Bank Market Structure and Earnings Quality

Luqiao Zhang

BISA, Henley Business School

University of Reading

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Declaration

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Abstract

With three empirical essays, this thesis aims to examine the relationship between bank market structure and earnings quality. Specifically, I test how regional bank market structure influence local firms' earnings quality at the level of U.S. states in Chapter 3. The results show that firms increase their earnings quality in the region where banks have more market power. This finding supports the information-based (IB) hypothesis that banks with market power are more likely to screen and monitor borrowers. I further analyse the trade-off between accrual earnings management and real earnings management as firms react to the change of bank deregulation during 1990s (IBBEA) in Chapter 4. The result show that enterprises use less accrual earnings management and more real earnings management with the freedom of bank market. This finding also supports Chapter 3 as bank deregulation leads to be more consolidated market and large banks have more market power. In Chapter 5, I use 1-to-1 matched lender-borrower (loan) data to examine the relationship between bank market structure and earnings quality. This data sample eliminates the limitations of the regional tests in Chapter 3 and Chapter 4. The results in Chapter 5 further support the earlier two chapters, and I find both screen and monitor work in determining borrowers' earning quality.

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1. Introduction

Information asymmetry is central to understanding the relationship between lenders and borrowers in cases like a loan contract, the lender's ex-ante screening and ex-post monitoring. The borrower's accounting information is an essential channel that potential lenders can use to alleviate such information asymmetry. This thesis emphasises one element of the quality of accounting information, namely earnings quality, which has been widely used to predict borrowers' future cash flows (Francis et al., 2005). Indeed, a borrower's future cash flow and the ability to predict future cash flow from financial reports are the two main issues lenders consider (Dechow, 1994). High earnings quality could effectively improve lenders' monitoring efficiency and benefit borrowers with a favourable loan contract, such as a lower loan price (Sunder et al., 2008). At the same time, bank lenders monitor borrowers' earnings management to increase earnings quality after issuing the loan (Ahn and Choi, 2009). However, there is little evidence that examined the relation between bank market structure and borrowers' earnings quality.

This thesis focuses on the effect of the lender's role (bank market structure) on the borrower's earnings quality. I examined how regional bank market competition (e.g., Lerner index and Herfindahl-Hirschman Index) influence local borrower's earnings quality in Chapter 3. Then, I used bank market deregulation policy and the propensity

score matching and difference in difference (PSM-DID) method to test this relationship in Chapter 4. The first two chapters examined the bank market structure and earnings quality at the level of U.S. states. Chapter 5 used loan-level data to match lenders and borrowers to test the bank monitor's role on borrowers' earnings quality.

1.1 Earnings quality and bank market structure

The Statement of Financial Accounting Concepts No. 1 (SFAC No. 1) defines earnings quality as follows: 'Higher quality earnings provide more information about the features of a firm's financial performance that are relevant to a specific decision made by a specific decision-maker. Earnings quality is contextual, otherwise it is meaningless, which means that evaluated earnings quality is based on decision models and depends on financial report'. There are many studies that define higher quality earnings. For example, Dechow and Schrand (2004) find that earnings quality for firms with more persistent earnings numbers is higher than those with less persistence. A smoother earnings number also indicates higher earnings quality (Francis et al., 2004). Furthermore, the slight change in total accrual has a higher earnings quality (Jones, 1991, Dechow et al., 1995). However, those definitions are official and intricate. Dichev et al. (2013) interviewed 475 CFOs of public and private companies to discuss the construct of earnings quality. Most of them think earnings quality is repeatable,

consistent with income and sustainable earnings based on a firm's operating activities. Nearly 95% of the CFOs responded that the two most important application for earnings quality were, first, reflecting consistent reporting choices over time, and second, avoiding long-term estimates as much as possible (Dichev et al., 2013).

Bank market structure refers to the geographic distribution or concentration of banks (e.g., branch density), their ability to set prices and their share of the market for particular products (e.g., deposit market or loan market). It is also known as bank competition, bank concentration and bank market power. A more concentrated bank market means that banks in that market have more power and less competition from other banks. Bank market structure plays an important role in financial markets which affects the supply of credit, the cost of debt, bank-firm relationships and firm innovation (Cornaggia et al., 2015, Butler and Cornaggia, 2011).

1.2 Development of research questions and objectives

Banks, as vital financial intermediaries, provide financial services to corporations. Changes in the bank market structure affect the supply of credit, cost of debt, the bank–firm relationship and firm innovation (Cornaggia et al., 2015, Butler and Cornaggia, 2011). I believe that bank market structure would be an influential factor in

determining a borrower's earnings quality. However, there are contrary predictions of the relationship between bank market structure and earnings quality. In the traditional view of Structure Conduct Performance (SCP), banks with market power tend to give depositors a lower interest rate. This results in lower capital accumulation and makes funds less accessible to firms. Therefore, local borrowers may engage in earnings management (lowering their earnings quality) to attract potential lenders. In terms of the information-based (IB) hypothesis, banks with market power have more incentive and ability to screen and monitor borrowers. Therefore, borrowers are expected to have high earnings quality in their financial reports. To test which channel dominates the relation between bank market structure and earnings quality, I provide three empirical essays.

The first essay in Chapter 3 examines the relationship between the regional bank market structure and local corporations' earnings quality. I employ a sample of 73,183 firm-year observations from the U.S. market for 1995–2019. I measure the bank market structure at the state level and proxy earnings quality/management using accrual quality. After carefully addressing the issues of endogeneity, I show that firms have better earnings quality in regions where banks have more market power. I also test the mechanism of this relation, and the results support the bank's screen and monitor channel.

In the second empirical essay in Chapter 4, I explore the influences of U.S. banking deregulation (1994-IBBEA) on local borrowers' earnings quality. Typically, firm managers have two approaches to manipulate their earnings numbers, which would erode earnings quality. The first approach is to use an accrual method. Accruals are the non-cash portion of earnings; they contain adjustments and estimates. Accruals can be used for earnings management because accruals need forecasting, estimation and judgments (Subramanyam, 1996, Dechow et al., 2010). The second earnings management method is through real activity. Graham et al. (2005) find that firms' managers are more likely to use real activity earnings management to avoid adverse reactions to investors' and analysts' earnings expectations. In the second essay, I investigate the effects of banking market deregulation on the choices between earnings management based on accrual and earnings management based on real activity. In the thesis, I assume that accrual earnings management and real earnings management can be substituted for each other (Cunningham et al., 2020). The baseline results show that bank deregulation leads to less accrual earnings management and more real earnings management. This result is consistent with the finding in Chapter 3 that bank market deregulation leads to a more consolidated and concentrated bank market, strengthening the banks' screening and monitoring roles. Our finding also supports prior research that firms' managers are more likely to use real activity earnings management to avoid the adverse reaction to investors' and analysts' earnings expectations (Graham et al., 2005).

Chapter 3 and Chapter 4 test how changes in regional bank market structure influence local firms' earnings quality. Theoretically, these two chapters bear two kinds of limitations: 1) There is clear evidence that firms are increasingly borrowing from the non-local state (Mi and Han, 2020). In this case, the local bank market structure plays a limited role in determining the firm's earnings quality. 2) We cannot distinguish between the bank's screening role and its monitoring role. Borrowers may increase their earnings quality before a loan is issued (the screening role) or engage in less earnings management because of strict bank monitoring (after the loan is issued). To deal with these limitations, I use loan-level data to support my findings because this provides a 1-to-1 match between the bank and the corporate borrowers.

The third empirical essay in Chapter 5 uses loan data to match lenders and borrowers. The results show that borrowers with more earnings management are usually matched with banks who have market power, and bank market power further increases the borrower's total earnings management after loan origination. I also find that borrowers switch from accrual earnings management to real earnings management, both before and after loan origination, when the lenders have market power. The base results in Chapter 5 support the findings in Chapter 3 and Chapter 4. I further examine the factors that could influence banks to exert their market power. The first factor is the number of lenders in syndication because a large group of lenders could lead to the problem of free riding (Sufi, 2007). We expect that the effect of bank market power on

earnings management decreases when the number of lenders increases. We then test the effect of lead share. In syndicated loans, more shares held by the lead arranger means more monitoring incentive after loan origination. We predict that a larger lead share strengthens the relation between bank market power and earnings management. Finally, we consider the effect of distance. We hypothesise that the link between bank market power and earnings management is weakened if lender and borrower are at a distance (Degryse and Ongena, 2005). Overall, the results support the conjecture, and they further prove the correctness of the base hypothesis.

1.3 Conclusion

In sum, this chapter provides an overview of the three empirical essays in this thesis. I construct the following four chapters: Chapter 2 provides the literature review about earnings quality and bank market structure; Chapter 3 examines the influence of regional bank market structure on earnings quality; Chapter 4 tests the trade-off between accrual earnings management and real-based earnings management after the 1994 state-level deregulation of banks; Chapter 5 further investigates the relationship between bank market power and earnings quality by using a 1-to-1 matched sample. Chapter 6 concludes the thesis.

2. Literature Review

2.1 Earnings Quality

2.1.1 Why Earnings Quality?

Earnings numbers are derived from various decisions[1], which play a significant role in our research. Dechow and Schrand (2004) show that a high quality of earnings number can reflect current operating activities, be a good predictor of future firm performance and accurately assess the intrinsic value of the firm. Therefore, earnings numbers are a summary of firm performance, and they have practical value for investors and contractors. In addition, the earnings number acts as a flag that reflects a stock price's trend (Sloan, 1996).

From the interviews noted above, about 95% CFOs of public companies think that earnings are most important for investors in their valuation of a company. Kothari (2001) finds that valuation is vital for investors, analysts, and financial executives in capital markets. Therefore, a lower quality of earnings is not desirable, since low-quality financial reports provide asymmetric information and reduce economic growth (Schipper and Vincent, 2003).

[1] Those decisions may be the result of company strategies, accounting standards and/or the styles of management.

2.1.2 Properties of Earnings Quality and Measurement

In our research, we define earnings as the sum of cash flow from operations and accrual adjustments. The aim of the accrual process is to overcome information asymmetries between management and outside parties in continuous operation and to reflect firm performance more accurately. Further, to mitigate problems of timing and matching realised cash flow, earnings obey the revenue recognition principle and the matching principle under the accrual process. Therefore, earnings are better than current cash flow in reflecting current firm performance and predicting future cash flows (Dechow, 1994). In the following sections, I introduce different ways to calculate accruals as a measurement of earnings quality.

The first simple approach is the magnitude of accruals, which includes changes in total accruals (DeAngelo, 1986) and changes in non-cash working capital (Dechow, 1994). Those studies show that large accruals provide low earnings quality because extreme accruals indicate less earnings persistence. However, under this method, we cannot distinguish between the accounting system and fundamental performance, which may lead to extreme accruals (Dechow et al., 2010).

The second approach is direct estimation of abnormal accruals by using an accrual model. A sophisticated model categorises accruals as normal (nondiscretionary) and abnormal (discretionary). In an accruals model, the coefficient of all variables

captures fundamental performance, which represents (normal) nondiscretionary accruals. Furthermore, the residual term or standard deviation of residuals captures distortions, which is abnormal accrual caused by accounting rules or earnings management. This approach is developed by Jones (1991), who defines a function of total accrual combined with sales growth, plant, property and equipment (PPE). Then, Dechow et al. (1995) extends Jones's model, deleting 'changing in receive' from 'changing in revenue'. They indicate that earnings performance is correlated with errors in measuring abnormal (discretionary) accruals since firms with high earnings tend to have high accruals. In fact, some studies have already shown that the Jones' model has lower explanatory power. Dechow et al. (1995) show that using Jones's model to detect earnings management in Securities and Exchange Commission (SEC) enforcement release suffers Type II error. Xie (2001) finds that the residuals in Jones's model have less ability to predict future earnings than normal accruals. The modified Jones' model still suffers Type I error, even though it enhances its explanatory power (Dechow et al., 2010).

