00361***</b> (-2.79)	<b>-0.00574***</b> (-7.60)	<b>-0.00645***</b> (-9.78)	<b>-0.00852***</b> (-4.90)
Equity / TA	<b>-1.990***</b> (-7.07)	<b>-2.041***</b> (-11.88)	<b>-1.563***</b> (-15.02)	<b>-0.936***</b> (-10.10)	<b>0.939***</b> (3.82)
Net Loan / TA	<b>-0.275**</b> (-2.37)	<b>-0.116*</b> (-1.76)	<b>-0.0968**</b> (-2.45)	<b>0.0251</b> (0.71)	<b>0.227**</b> (2.28)
Average Residual Maturity of Outstanding	<b>0.000268*</b> (1.77)	<b>0.000272**</b> (2.57)	<b>0.000196***</b> (2.88)	<b>0.000138**</b> (2.2)	<b>0.000605***</b> (4.01)
Liquid Assets / Total Assets (%)	<b>-0.0179***</b> (-11.27)	<b>-0.00769***</b> (-8.35)	<b>-0.00703***</b> (-12.92)	<b>-0.00363***</b> (-7.62)	<b>0.00283**</b> (2.16)
Growth of Gross Loans (%)	<b>0.00680***</b> (5.33)	<b>0.00169**</b> (2.15)	<b>0.00168***</b> (3.59)	<b>0.000904**</b> (2.22)	<b>-0.00301***</b> (-2.88)
Loan Imp. Charges / Avg. Gross Loans (%)	<b>-0.117***</b> (-4.63)	<b>0.0147</b> (0.83)	<b>0.0531***</b> (4.93)	<b>0.0461***</b> (4.87)	<b>0.0903***</b> (4.02)
Interest Income / Avg. Earning Assets (%)	<b>-0.0036</b> (-1.40)	<b>-0.00187</b> (-1.21)	<b>-0.00105</b> (-1.12)	<b>0.000477</b> (0.56)	<b>0.00276</b> (1.28)
Constant	<b>0.417***</b> (3.93)	<b>0.218***</b> (3.51)	<b>0.226***</b> (6.03)	<b>0.0913***</b> (2.73)	<b>-0.218**</b> (-2.40)
Observations	1282	1282	1282	1282	1282
Pseudo R <sup>2</sup>	0.076	0.038	0.028	0.013	0.014