Taking a fresh perspective, Dechow and Dichev (2002) (hereafter DD) focus on errors in accrual estimation. These are the residuals from firm-specific regressions on changes in working capital accruals by considering past, current and future cash flows from operations. These residuals exclude cash flow realisation and include estimation errors and reversals. The standard deviation of residuals represents earnings quality,

such that a higher standard deviation reflects lower earnings quality. In addition, they note that firm characteristics also influence earnings quality. These characteristics include the operating cycle, firm size, sales, cash flows from operations, working capital and earnings. Then, they find that earnings quality (standard deviation of residual) and earnings persistence are positively correlated. That is, a firm with low earnings quality has a higher magnitude of accrual because earnings have less correlation with cash flow from operations. Higher magnitude of accrual would increase the noise in earnings and result in less persistence in earnings. They also observe that earnings quality is not only affected by intentional factors, such as earnings management, but also by unintentional factors, such as a firm's characteristics. However, Dechow and Dichev (2002) point out that the DD model is unsigned, so its explanatory power is weakened if this model is used to predict accounting distortions.

Some researches such as Joens et al. (2008) suggests that discretionary accruals which can be explained by the legal space that the accounting principles leave for interpretation can detect an extreme case of earnings presented as accounting fraud. According to Dechow et al. (1996) and Hui et al. (2014), earnings management is the first step toward violating the generally accepted accounting principles (GAAP). Firms can manipulate their financial statements by earnings management using discretionary accruals. Thus, companies with higher or lower levels of discretionary accruals should deal with the consequences of this manipulation, or they commit fraud to compensate

for the reverse accruals (Beneish et al., 2012, Dechow et al., 2010). Thus, using accruals to manipulate results over several years can also push managers to enhance all possible manipulations (Perols and Lougee, 2011). In addition, the sign of the discretionary accruals traces the accounting policy adopted by the company. In this line, Gietzmann and Ireland (2005) show the different effects of discretionary accruals by breaking down the positive and negative sign.

The effective reporting regulatory environment (e.g., IFRS and GAAP) can influence and limit earnings management. Barth et al. (2012) point out that non-U.S. firms adopting IFRS (international financial reporting standards) will engage more accruals earnings management than those U.S. firms adopting GAAP (generally accepted accounting principles). For firms located in the U.S. and using GAAP, Graham et al. (2005) provide evidence that those firms prefer real earnings management to accrual-based earnings management. A broader perspective has been adopted by Evans et al. (2015) who argues that U.S. located firms using GAAP engage more real earnings management than non-U.S. firms taking either IFRS or GAAP. This approach can be explained by the U.S. GAAP stringent detection on earnings management. However, total earnings management does not reduce in the stronger reporting regulatory environment, and it suggests that firms transfer from accrual earnings management to real earnings management.

Dechow et al. (2010) show that accruals create the opportunity for earnings management because they require managers to make forecasts, estimates, and judgments. The more discretion in their accruals, the greater the opportunity for earnings management. The choice of an insight accounting method leads to lower earnings quality, since management masks information and manipulates earnings, rather than improving earnings information (Aboody et al., 1999). For example, aggressive earnings numbers are opportunistic discretion by investors. However, many firms have come to prefer decreasing discretion in financial reporting in their business decisions. Dichev et al. (2013) find significant evidence that reporting discretion has been reduced over time.

Financial lending has a strong connection with a firm's financial report. If banks and firms have highly asymmetric information, the bank increases loan rates and establishes a deflation contract with the firm. Banks use borrower's financial statements to predict future cash flow and the ability to repay the loan (Berger and Udell, 2006). As mentioned earlier, Dechow (1994) has already proved that accruals can improve the ability to predict future cash flow and reduce the problem of asymmetric information (Bharath et al., 2008). Therefore, a good financial report, such as one with high accrual quality, can reduce information asymmetry between firms and banks. Moreover,

previous studies show that increasing the quality of accruals can help firms get outside financial support more easily (García-Teruel et al., 2014).

Real activity manipulation is defined as ‘management actions that deviate from normal business practice, undertaken with the primary objective of meeting certain earnings thresholds’ (Roychowdhury, 2006). It can hurt a firm’s value because actions taken in the current period to boost earnings may hurt cash flow in future periods. Earnings management based on accrual reverts to the mean, and overstatements of earnings that violate GAAP could generate litigation. In contrast, earnings manipulation based on real activity is not prohibited by GAAP. According to the survey by Graham et al. (2005), financial executives are willing to manipulate real activities to avoid negative market reaction if they miss the earnings expectations of analysts and investors, but they are hesitant to employ within-GAAP accruals to hit earnings targets. Earnings management by real activities is a purposeful action to alter reported earnings in a particular direction, which is achieved by changing the timing or structuring of an operation, investment, or financing transaction, and which has suboptimal business consequences. The idea that firms engage in real activities manipulation is supported by the survey evidence from Graham et al. (2005). They report that 80% of the CFOs they surveyed stated that, to deliver earnings, they would decrease expenditures in research and development (R&D), advertising, and maintenance, while 55% said they would postpone a new project, even if such delay caused a small loss in firm value.

Consistent with that survey, Roychowdhury (2006) provides large-sample evidence suggesting that managers avoid reporting annual losses or missing analyst forecasts by manipulating sales, reducing discretionary expenditures, and overproducing inventory to decrease the cost of goods sold. All these are deviations from otherwise optimal operational decisions, intended to bias earnings upward.

Using the model from Kasznik and McNichols (2002), Francis et al. (2005) develop the FLOS model by modifying and extending the DD model. They find that changes in sales revenue and PPE are significant for current accruals, overpassing the effects of cash flows from operations. Adding these two variables in the DD model helps FLOS increase explanatory power and reduce error. The FLOS model decomposes accruals (earnings) quality into two parts. Innate accruals quality is induced by economic fundamentals, and discretionary accruals quality is caused by management choices. However, this model does not indicate whether it reduces Type I or Type II error.

Earnings persistence can be defined as earnings quality that is determined by fundamental performance and the accounting system. In general, earnings are more persistent than cash flows, and cash flows are more persistent than the level of accruals (Dechow, 1994, Subramanyam, 1996). Therefore, a higher persistence earnings number indicates higher earnings quality. Lev (1983) finds that earnings persistence is

associated with firm performance, such as product type, industry competition, capital intensity and firm size. Another study finds that changes in property, plants and equipment as the accrual of working capital influence causes lower earnings persistence (Fairfield et al., 2003). Sloan (1996) shows that lower earnings persistence results from including a higher accrual component in earnings. He points out that this result is induced by measurement problems of the accounting system. Therefore, firm performance and accounting measurement together determine earnings persistence.

As stated in the previous section (2.1.1), accrued earnings can better reflect firm performance and have more ability to predict future cash flow (Dechow, 1994). However, if accruals account for a larger portion of earnings than cash flow, this causes lower earning persistence. Therefore, we assert that the judgement of earnings quality should be in the specific model.

The accrual models show that abnormal accruals have positive persistence. Xie (2001) finds that the persistence coefficient on cash flows, normal accruals and discretionary accruals have positive significance in Jones's model. Dechow and Dichev (2002) find that involving more forecasting and estimation leads to larger accrual adjustments. In other words, there is likely to be more estimation error if earnings contain a large magnitude of accruals, and that reduces earnings persistence. Therefore, we can state that a firm with extreme accruals has less earnings persistence.

Dechow et al. (2010) viewed over 300 studies and concluded that there are three categories of proxies for earnings quality. The first is the property of earnings. This kind of proxy includes earnings smoothness, timely loss recognition, earnings persistence and abnormal accrual. The second is investors' reactions to earnings. This category includes R^2 from the earnings-return model and the earnings response coefficient (ERC). The third is external indicators of reporting quality, such as restatements and Accounting and Auditing Enforcement Releases (AAERs). In this thesis, we measure earnings quality through accrual-based earnings management and real-based earnings management[2].

It is challenging to describe earnings quality since the practice relies on both the firm's financial performance and specific business decisions and accounting measures. Besides these two major factors, the type of industry, the characteristics of the firms and their business strategy also affect earnings management (Dechow and Schrand, 2004). In practice, managers have discretion to judge, estimate, or use private information to disclose or hide information. Managers have incentives to manipulate earnings, leading to lower financial reporting quality. These include incentives from the

[2] Details about the measures of earnings quality are provided in Chapters 3, 4 and 5. In case of duplication, I do not repeat the calculation process of accrual-based and real-based earnings management.

stock market to manage earnings numbers, support their compensation contracts and protect their job security (Wahlen and Healy, 1999).

Typically, there are two ways to manipulate earnings number. The first one is through the accrual method. Accruals are the non-cash part of earnings; they contain adjustments and estimates. Accruals can create earnings management because accruals need forecasting, estimation and judgments (Subramanyam, 1996, Dechow et al., 2010). For example, a growing company may spend a lot of money on inventory. This may lead to high accruals and low accounting quality because accruals may contain estimation error or earnings manipulation, which will reduce the persistence of earnings or their reliability in the future (Dechow and Schrand, 2004). Firms have some discretion in earnings management to manipulate earnings by using discretionary (abnormal) accruals. Some researchers consider residuals derived from the accrual model as discretionary accruals (Dechow et al., 2010). Therefore, larger discretionary accrual indicates lower accounting quality and more earnings management (Dechow et al., 1995).

The second approach to earnings management uses real activity. Graham et al. (2005) find that firms' managers are more likely to use real activity earnings management to avoid adverse reactions to investors' and analysts' earnings expectations. Managers have three main ways to manipulate real activity

(Roychowdhury, 2006). First, they use attractive discounting prices or lenient credit policies to increase sales volume and increase current income. However, this decreases cash inflow in the future. Therefore, an abnormal negative cash flow is a proxy for real-based earnings management. Second, firms can reduce the reported cost of goods sold (SOGS) by reducing fixed costs per unit. Finally, firms can reduce discretionary expenses such as selling, general and administrative (SG&A) expenses, research and development (R&D) and advertising to boost current earnings.

2.1.3 The determinants and consequences of earnings quality

Theoretically, there are five categories of determinants of earnings quality: firm performance, compensation agreements and debt covenants, firm size, accounting choice and capital market.

First, Dechow and Dichev (2002) showed that firm characteristics affect earnings quality. However, there are contrary theorems to explain the relationship of weak performance to earning management. (Doyle et al., 2007) contend that weak

performance stimulates earnings management, while (DeAngelo et al., 1994) hold that sustaining weak performance hinders earnings management. Second, available evidence shows that earnings are commonly used in compensation arrangements and debt covenants. If debt leverage limits debt covenants, then higher leverage is an incentive to boost sales or manipulate the financial statement, which reduces earnings quality. In particular, firms with high growth in sales or net operating assets may have lower earnings persistence (Nissim and Penman, 2001, Penman and Zhang, 2002). In addition, earnings numbers are associated with compensation arrangements. For example, overstated earnings numbers induce overcompensation to managers (Schipper and Vincent, 2003). Third, Researchers have shown that firm size has a negative relationship with earnings quality (Watts and Zimmerman, 1986). However, more recent research finds that firm size has a positive relationship with earnings quality, because of internal controls (Doyle et al., 2007). Next, we believe a firm has more or less discretion in financial reporting. Discretion, such as the choice of accounting method, leads to lower earnings quality because management masks information or manipulates earnings rather than improving earnings information (Aboody et al., 1999). For example, aggressive earnings numbers are opportunistic discretion by investors. Many firms have begun to decrease discretion in financial reporting in their business decisions. Dichev et al. (2013) find significant evidence that reporting discretion has been reduced over time. Finally, the capital market is also viewed as a determinant of

earnings quality. Equity market valuation influences firms' accounting choices during the process of raising capital, particularly choices about accruals (Morsfield and Tan, 2006).

Firms with high accruals are more likely to get modified audit opinions (Francis and Krishnan, 1999). However, extremely high working capital accruals have no relation with adverse audit opinions or auditor turnover (Bradshaw et al., 2001). Rewards for a firm that beats period earnings targets are overstated (Myers et al., 2007). However, earnings management with discretionary loss reserves is not rewarded with higher valuations (Petroni et al., 2000). If a firm does not reach a target, it is more likely to lose extra valuation (Myers et al., 2007). In addition, higher earnings quality reduces information asymmetry between managers and outside contractors, thereby improving investment efficiency (Biddle and Hilary, 2006, Biddle et al., 2009). Moreover, earnings numbers also affect managers' internal investment decisions (Jackson and Liu, 2010). Gaver and Gaver (1998) find that transitory gains, which are regarded as earnings, reduce earnings persistence. Dechow and Shakespear (2009) show that compensation agreements are sensitive to highly discretionary and increased earnings. Therefore, earnings quality and management compensation are closely related.

2.1.4 Earnings quality, earnings management and the quality of financial reporting

Wahlen and Healy (1999) and Schipper (1989) use this definition: ‘Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers’. Lo (2008) states that earnings management and earnings quality have a lot in common, although less earnings management does not guarantee high earnings quality (e.g., following a poor set of accounting standards).

Ciesielski and Selling (2019) conclude that the quality of financial reporting and earnings quality are different but interrelated. The quality of financial reporting focuses on the quality of the information in financial reports (including the notes disclosed). High-quality reporting should ‘provide decision-useful information, which is relevant and faithfully represents the economic reality of the company’s activities during the reporting periods as well as the company’s financial condition at the end of the period.’ (Ciesielski and Selling, 2019) Such as, high-quality financial reports should conform to the GAAP of the jurisdiction (e.g., the International Financial Reporting Standards–IFRS and the GAAP in the USA and home-country GAAP). They should embody the characteristics of decision-useful information (e.g., defined in the conceptual

framework). Earnings quality focuses on a company's actual economic activities and the resulting financial numbers, such as earnings and cash flow. High-quality earnings should be sustainable in the future period, and investors or analysts should be able to use current earnings numbers to predict future earnings numbers. Only if there is high-quality financial reporting can the users of financial statements assess earnings quality and predict future performance. It is possible that financial reporting has high quality (e.g., GAAP and decision-useful) while earnings have low quality, because a non-sustainable earnings number may result from non-recurring activities and low earnings that cannot provide an adequate return on investment (Ciesielski and Selling, 2019).

In some studies, the quality of financial reporting, earnings quality and earnings management do not have clear margins and are interchangeable, such as Chy and Hope (2021), Fan et al. (2020), Jiang et al. (2020), He (2015), Alam et al. (2018), Wang (2006), Labelle et al. (2010) and Dechow et al. (2010). In this thesis, we focus on earnings quality and earnings management, and we follow prior research to predict that there is a negative relationship between earnings management and earnings quality or the quality of financial reporting. (Increased earnings management would erode earnings quality and the quality of financial reporting.)

2.2 Bank Market Structure

2.2.1 What do we know about bank market structure

Banks, as vital financial intermediaries, provide financial services to corporations. Changes in the bank market structure matters supply of credit, cost of debt, the bank–firm relationship and firm innovation (Cornaggia et al., 2015, Butler and Cornaggia, 2011). There are two streams of thought about bank market structure, the structure-conduct-performance (SCP) paradigm and the information-based (IB) hypothesis.

SCP: The SCP paradigm is used to explain the conduct and performance of banks in a specific bank market structure. Research suggests that bank markets with monopolistic power have negative effects on the availability of credit, since powerful banks tend to provide higher loan interest rates and lower deposit interest rates. This is likely to reduce market efficiency (Rhoades, 1982, Gilbert, 1984, Weiss, 1989). Therefore, some studies indicate that banking competition has a favourable effect in supplying more credit at lower prices.

Here are some studies in favour of bank competition. Hannan (1991) proves that high banking concentration leads to high interest rates for credit in the U.S. Pagano (1993) has similar results and finds that banks with monopolistic power reduce credit funding to firms. However, banking concentration can protect against credit interest

shock in the volatile environment. Guzman (2000) states that banks with monopoly power are more likely to use credit rationing than competitive banks. Black and Strahan (2002) prove that bank markets with monopolistic power limit the entry of new firms.

In their studies of the concentration of market power, Berger and Hannan (1989) and (Alegria and Schaeck, 2008) show that the Herfindahl-Hirschman Index (HHI) and the concentration index (CRn) can be used to define the degree of bank concentration. In general, concentration is defined as a less symmetric distribution of market power. Competition is more complex because price levels, price-cost margins, the number of firms, regulation and many other economic factors affect banking market competition.

IB: At present, banks place more emphasis on a firm's soft information, which includes competence, reputation and the culture of the firm (Giannetti and Yafeh, 2012, Kim et al., 2014). Information asymmetry causes adverse selection and the problem of moral hazard, but soft information reduces those problems.

In a competitive market, banks are reluctant to collect information on specific borrowers, because borrowers have more choices for raising capital and easily to switch lenders (Marquez, 2002). In such a condition, banks try to increase loan interest rates to cover potential high risks from low-quality borrowers. In a concentrated bank market, on the other hand, banks do prefer to collect borrowers' private information even

though it is costly, because they can capture benefits through long-term relationships (Dell'Ariccia and Marquez, 2004).

From the aspect of information, the level of asymmetry in the loan market may determine the banking market structure (Petersen and Rajan, 1995, Dell'Ariccia and Marquez, 2004). Research points out that credit rationing depends a great deal on the extent of information asymmetry and agency problems (Stiglitz and Weiss, 1981). Banks in a competitive market are less likely to collect borrower's private information, because borrowers have more choices to raise capital, such as other banks, bond markets or the stock market. Therefore, it is rare that lending relationships are established in a competitive market (Marquez, 2002, Cetorelli and Peretto, 2000).

2.2.2 Measures of bank market structure

Researchers have identified two main approaches to describe the bank market: structural and non-structural (Claessens and Laeven, 2005, Delis et al., 2008). The structural approach mainly relies on the SCP paradigm, which holds that the market share of large firms reflects the market structure, and it can be computed by the concentration ratio (CRn) and Hirschman-Herfindhal index (HHI). The non-structural approach contends that factors other than market concentration influence market structure. They include pricing power and entry or exit barriers (Perrakis et al., 1982, Panzar and Rosse, 1984). One commonly used non-structural method to determine the

market structure is the index devised by Lerner (1934) and the Panzar–Rosse *H*-statistic index (Panzar and Rosse, 1984).

Overall, Lerner's method of calculation is the most direct and intuitive, but it is also flawed. Few papers use the concentration ratio, or the number of firms in one industry, especially when the database is very limited. We usually understand that the degree to which a firm dominates an industry in a given region is different from a situation in which many firms of the same size dominate an industry. In the bank market, empirical studies define the concentration ratio as the sum of the *n* largest banks' market share, and they ignore many small banks in the market. In previous analyses, 3, 10, 30 and 50 are the most widely used values for as n (Lian, 2017, Mi and Han, 2020). The *n–bank* concentration ratio measures the market share of the top *n* banks in the industry:

$CR_n = \sum_{i=1}^{n} S_i$, with $S_i \geq \cdots \geq S_n \geq S_t, \forall T \geq N$

where s_i is the market share of the *i*th bank, when banks are ranked in descending order of market share, and T is the total number of bank. Therefore, the higher the concentration ratio, the more bank market power of these large banks. In the banking industry, the concentration ratio mainly reflects the entry and exit of banks, or mergers. As we know, the concentration ratio is one measure of bank market power and banks with the highest market share still maintain a competitive relationship even though the bank market has strong power.

The Herfindahl-Hirschman Index (HHI) also is widely used by researchers to calculate the bank market structure (e.g.,Tian et al., 2019). The HHI index is significant in U.S. antitrust law, because HHI requires more bank information than the concentration ratio and it takes all banks into account, even the small banks. Therefore, it is calculated by summing the squares of the market share of all banks:

$$HHI = \sum_{i=1}^{T} S_i^2 \, , \forall_i = 1, \cdots, T \quad \text{…(Eq.2-1)}$$

where T is the total number of banks in the market. The HHI index ranges between 1/T and 1 for monopolies. Moreover, the higher the HHI index, the more monopolistic is the bank. In the USA, if the HHI index is greater than 0.18, it indicates more concentration in the bank. On the other hand, if the HHI index is less than 0.10, it indicates a more competitive condition for the bank (Cetorelli, 1999). HHI can show the distribution of all the banks, and it highlights the market share of the large banks in the industry.

Lerner (1934) is the first to devise a non-structural measurement of bank market structure, the Lerner index. The Lerner index is recognised by the firms' product price and their marginal cost. Therefore, we estimate this indicator at the bank-year level, which is more conducive to our research about the relationship between banks and firms. In addition, the Lerner index is not limited by the size of the bank, and it can reflect the pricing power of the bank (Beck et al., 2013). A larger gap between price and marginal

cost indicates a stronger bank market power. On the contrary, when the gap between price and marginal cost is zero or near zero, it means that the market is competitive. The following measure of bank market power is known as the Lerner (1934) index:

$$L_i = P(Q) - C'_{q_i}(q_i, w_l)/P(Q) \quad \text{…(Eq.2-2)}$$

where q_i is the quantity produced (product) by bank *i*, Q is the total quantity and $\mathrm{P}(Q)$ is the price in the market. $C'_{q_i}(q_i, w_l)$ is the marginal cost of bank *i* and w_l is the vector of the prices of the factors of production employed by bank *i*. Especially, marginal cost is estimated by a cost function. The Lerner index ranges from 0 to 1, where zero corresponds to perfect competition, and larger values reflect more bank market power (and less competition).

The other widely used calculation for the bank market structure is the *H*-statistic, developed by Panzar and Rosse (1984). They find that banks must be operated with long-term equilibrium. The equilibrium between the output and number of banks is determined by the profit maximisation of firm and industry level through the *H*-statistic. When marginal cost equals marginal revenue, it means maximal bank profits. Therefore, we follow Al-Muharrami et al. (2006) and estimate the bank revenue function as:

$$\ln(\mathrm{TRTA}) = \alpha_0 + \alpha_1 \ln(PEE) + \alpha_2 \ln(CEA) + \alpha_3 \ln(IEL) + \alpha_4 \ln(PTA) +$$

$$\alpha_5 \ln(ASSET) + \alpha_6 \ln(BB) \quad \text{…} \quad \text{(Eq.2-3)}$$

The variables are defined as follows:

TRTA: The ratio of total revenue to total assets

PEE: The ratio of personal expenses to employees (unit price of labour)

CEA: The ratio of capital expenses to fixed assets (unit price of capital)

IEL: The ratio of annual interest expenses to total loanable funds minus deposit and non-deposit liabilities (unit price of funds)

RTA: The ratio of provisions to total assets

ASSET: The bank's total assets

BB: The ratio of the number of branches of a bank to the total number of branches.

The *H*-statistic value is the sum of α_1, α_2 and α_3. If the value of *H* is less or equal to zero, it indicates monopoly equilibrium. That is, banks maximise profits under monopoly conditions. If the value of *H is* between one and zero, it indicates that the bank operates under monopolistic conditions with free-entry equilibrium. If the value of *H* equals one, that means the conditions for competition are perfect.

2.2.3 The bank market structure in the U.S.

In U.S. financial markets, there are three types of financial intermediaries: depository institutions (e.g., commercial banks, savings institutions and other credit

unions), investment intermediaries (e.g., investment banks, mutual funds and other securities firms) and contractual savings institutions (e.g., insurance companies and pension funds). In this thesis, we focus on the depository institutions, especially commercial banks, in the U.S. for the following reasons: 1) Commercial banks supply most of the corporate loans in the U.S. (Lim et al., 2014). This thesis examines the relationship between bank market structure and borrowers' earnings management. Therefore, the structure of commercial banks is the most suitable one to test this relationship; 2) Compared with the limited data for investment intermediaries and contractual institutions, we can easily access detailed data on depository institutions from the Federal Deposit Insurance Corporation (FDIC). These data include the deposit institution's location, branch deposit information and the full financial statements of the depository institutions.

Before the 1970s, U.S. commercial banks were heavily regulated and could not open new branches in another state. When this situation was eased through a wave of banking deregulation from the 1970s to the middle of the 1990s (Johnson and Rice, 2008). The state of Maine was the first to remove the interstate banking restriction in 1982. This deregulation process includes intrastate branching and interstate banking. The intrastate branching deregulation allows banks to acquire other bank branches within the state, and interstate branch deregulation permits non-local banking originations to acquire banks in the deregulated states. In 1994, the Riegle–Neal

Interstate Banking and Branching Efficiency Act (IBBEA) removed all the restrictions across the U.S. on interstate banking and intrastate branching. That market deregulation improved market efficiency, as more efficient banks can take market share from inefficient banks (Kroszner and Strahan, 2013). It also decreased the total number of banks in the market, based on the decline in the number of small local banks (Kerr and Nanda, 2009).

Figure 2-1: Total Number of Branches and Banks in U.S. (Source: FDIC)

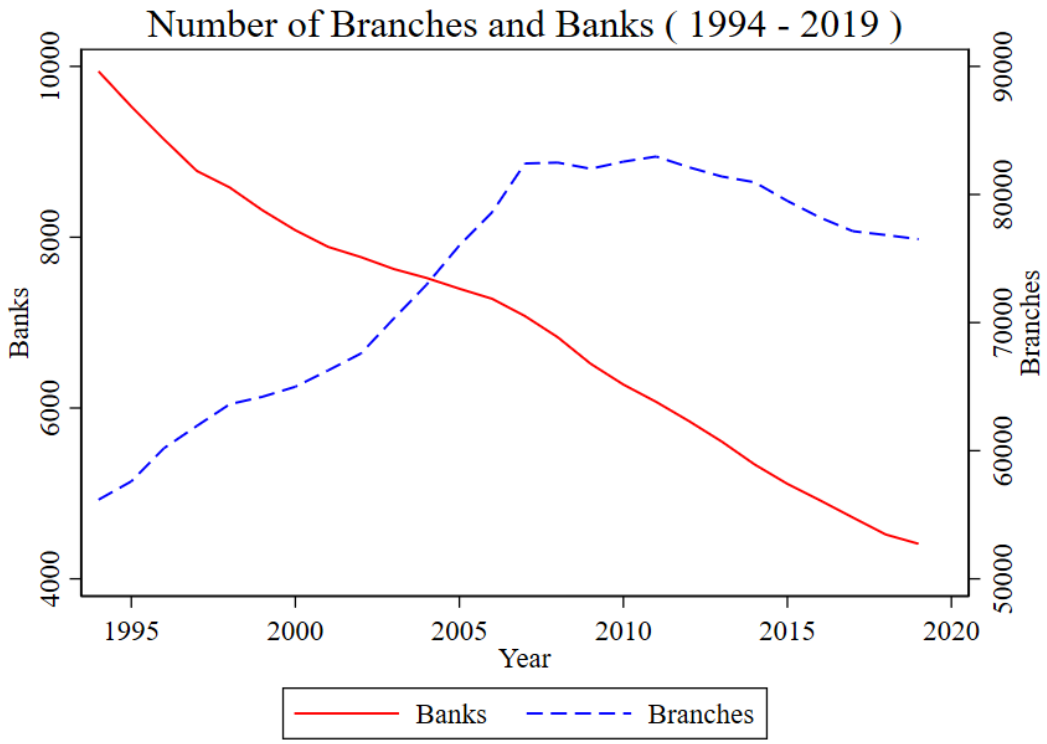


Figure 2-2: U.S. State Bank Market Structure - Deposit HHI (2019) (Source: FDIC)

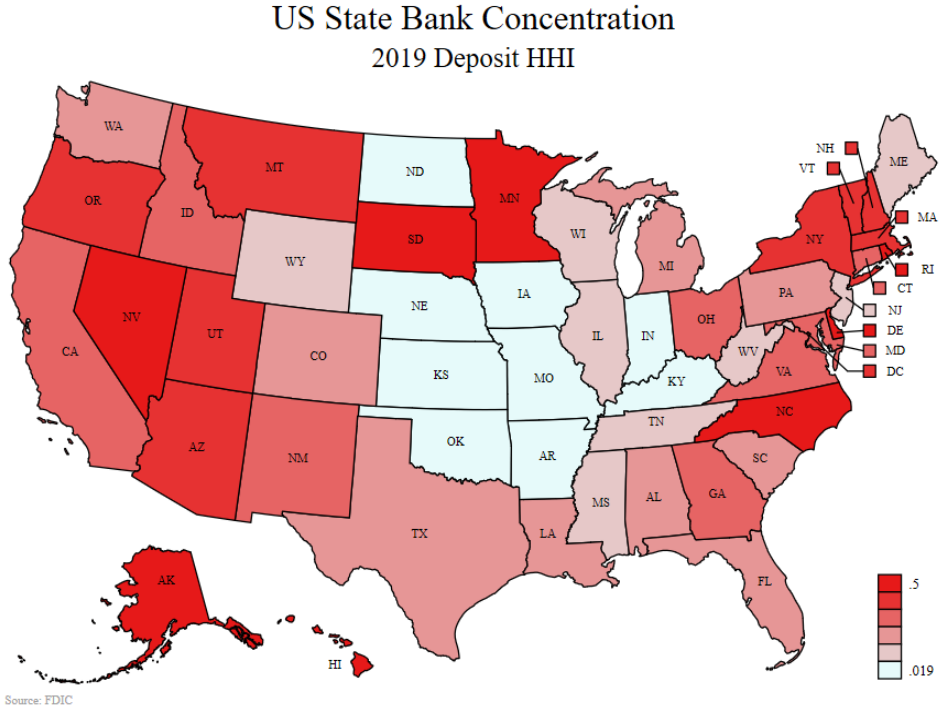


Figure 2-3: U.S. State Bank Market Structure - Deposit HHI (1994) (Source: FDIC)

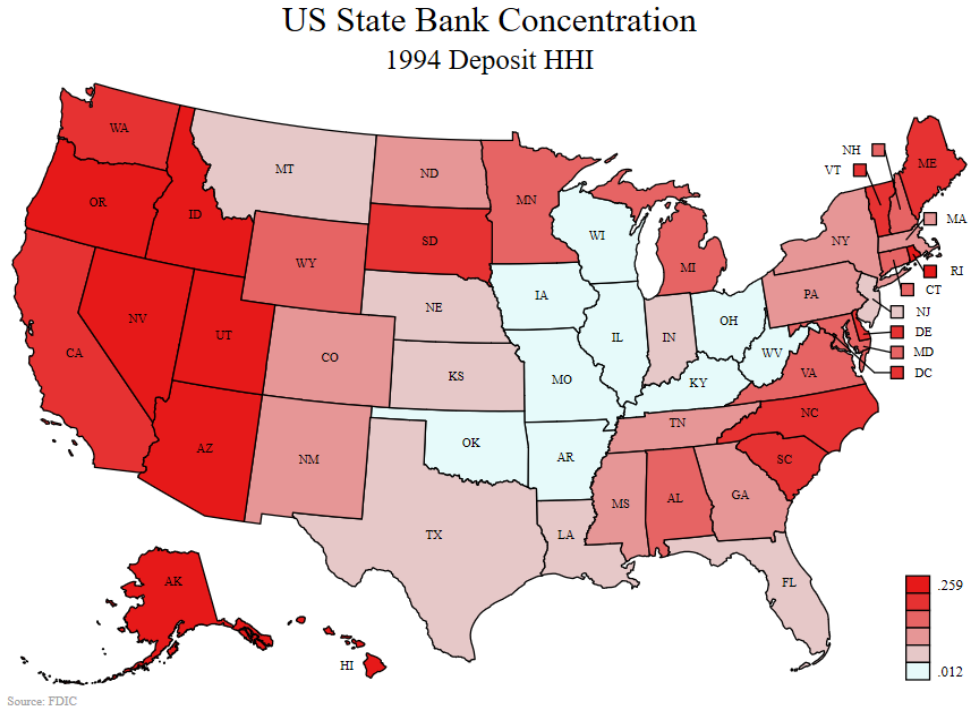


Figure 2-4: U.S. State Bank Market Structure – Lerner index (1994) (Source: FDIC)

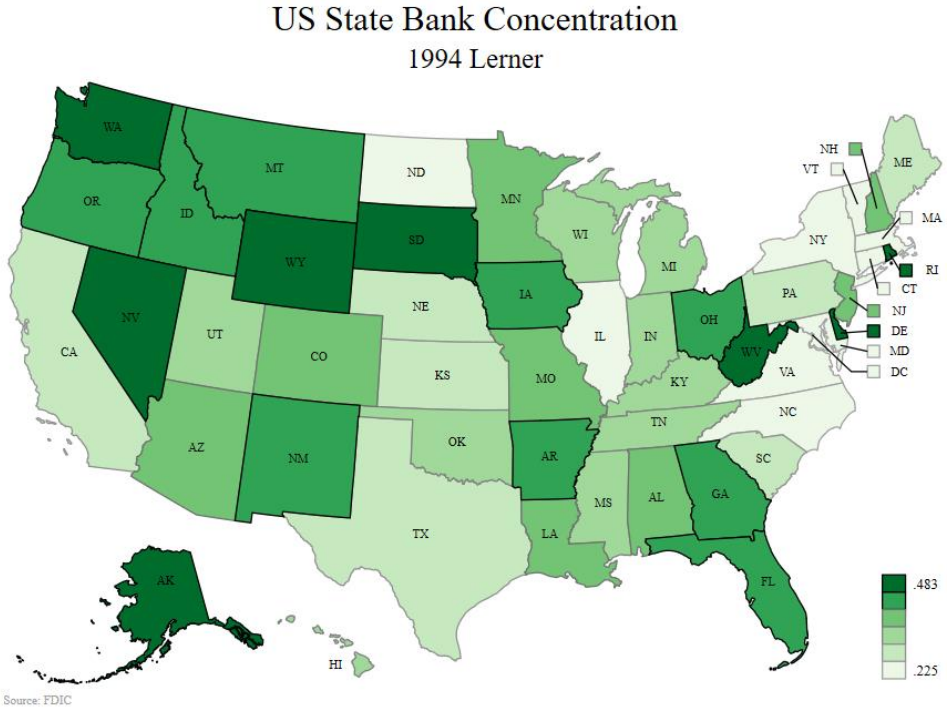
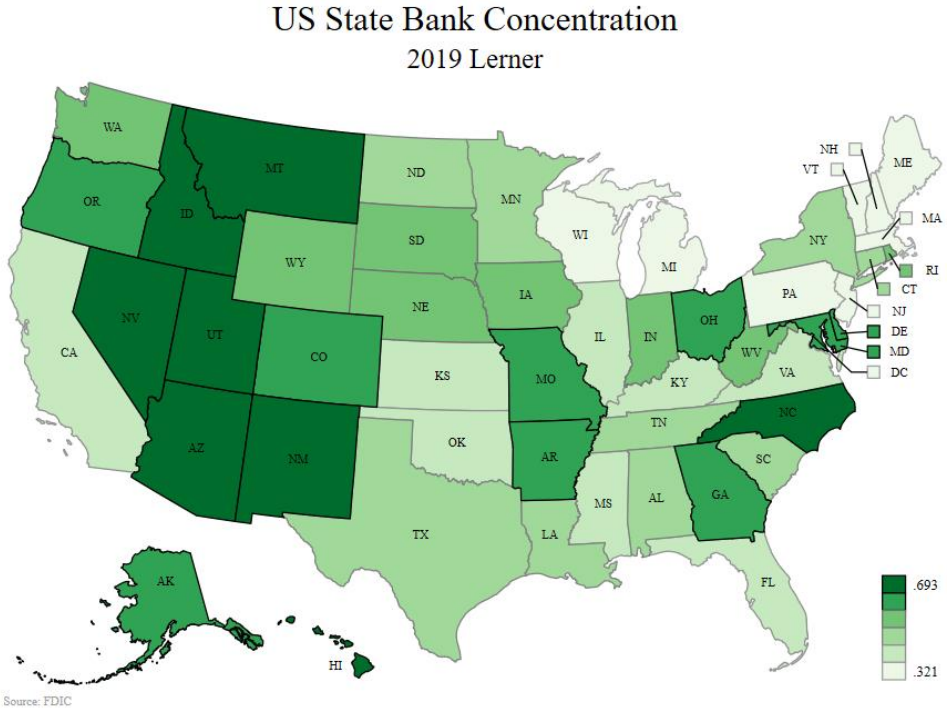


Figure 2-5: U.S. State Bank Market Structure – Lerner index (2019) (Source: FDIC)



3 Bank market structure and financial reporting quality

3.1 Introduction

How do businesses react to changes in banking market structure in terms of financial reporting? This question becomes important for corporate accounting practices in both emerging and developed markets. For example, since the 1990s, foreign banks have operated in India. They have relied more heavily on had information than domestic banks, driving businesses to produce more conservative financial statement (Gormley et al., 2012). Since banking market regulations (e.g. IBBEA) were lifted in the 1990s, U.S. banks have been allowed to open banks and branches across state borders, and the local banking market has changed significantly. Bank mergers in the U.S. have led corporate borrowers to disclose more accounting information because larger, more complex and hierarchical financial institutions rely more on hard accounting information than on soft information (Chen and Vashishtha, 2017).

This study aims to answer the question by investigating the impacts of banking market structure on the quality of corporate financial reporting. We conjecture that the relationship between bank market structure and the quality of corporate financial reporting is driven by both information supply (i.e. corporate borrowers) and demand (i.e. banks). Because of the reduced credit supply in a bank market when it becomes more concentrated, corporate borrowers are expected to provide more accounting

information and/or accounting information of greater quality to secure external financing. Hence, we conjecture a positive relationship between bank concentration and the quality of financial reporting (the incentive channel, hereafter). From the banks' perspective and based on the information hypothesis, there is a stronger incentive to collect private or soft information and monitor borrowers if they have more market power (screen and monitor channel, hereafter). Therefore, relationship between bank concentration and the quality of financial reporting could be positive.

To examine the impacts of bank market structure on the quality of corporate financial reporting, we employ a sample of 73,183 firm-year observations from the U.S. market for the period 1995–2019. We measure bank market structure at the state level and document that firms have higher-quality quality financial reporting in regions where banks have more market power. Our results show that if state bank market power increases by one standard deviation (0.0715), the corporations in that region have 5% less earnings management behaviour. This baseline finding supports both the 'incentive channel' and 'screen and monitor channel'. Then, we explore which channel dominates the relationship between bank market structure and the quality of financial reporting. We use two dummy variables (Top_performance and Poor_performance) to measure business performance and to test the dominant role of the two channels. We expect that banks will take more stringent screen and monitor actions with poorly performing borrowers because banks are only concerned about the default of future repayment. The

results support our conjecture that the screen and monitor channel dominates the relationship between regional bank market power and the quality of corporations' financial reporting when businesses poorly perform.

One potential source of concern about our empirical analysis is the problem of endogeneity. In our baseline model, we have controlled various firm characteristics, such as firm size and return on assets (ROA). We also control the time and firm fixed effects, eliminating omitted factors driven by time and firm. In addition, we use 2SLS by employing state median Tier 1 capital ratio as an instrumental variable, and we perform a placebo test to deal with omitted variables arising from state characteristics. Our empirical analysis finishes with additional tests of robustness. In these tests, we use a different sample (we keep only states with a significant change in bank market structure), additional state-level characteristics and alternative measures of bank market structure (e.g. HHI, CR3, H-statistics and Branch density). Overall, the results of the endogeneity test and robustness test support our baseline result: Bank concentration improves the quality of corporate financial reporting.

This paper advances the existing understanding of the effects of banking market structure on regional accounting choices by investigating the effect on the quality of financial reporting from changes in bank market structure. We document a positive relation between regional bank market power and the quality of financial reporting.

Different from Gormley et al. (2012) and Chen and Vashishtha (2017) which show that firms actively increase the quality of their financial reporting to meet the needs of banks, we show that corporations passively engage in less earnings management. Therefore, the quality of financial reporting is higher when banks that have market power take stringent screen and monitor actions. This paper also enriches the literature by examining a period after bank branch deregulation in the U.S. (IBBEA 1994) when the bank market becomes more concentrated through bank M&A and the failures of small banks.

The rest of this chapter is organised as follows. Section 3.2 reviews the relevant literature on bank market structure and the quality of financial reporting. Section 3.3 develops the hypothesis. We detail the data and research design in Section 3.4, and we discuss empirical findings in Section 3.5. Section 3.6 concludes the chapter.

3.2 Literature review

3.2.1 Bank market structure

Several papers show that bank market power positively affects firm performance. This is because the banks have superior screening and monitoring ability than in a competitive bank market, so they can find good investment projects and outcomes. Banks with market power may increase firms' access to credit and accelerate innovation, promote firm growth, and reduce information asymmetry (Delis et al., 2016,

De Haas and Van Horen, 2012, Boot and Thakor, 2000). On the contrary, prior research suggests that concentrated bank market has a negative effect on social welfare, since powerful banks tend to have higher loan prices and lower interest rates on deposit, and this is likely to reduce market efficiency (Rhoades, 1982, Gilbert, 1984, Weiss, 1989, Ryan et al., 2014). Moreover, in a concentrated bank market, highly risky firms must rely more on banks so they accept stringent conditions of lenders (Dennis and Mullineaux, 2000). In addition, Black and Strahan (2002) point out that banks with market power do not attract new business because of strict bank regulation.

Concerning information, the level of information asymmetry in the loan market may determine the bank market structure (Petersen and Rajan, 1995, Dell'Ariccia and Marquez, 2004). Researchers point out that credit rationing depends on the extent of information asymmetry and agency problems (Stiglitz and Weiss, 1981). Banks in competitive markets are less likely to collect borrowers' private information, because borrowers have more choices to raise capital, such as other banks. Therefore, it rarely establishes a lending relationship in the competitive banking market (Marquez, 2002, Cetorelli and Peretto, 2000). However, in a concentrated banking market, banks prefer to collect borrowers' soft information even though it is costly because they can capture benefits and cover the costs of information-collection through a long-term lending relationship (Dell'Ariccia and Marquez, 2004). It is obvious that banks with market power possess a superior ability to screen profitable investment ideas (Delis et al., 2016).

3.2.2 The quality of financial reporting and earnings quality

It is difficult to describe the quality of financial reporting since it relies on the firm's financial performance based on specific business decisions as well as accounting measures. The objectives of raising the quality of financial reporting are to provide more information about a firm's underlying economics in its business. Yet, the quality of financial reporting can predict a firm's future operating performance, and it is also a basis for assessing the firm's value (Dechow and Schrand, 2004). From those perspectives, higher financial reporting quality has persistence, predictability and smoothness, and it has a trade-off of relevance and reliability.

Higher financial reporting quality is useful for investors, creditors, managers and other parties contracting with the firm. A firm with higher-quality financial reporting could allocate resources more efficiently, make business decisions more accurately and convey more information to stakeholders. However, managers have discretion to judge, estimate, or use private information and to disclose or hide some information. Managers might manipulate earnings because of stock market incentives to manage earnings numbers, compensation contracts or a desire to protect their job security (Healy and Wahlen, 1999). This leads to lower financial reporting quality. For creditors, financial statements are a good way to communicate with lenders, and banks use this accounting information to predict future cash flow and assess the firm's

repayment capacity (Berger and Udell, 2006). Therefore, a firm with higher financial reporting quality can reduce risk and information asymmetry with banks and find it easier to obtain bank loans (García-Teruel et al., 2014). Overall, firms with higher financial reporting quality can reduce information asymmetry and avoid hazard problems with external stakeholders.

Accrual quality is one of the major criteria for measuring earnings management or the quality of financial reporting. Unlike cash flow, accruals are the non-cash of earnings and contain adjustments and estimates. The aim of the accrual process is to overcome information asymmetries between management and other parties in a continuous operation. The aim is to better reflect the firm's performance and predict its future cash flow and earnings. Therefore, earnings quality can be improved by accruals (Dechow, 1994, Dechow et al., 1995). However, accruals can be the basis for earnings management because accruals require forecasting, estimation and judgments (Subramanyam, 1996, Dechow et al., 2010). For example, a growing company may spend a lot of money on inventory, which may lead to high accruals and low earnings quality. This is because accruals may contain estimation error or earnings manipulation, which reduce earnings persistence or reliability in the future (Dechow and Schrand, 2004). In general, firms have some discretion in earnings management and manipulation of earnings by using discretionary (abnormal) accruals, and some researchers consider residuals derived from an accrual model as discretionary accruals

(Dechow et al., 2010). Therefore, large discretionary accruals indicate lower financial reporting quality and higher earnings management (Dechow et al., 1995). In addition, positive discretionary accruals indicate increasing income or aggressive accounting policy, and negative discretionary accruals indicate decreasing income or conservative accounting policy (Ines, 2017).

3.3 Hypothesis Development

From bank monitoring[3] mechanisms, Freixas and Rochet (1997) declare that monitoring is one of the bank's most special and important functions. Banks have information advantages over other financial intermediaries (Fama, 1985). There is some information about bank monitoring activities in syndicated loans that lead arrangers bank market power have a positive effect to reduce information asymmetry between the lead lender and the other participants (Jones et al., 2005, Champagne and Kryzanowski, 2007). In fact, banking monitoring is a better and more effective way to reduce agency problems in a concentrated banking system. This in turn allows firms easier access to bank debt (Caminal and Matutes, 2002, Beck et al., 2006). Recent banking literature suggests that stronger bank monitoring can avoid earnings management by borrowers as measured by discretionary accrual models. This helps to

[3] Banks with monopoly power would exercise excessive monitoring activities as an alternative method to credit rationing (Guzman, 2000) by advising manager, regular site visiting, covenants, renegotiating loan contract terms and assessing financial statements (Fama, 1985, Dennis and Mullineaux, 2000)

reduce credit risk (Ahn and Choi, 2009). Studies also show that banks with market power have a stronger positive monitoring effect on borrowers than in a competitive bank market (Guzman, 2000, Caminal and Matutes, 2002).

In a less competitive bank market, banks can maintain longer relationships with borrowers (Guzman, 2000b). At the same time, banks can charge higher loan prices (Mi and Han, 2020). Thus, banks can be compensated for their costly collecting of information. Moreover, because of the higher loan price, borrowers are more likely to take risky projects after getting the loan (Goetz, 2018). To secure future loan repayment, banks have the incentive to monitor the borrowers. Normally, banks with market power have a large market share regardless of whether it is in loans or deposits. Therefore, it is more likely that current borrowers are the banks' previous clients in deposits or loans. Thus, banks can get the borrower's private information from the deposit channel or from previous lending relationships. Therefore, in a concentrated banking system, banks with stronger screening and monitoring ability may decline firms' earnings management. This would lead to improved financial reporting quality. Therefore, we speculate that regional bank market power has a positive effect on the quality of financial reporting. We name this the 'screen and monitor channel'

From the orientation to bank credit supply and based on the structure–conduct–performance (SCP) paradigm, high bank market concentration tends to mean lower

interest rates paid to depositors. This results in lower capital accumulation, and it makes funds less accessible by firms. Therefore, the bank credit supply is declining, and loan conditions are more stringent for borrowers in a concentrated bank system (Guzman, 2000). In a concentrated bank system, firms facing lending reductions manage earnings to enhance their borrowing capacities and obtain lower interest rates and higher loan amounts. Before the lending decision, banks must evaluate borrowers' financial conditions and their collateral (Fraser et al., 2001, Mishkin and Eakins, 2006). Therefore, firms' earnings, such as profits or losses, may affect debt contracts, giving borrowers an incentive to manage earnings, which reduces financial reporting quality. After the loan is originated, borrowers still have increased incentives to manage earnings to avoid violations of debt covenants, since the debt contract is more stringent in a concentrated bank system. Studies show that firms' financial reports through different accounting methods can reduce the stringency of a covenant (Begley, 1990). In this condition, we expect regional bank market power to lead to more earnings management in this area.

However, it is also possible that corporate borrowers prefer to provide high-quality financial reports. This means less earnings management when there is less credit available in a concentrated bank market. Chen and Vashishtha (2017) give two reasons for disclosing more information in a concentrated bank market. From the finance channel, bank mergers change the bank structure, and this leads to less credit supply.

In this case, borrowers decide to disclose more information to attract alternative financing. From the information channel, M&A lead to larger, more complex and more hierarchical financial institutions. This 'big' organisation will rely more on hard information, not soft information. The nature of bank monitoring generates higher public disclosure from borrowers. If this is the case, we expect corporations to have more incentive to provide high-quality financial reporting (less earnings management) in a region where banks have more market power. We name this the 'incentive channel'. This leads to the first hypothesis:

H1a: There is a positive relation between regional bank market structure and the quality of firms' financial reporting

H1b: There is a negative relation between regional bank market structure and the quality of firms' financial reporting

3.4 Data and research design

3.4.1 Data

We use panel data from the U.S. for our analysis. Our banking market information is from the Federal Deposit Insurance Corporation (FDIC). We collected two kinds of data from the FDIC[4]. The first is branch deposit information, which gives

[4] The branch deposit information from FDIC starts with 1994. In the empirical analysis, we put the bank market structure ratio in a one-year lag. Thus, in this paper, we present data starting from 1995.

the location of the bank branch (state, MSA and city) and yearly deposit information. The second kind is the bank's financial reporting, which is at the bank institution level. The principal source for the quality of financial reporting and firm-level information on corporations is Compustat. We then match the firm's financial reporting information with bank market structure information based on the location of the firm's headquarters (state level). We exclude financial firms and drop at the 1% and 99% levels of extreme observations in each tail of each variable. Data were collected for the period 1995–2019 and they contain 73,183 firm-year observations.

3.4.2 Measure of bank market structure

In this paper, we used the Lerner index to present the state-level bank market structure in our main test. We also use HHI, H-statistics, CR3 and branch density in the robustness test. Lerner (1934) is used to calculate the bank's market power, which reflects the bank's pricing ability. Originally, the Lerner ratio is calculated at the bank year level:

$$Lerner_{mt} = (P_{mt} - MC_{mt})/P_{mt} \quad \text{…(Eq. 3-1)}$$

where P is the bank loan price, MC is the marginal cost of the loan, *m* indicates the state and *t* represents the year. The Lerner index ranges between zero and one, where zero indicates perfect bank market competition and near one indicates strong bank market power. In addition, the marginal cost of the Lerner index is unavailable, and most

researchers use an econometric approach to estimation (Delis et al., 2016). Using a translog cost function and taking its derivative to estimate the marginal cost is a widely accepted method. In this paper, we follow Carbó-Valverde et al. (2009) to calculate the state-level bank power, the Lerner index. We estimate the regional bank performance based on the weighted average (regional branch distribution) of the bank's financial reporting.

3.4.3 Measuring earnings management

In this paper, we use two popular methods to measure earnings management, *Accrual_CF* (Francis et al., 2005) and *Accrual_MJ* (Dechow et al., 1995). For *Accrual_CF*, we first compute total current accruals using firm accounting information from Compustat::

$$TCA_{i,t} = \Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta STDEBT_{i,t} - DEPN_{i,t} \text{.....(Eq. 3-2)}$$

where $\Delta CA_{i,t}$ is firm i's change in current assets from year $t-1$ to year t; $\Delta CL_{i,t}$ is firm i's change in current liabilities between year $t-1$ and year t; $\Delta Cash_{i,t}$ is firm i's change in cash from year $t-1$ to year t; $\Delta STDEBT_{i,t}$ is firm i's change in debt from current liabilities between year $t-1$ and year t; $DEPN_{i,t}$ is firm i's depreciation and

amortisation expense in year t. Then, we estimate the following equation for each industry group by following Fama and French (1997):

$$\frac{TCA_{i,t}}{AT_i} = \partial_1 \frac{1}{AT_i} + \partial_2 \frac{CFO_{i,t-1}}{AT_i} + \partial_3 \frac{CFO_{i,t}}{AT_i} + \partial_4 \frac{CFO_{i,t+1}}{AT_i} + \partial_5 \frac{\Delta REV_{i,t}}{AT_i} + \partial_6 \frac{PPE_{i,t}}{AT_i} + \varepsilon_{it} \ldots \text{(Eq. 3-3)}$$

where $CFO_{i,t}$ is firm i's cash flow from operating in year t; $\Delta REV_{i,t}$ is firm i's change in revenues from year $t-1$ to year t; $PPE_{i,t}$ is firm i's gross value of property, plant and equipment in year t. We predict the firm-year residuals after regression, and *Accrual2* is the standard deviation of firm i's 5-year residuals from year $t-4$ to year t. We also follow Francis et al. (2005) to winsorize the extreme values of distribution to 1/99 percentiles. The larger the standard deviation of residuals, the poorer is the earnings quality and the greater the earnings management. We expect this to be a negative relation between *Accrual_CF* and *Lerner*, which indicates that firms have higher earnings quality in a monopoly bank market.

For *Accrual_MJ*, the total accrual for firm i in year t is:

$$Total\ Accrual_{i,t} = TA_{i,t} = EBXI_{i,t} - CFO_{i,t} \ldots\ldots\ldots\ldots\ldots \text{(Eq. 3-4)}$$

In this equation, $EBXI_{i,t}$ indicates the earnings before extraordinary items and discontinued operations for firm i at time t. $CFO_{i,t}$ is the operating cash flow extracted

from the cash-flow statement. Then, we use the equation below to extract the estimated coefficients.

$$\frac{TA_{i,t}}{AT_{i,t-1}} = \partial_1 \frac{1}{AT_{i,t-1}} + \partial_2 \frac{\Delta REV_{i,t}}{AT_{i,t-1}} + \partial_3 \frac{PPE_{i,t}}{AT_{i,t-1}} + \varepsilon_{i,t} \text{ ……(Eq.3-5)}$$

In this equation, $TA_{i,t}$ represents firm $i's$ total assets in year $t-1$. $\Delta REV_{i,t}$ and $PPE_{i,t}$ have the same definition as stated in $Eq(3)$. We estimate the above equation for each industry group by following Fama and French (1997).

Then, using the estimated coefficients above, we estimate the normal accrual:

$$Normal\ Accrual_{i,t} = \hat{\partial}_1 \frac{1}{AT_{i,t-1}} + \hat{\partial}_2 \frac{(\Delta REV_{i,t} - \Delta AR_{i,t})}{AT_{i,t-1}} + \hat{\partial}_3 \frac{PPE_{i,t}}{AT_{i,t-1}} +$$

$\varepsilon_{i,t}$……(Eq.3-6)

In $Eq(6)$, $\Delta AR_{i,t}$ represents the change in accounts receivable between year t and the year $t-1$. . Finally, we calculate *Accrual_MJ* by:

$$\text{Accrual\_MJ} = Abnormal\ Accrual_{i,t} = \frac{TA_{i,t}}{AT_{i,t-1}} -$$

$$Normal\ Accrual_{it} \text{ ……(Eq.3-7)}$$

In this paper, we follow Kothari et al. (2005) to use the absolute value of *Accrual_MJ*, subsample if *Accrual_MJ* >0 and subsample if *Accrual_MJ*<0 to examine the relationship between bank market power and earnings management. Based on the

prediction, *Abs(Accrual_MJ)* and *Accrual_MJ* >0 samples should be negatively related to the Lerner index. *Accrual_MJ*<0 should be positively related to the Lerner index.

3.4.4 Control variables and baseline model specification

In the following empirical analysis, we control for firm characteristics that can influence firms' earnings management. We follow Karuna et al. (2015) and Hope et al. (2013) to control the firms' characteristics by sale growth (*Sales Growth*), firm size (*Asset*), book-to-market ratio (*Book/Market*), return on assets (*ROA*), financial leverage (*Total Debt/Total Assets*) and cash flow from operations (*Operating Cash Flow*). We control firm size (*Asset*) because large companies are normally have better control of company and have better earnings quality. Firms with high growth (*Sales Growth*) may lead to more earnings management behaviour because of capital-market reaction (Lee et al. 2006). High leverage (*Total Debt/Total Assets*) and volatility of cash flow (*Operating Cash Flow*) may result in more earnings management (Ivashine 2009, Karuna et al. 2015). We define the variables used in the Appendix and report their descriptive statistics in Table 3-1. On average, firms with earnings management ratio *Accrual_CF* are 0.0918, *ABS(Accrual_MJ)* ratio is 0.1211. For the bank market structure, the state *Lerner* ratio in our sample has an average of 0.3290 with a standard deviation of 0.0715. We also use HHI, CR3 and H-statistics to indicate the bank market structure in our sample and find average ratios of 0.0854, 0.4235 and 0.4446,

respectively. In terms of the firms' characteristics, an average firm has an asset value of $2,955 million with a sales growth ratio of 0.2264. These corporations have a return on assets of 0.0577, a book-to-market ratio of 0.7706 and a total debt-to-total asset ratio of 0.2082.

In Table 3-2, we report the distribution of firm-year observations across years with yearly average *Accrual_CF*, *Abs(Accrual_MJ)*, *Lerner*, *H-statistics*, *HHI*, *CR3* and Branch density. In Figure 3-1, we plot the average bank market power by state (Lerner and HHI) with the average earnings management ratios (*Accrual_CF* & *Abs (Accrual_MJ*)). The fitted line shows that there is a negative relation between regional bank market power and earnings management.

Table 3-1: Descriptive Statistics

Variables	N	Mean	SD	P25	Median	P75
Accrual_CF	61122	0.0918	0.0856	0.0319	0.0619	0.1217
ABS(Accrual_MJ)	73183	0.1211	0.1913	0.0309	0.0680	0.1359
Lerner	73183	0.3290	0.0715	0.2773	0.3133	0.3813
H-statistics	71294	0.4446	0.2818	0.1955	0.4517	0.6833
HHI	69287	0.0854	0.0484	0.0586	0.0788	0.0973
CR3	69287	0.4235	0.1104	0.3540	0.4247	0.4881
Branch Density	69287	0.2912	0.0729	0.2300	0.2937	0.3441
Asset	73183	2955.0372	1.32e+04	62.6180	265.1630	1239.3850
ROA	73183	0.0577	0.2590	0.0280	0.1080	0.1704
Total Debt/Total Assets	73183	0.2082	0.1931	0.0250	0.1757	0.3359
Sales Growth	73183	0.2264	0.8313	-0.0254	0.0832	0.2453
Operating Cash Flow	73183	307.6328	1749.2727	0.2050	16.2270	111.3490
Book/Market	73183	0.7706	15.3574	0.2802	0.4992	0.8299
Ln (GDP)	73165	13.0029	0.9475	12.4011	12.9785	13.7229
GDP_Growth	73165	0.0522	0.0302	0.0367	0.0513	0.0691
Ln (Personal Income)	73165	10.4586	0.2823	10.2387	10.4519	10.6722

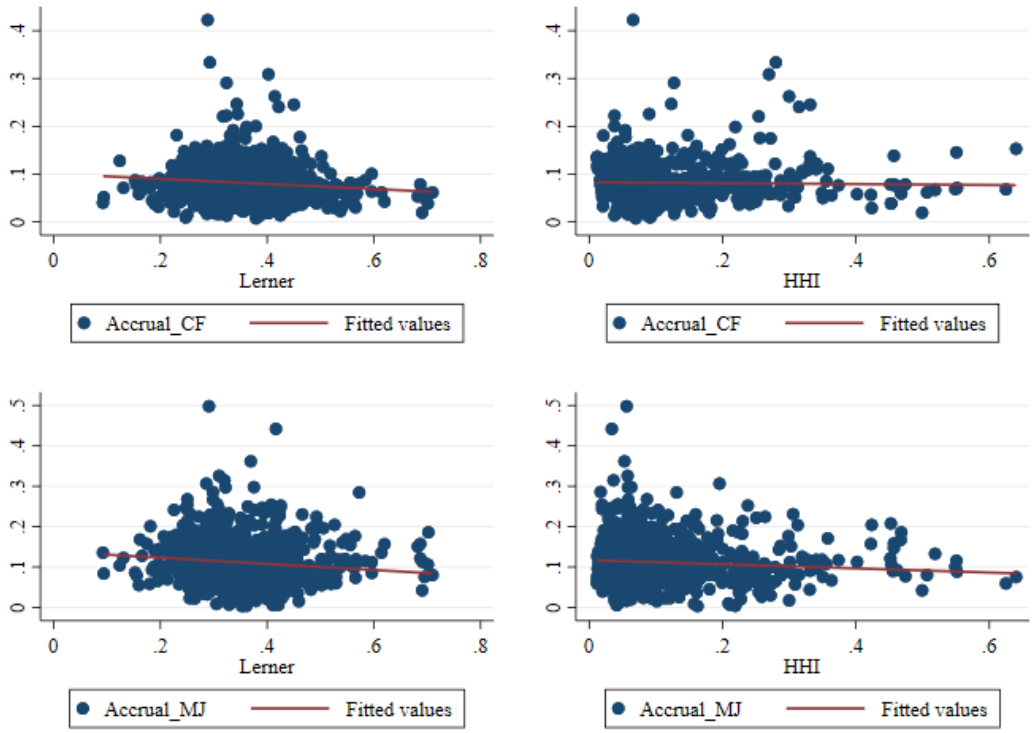
Table 3-2: The distribution of sample by year

Year	N	Accrual_CF	ABS(Accrual_MJ)	Lerner	H-Statistics	HHI	CR3	Branch Density
1995	3879	.0667	.1519	.2743	.4507	.0568	.333	.2921
1996	4087	.0707	.1468	.266	.6065	.0584	.3397	.2926
1997	4505	.0765	.1593	.2708	.5467	.0651	.3684	.2914
1998	4281	.0806	.1614	.2885	.5768	.0704	.3856	.291
1999	3987	.0856	.158	.2776	.6157	.0724	.3928	.2908
2000	3952	.0873	.147	.2984	.5355	.0761	.409	.2888
2001	3570	.0953	.1177	.284	.5061	.0792	.4117	.2837
2002	3358	.0996	.1221	.3029	.6495	.0817	.4179	.2836
2003	3193	.0989	.1057	.3647	.5596	.083	.4256	.2828
2004	3141	.0981	.121	.3772	.488	.0872	.4359	.2844
2005	3074	.097	.1064	.3738	.4443	.0858	.4298	.2896
2006	2980	.0941	.1072	.3571	.4484	.0874	.4404	.2957
2007	2833	.0954	.1072	.3172	.4748	.0858	.4295	.3014
2008	2657	.1004	.0987	.2867	.4957	.0813	.418	.3079
2009	2606	.1021	.1394	.2813	.4315	.0855	.4273	.3129
2010	2512	.1024	.1001	.346	.2277	.0897	.4312	.31
2011	2406	.1006	.1035	.3664	.3924	.0934	.4423	.3049
2012	2374	.0957	.0912	.3673	.1807	.1027	.459	.3018
2013	2355	.0913	.0877	.3872	.2888	.1055	.4648	.2972

2014	2350	.0955	.0873	.3888	.2307	.1085	.4724	.2916
2015	2254	.0995	.0946	.3961	.2152	.1119	.4801	.285
2016	2179	.1011	.0902	.407	.2818	.11	.4815	.2796
2017	2146	.1049	.0851	.4207	.1576	.1087	.4785	.2732
2018	2107	.1104	.085	.4274	.1869	.1095	.4797	.2632
2019	397	.09	.0825	.4247	.1785	.1072	.4758	.2578

This Table reports the distribution of sample observations across year. We report the numbers of observations each year, and the mean values of Accrual_CF, ABS(Accrual_MJ), Lerner, H-statistics, HHI, CR3 and Branch density.

Figure 3-1：Relation Between Earnings Management and Bank Market Structure



To examine whether bank market power affects firms' earnings management, we have the baseline model specification as follows:

$$EM_{i,t} = \alpha + \beta * Lerner_{k,t-1} + \gamma * Firm\ characteristics_{i,t-1} + \theta * EM_{i,t-1} + \varepsilon_{i,t} \quad \text{..... (Eq.3-8)}$$

where $EM_{i,t}$ means the earnings management indicator for firm i at time t. We use *Accrual_CF*, *Abs(Accrual_MJ)*, *Accrual_MJ* >0 and *Accrual_MJ* <0 to represent the earnings management in our test. $Lerner_{k,t-1}$ indicates the regional bank market power in state *k* at time *t – 1*. $Firm\ characteristics_{i,t-1}$ are the control variables for firm i at time $t-1$. We also include $EM_{i,t-1}$ to control earnings management in previous years. In this model, a negative β means that more regional bank market power increases more regional the quality of financial reporting and vice versa.

3.5. Empirical Analysis

3.5.1 The effect of bank market power on earnings management

We report our baseline results in Table 3-3 by regression Eq. 3-8. In Table 3-3, our main independent variable is the Lerner index, and the dependent variables are *Accrual_CF* in Column 1, *Abs(Accrual_MJ)* in Column 2, the subsample of *Accrual_MJ* if it is larger than 0 in Column 3 and subsample of *Accrual_MJ* if it is smaller than 0 in Column 4. Overall, Table 3-3 results suggest that corporations have

less earnings management (higher financial reporting quality) in regions with high bank market power after controlling for a set of risk variables and fixed effects. The negative relation between bank market structure and earnings quality supports both screen and monitor channel and incentive channel in the hypothesis. The effect of bank market power on earnings management is not only statistically significant, but it is also economically significant. For example, if state bank market power increases by one standard deviation (0.0715), the corporations in that region will have less earnings management behaviour: 5% less in *Abs(Accrual_MJ)* and 2% less in *Accrual_CF*. Table 3-3 also suggests that firms with high ROA have less motivation to engage in earnings management (e.g., Column1). For corporations with high leverage, they will engage with less accrual earnings management behaviour (e.g., Column 1 and 2).

Table 3-3: The effect of bank market structure on earnings management

VARIABLES	(1) Accrual_CF	(2) ABS(Accrual_MJ)	(3) Accrual_MJ>0	(4) Accrual_MJ<0
Lerner	-0.0232***	-0.0862***	-0.0853***	0.0705***
	(0.0038)	(0.0153)	(0.0114)	(0.0186)
Accrual_CF_t-1	0.6759***			
	(0.0064)			
ABS(Accrual_MJ)_t-1		0.0907***		
		(0.0138)		
Ln(Asset)	0.0152***	-0.0272***	-0.0147***	0.0251***
	(0.0006)	(0.0030)	(0.0018)	(0.0021)
ROA	-0.0128***	0.0519***	-0.0648***	-0.1140**
	(0.0025)	(0.0117)	(0.0140)	(0.0489)
Total Debt/Total Assets	-0.0013	0.0205***	-0.0081	-0.0282***
	(0.0019)	(0.0078)	(0.0074)	(0.0100)
Sales Growth	-0.0003	0.0491***	-0.0346***	-0.0775***
	(0.0005)	(0.0089)	(0.0090)	(0.0147)
Operating Cash Flow	-0.0000***	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0000***	0.0001***	0.0001***	0.0040
	(0.0000)	(0.0000)	(0.0000)	(0.0038)
Accrual_MJ_t-1			-0.0468***	0.0959***
			(0.0150)	(0.0099)
Constant	-0.0432***	0.2732***	0.2127***	-0.2337***
	(0.0034)	(0.0161)	(0.0097)	(0.0140)
Observations	60,374	73,183	40,927	35,074
R-squared	0.5559	0.0876	0.0643	0.2123
YEAR FE	YES	YES	YES	YES
COMPANY FE	YES	YES	YES	YES

This table presents the results by testing the relation between regional bank market power and earnings quality. The sample includes all of the unregulated Compustat firms from 1995 to 2019. Financials (SIC Codes 6000-6999) and utilities (4900-4949) are not included. Definitions of the variables are summarized in Appendix 1. The independent variable is Lerner index which measures state level bank market power. In Columns (1)-(2), the dependent variables are Accrual_CF, ABS(Accrual_MJ). In columns 3 and 4, our dependent variables are Accural_MJ. In column, we use the subsample if Accrual_MJ >0 and use subsample if Accruak_MJ<0 in column 4. We included dummy variables to capture firm- and year-fixed effects. Standard errors are clustered by firm and year. Standard errors are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

3.5.2 Differentiate between the screen and monitor channel and the incentive channel

As discussed in the hypothesis part, a concentrated bank market would lead to a lower credit supply. Therefore, borrowers are more likely to disclose themselves, such as providing more financial reporting, to attract alternative lenders. Simultaneously, banks with market power are usually large institutions, and such institutions prefer public information. Therefore, these arguments may also conclude that regional bank market power leads to higher financial reporting quality in this area, which has the same effect as 'screen and monitor channel'. To test which channel determines the regional bank market power and earnings management relation, we deploy two new variables. We use Poor_performance, which equals one if a firm's earnings growth is in the bottom 25% of the sample, and Top_performance, which equals one if a firm's earnings growth is in the top 25% of the sample.

For Poor_performance borrowers, if screen and monitor dominate this relationship, we expect regional bank market power to be more sensitive to earnings management. Because these firms are poorly performing, the banks generate more screen and monitor activity to increase the possibility that borrowers will repay the loans. If the incentive channel dominates this relationship, we expect regional bank market power is not able to strengthen corporations' incentive to disclose high-quality

financial reports, because such reports for those firms are 'poor earnings growth'. In other words, if the incentive channel dominates the relationship, we see a non-significant relationship (or even a positive one) between bank market power and earnings management for poor-performance firms.

Top_performance corporations usually generate income-decreasing earnings management to smooth earnings (Dechow et al., 2010). If the screen and monitor channel dominates this relationship, we expect that the interaction between earnings management and Lerner will have the opposite sign to the Lerner itself. This is because banks focus more on future repayment by corporations. If corporations are performing well, banks are less likely to concern borrower's earnings management behaviour. In other words, bank market power has less influence on top-performing companies. On the other side, if the incentive channel dominates this relationship, we expect that the coefficient of interaction between Lerner and Top_performance will have the same sign as Lerner itself. This is because the borrowers still have an incentive to provide quality financial reporting.

The regression results are shown in Table 3-4[5]. We test the moderation effect of *Poor_performance* (columns 1-2) and Top_performance (column 3-4). Table 3-4

[5] In this table, we keep only Accrual_MJ >0 samples for Poor_performance, as firms with negative earnings growth are more likely to generate income-increasing earnings management. We keep Accrual_MJ <0 samples for Top_performance, as firms with high earnings growth are more likely to generate income-decreasing earnings management.

shows that *Poor_performance* can strengthen the relation between bank market structure and earnings quality and *Top_performance* will erode the relation between bank market structure and earnings quality. To interpret the results in a different way, the effect of *Lerner* will be doubled for *Poor_performance* firm (column 1) and the influence of *Lerner* will decrease by 18% for *Top-performance* firm (column 3). Overall, the results suggest that the relation between regional bank market power and the firms' earnings management is through the 'screen and monitor channel'.

Table 3-4: Screen & monitor channel or incentive channel

VARIABLES	(1) Accrual_CF	(2) Accrual_MJ>0	(3) Accrual_CF	(4) Accrual_MJ<0
Lerner	-0.0142***	-0.0083	-0.0268***	-0.0255*
	(0.0040)	(0.0105)	(0.0040)	(0.0142)
Poor_performance	0.0138***	0.1110***		
	(0.0020)	(0.0078)		
Lerner*Poor_performance	-0.0296***	-0.1107***		
	(0.0065)	(0.0219)		
Top_performance			-0.0073***	-0.1627***
			(0.0022)	(0.0115)
Lerner* Top_performance			0.0221***	0.0836**
			(0.0061)	(0.0325)
Accrual_CF_t-1	0.6740***		0.6756***	
	(0.0065)		(0.0066)	
Accrual_MJ_t-1		-0.0451***		0.0688***
		(0.0143)		(0.0079)
Ln(Asset)	0.0152***	-0.0153***	0.0152***	0.0216***
	(0.0006)	(0.0018)	(0.0006)	(0.0020)
ROA	-0.0113***	-0.0328***	-0.0128***	-0.0922**
	(0.0023)	(0.0104)	(0.0025)	(0.0401)
Total Debt/Total Assets	-0.0014	-0.0098	-0.0013	-0.0047
	(0.0019)	(0.0070)	(0.0019)	(0.0086)
Sales Growth	0.0006	-0.0148**	-0.0003	-0.0517***
	(0.0005)	(0.0069)	(0.0005)	(0.0101)
Operating Cash Flow	-0.0000***	0.0000**	-0.0000***	-0.0000**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0000***	0.0001***	-0.0000***	0.0026
	(0.0000)	(0.0000)	(0.0000)	(0.0026)
Constant	-0.0472***	0.1571***	-0.0417***	-0.1424***
	(0.0035)	(0.0092)	(0.0032)	(0.0099)
Observations	60,374	40,927	60,374	35,074
R-squared	0.5570	0.1647	0.5560	0.3613
YEAR FE	YES	YES	YES	YES
COMPANY FE	YES	YES	YES	YES

This table presents the results by testing the relation between regional bank market power and earnings quality. The sample includes all of the unregulated Compustat firms from 1995 to 2019. Financials (SIC Codes 6000-6999) and utilities (4900-4949) are not included. Definitions of the variables are summarized in Appendix 1. The independent variable is Lerner index which measures state level bank market power. In Columns 1 and 3, the dependent variables are Accrual_CF. In columns 2 and 4, our dependent variables are Accural_MJ. In column 2, we use the subsample if Accrual_MJ >0 and

use subsample if Accruak_MJ<0 in column 4. We included dummy variables to capture firm- and year-fixed effects. Standard errors are clustered by firm and year. Standard Errors are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

3.5.3 Endogeneity issues

Using panel data from 51 states in the U.S. between 1995 and 2019 and earnings management ratios, our results show that bank market power at the state level can reduce earnings management behaviour. In our model, there are two possible endogeneity problems, reverse-causality and omitted variables problem. To account for reverse-causality issue, we lag all right-hand side variables including *Lerner*. This can diminish the reverse-causality problems because current earnings quality cannot affect prior bank market structure. To control for the endogeneity (omitted variable) of the state Lerner index, we first employ the instrumental variable method. In Table 3-5, we use 'state median Tier 1 capital ratio' as our instrumental variable and re-run Eq. 3-8 by using the two-stage least squares method (2SLS). The 'state median Tier 1 capital ratio' is an optimal instrumental variable for bank market structure, and it has been used by researchers such as Tian et al. (2019). As in the competitive bank market, it is more likely to create free entry for new players and free exit for losers (Corbae and D'Erasmo, 2019). State with competitive bank market usually has a lower minimum value of Tier 1 capital ratio (Tian et al., 2019). At the same time, the state median Tier 1 capital ratio does not, in principle, have any direct impact on firms' earnings management. (We also control many firm-level characteristics and year-firm fixed effects.). The results in

Table 3-5 still support the screen and monitor channel that corporations' earnings management decreases as regional bank market power increases. We also perform a place-test to address the endogeneity problem arising from omitted state-level characteristics. It is possible that unobservable state-level factors in various states could determine the timing of state bank deregulation, and this may further influence the state-level structure of the bank market (Mi and Han, 2020). We follow Cornaggia et al. (2015) to perform a placebo test by randomly reordering the Lerner index within the same state. We replace Lerner with Fake-Lerner and re-run the baseline model. Table 3-6 shows that all the coefficients of Fake-Lerner are statistically insignificant. This means that our baseline model does not suffer from the problem of missing state-level characteristics.

Table 3-5: 2SLS-The effect of bank market structure on earnings management

VARIABLES	(1) Accrual_CF	(2) ABS(Accrual_MJ)	(3) Accrual_MJ>0	(4) Accrual_MJ<0	(5) First Stage
Lerner	-0.0247***	-0.0885***	-0.0916***	0.0945***	
	(0.0038)	(0.0161)	(0.0122)	(0.0189)	
Accrual_CF_t-1	0.6734***				
	(0.0062)				
ABS(Accrual_MJ)_t-1		0.0902***			
		(0.0134)			
Accrual_MJ_t-1			-0.0491***	0.0905***	
			(0.0159)	(0.0102)	
Ln(Asset)	0.0152***	-0.0273***	-0.0146***	0.0228***	
	(0.0007)	(0.0031)	(0.0020)	(0.0023)	
ROA	-0.0124***	0.0505***	-0.0640***	-0.1001**	
	(0.0026)	(0.0117)	(0.0144)	(0.0464)	
Total Debt/Total Assets	-0.0011	0.0180**	-0.0076	-0.0256**	
	(0.0020)	(0.0083)	(0.0078)	(0.0105)	
Sales Growth	-0.0003	0.0478***	-0.0339***	-0.0754***	
	(0.0005)	(0.0084)	(0.0091)	(0.0144)	
Operating Cash Flow	-0.0000***	0.0000	0.0000	0.0000	
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
Book/Market	-0.0000***	0.0001***	0.0001***	0.0303***	
	(0.0000)	(0.0000)	(0.0000)	(0.0043)	
Tier 1 capital ratio					0.0068***
					(0.0001)
Observations	56,594	68,241	37,565	31,297	
R-squared	0.5485	0.0856	0.0640	0.2148	
YEAR FE	YES	YES	YES	YES	
COMPANY FE	YES	YES	YES	YES	
LM statistic Chi-sq(2)					5107***
Rubin Wald test Chi-sq(2)					66.85***

This table presents the results by testing the relation between regional bank market power and earnings quality. The sample includes all of the unregulated Compustat firms from 1995 to 2019. Financials (SIC Codes 6000-6999) and utilities (4900-4949) are not included. Definitions of the variables are summarized in Appendix 1. The independent variable is Lerner index which measures state level bank market power. In Columns (1)-(2), the dependent variables are Accrual_CF, ABS(Accrual_MJ). In columns 3 and 4, our dependent variables are Accural_MJ. In column, we use the subsample if Accrual_MJ >0 and use subsample if Accruak_MJ<0 in column 4. First stage of 2SLS is reported in column 5. We included dummy variables to capture firm- and year-fixed effects. Standard errors are clustered by firm and year. Standard Errors are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 3-6: Placebo test: The effect of bank market structure on earnings management

VARIABLES	(1) Accrual_CF	(2) ABS(Accrual_MJ)	(3) Accrual_MJ>0	(4) Accrual_MJ<0
Fake_Lerner	0.0028	-0.0006	0.0173	0.0139
	(0.0026)	(0.0100)	(0.00186)	(0.0106)
Accrual_CF_t-1	0.6713***			
	(0.0063)			
ABS(Accrual_MJ)_t-1		0.0917***		
		(0.0134)		
Accrual_MJ_t-1			-0.0516***	0.0930***
			(0.0157)	(0.0103)
Ln(Asset)	0.0145***	-0.0298***	-0.0175***	0.0254***
	(0.0006)	(0.0031)	(0.0019)	(0.0021)
ROA	-0.0118***	0.0520***	-0.0608***	-0.1010**
	(0.0026)	(0.0120)	(0.0141)	(0.0469)
Total Debt/Total Assets	-0.0007	0.0189**	-0.0067	-0.0273**
	(0.0019)	(0.0085)	(0.0077)	(0.0106)
Sales Growth	-0.0003	0.0481***	-0.0337***	-0.0759***
	(0.0005)	(0.0085)	(0.0092)	(0.0145)
Operating Cash Flow	-0.0000***	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0000***	0.0001***	0.0001***	0.0289***
	(0.0000)	(0.0000)	(0.0000)	(0.0041)
Constant	-0.0477***	0.2607***	0.1950***	-0.2326***
	(0.0038)	(0.0169)	(0.0111)	(0.0131)
Observations	57,460	69,304	39,079	32,958
R-squared	0.5478	0.0848	0.0615	0.2136
YEAR FE	YES	YES	YES	YES
COMPANY FE	YES	YES	YES	YES

This table presents the results by testing the relation between regional bank market power and earnings quality. The sample includes all of the unregulated Compustat firms from 1995 to 2019. Financials (SIC Codes 6000-6999) and utilities (4900-4949) are not included. Definitions of the variables are summarized in Appendix 1. The independent variable is Lerner index which measures state level bank market power. In Columns (1)-(2), the dependent variables are Accrual_CF, ABS(Accrual_MJ). In columns 3 and 4, our dependent variables are Accural_MJ. In column, we use the subsample if Accrual_MJ >0 and use subsample if Accruak_MJ<0 in column 4. We included dummy variables to capture firm- and year-fixed effects. Standard errors are clustered by firm and year. Standard Errors are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

3.5.4 Robustness tests

In Table 3-7, we only keep the sample if the regional bank market experienced an enormous change. To do this, we compute the standard deviation of the state Lerner index across 25 years (1995–2019). Then we keep the state if it has an above-median standard deviation. The results in Table 3-7 are consistent with our expectation. For example, if state bank market power increases by one standard deviation (0.0715), the corporations in that region will have less earnings management behaviour: 5% less in *Abs(Accrual_MJ)* and 15% less in *Accrual_CF*. In Table 3-8, we use additional state-level characteristics to control the potential effect at the state level. We also use different measures of bank market structure as a robustness test in the four panels of Table 3-9. For example, the results in Table 3-9A show that with a one-standard deviation increase in HHI (0.0484) will reduce earnings management behaviour by 13% (column 1). Overall, all the measures of the regional bank market structure support our baseline that regional bank market power would reduce earnings management behaviour.

Table 3-7: Subsample- Only state with a large change in bank market

VARIABLES	(1) Accrual_CF	(2) ABS(Accrual_MJ)	(3) Accrual_MJ>0	(4) Accrual_MJ<0
Lerner	-0.0188***	-0.0875***	-0.0844***	0.0649***
	(0.0051)	(0.0175)	(0.0133)	(0.0220)
Accrual_CF_t-1	0.6721***			
	(0.0067)			
ABS(Accrual_MJ)_t-1		0.0831***		
		(0.0148)		
Accrual_MJ_t-1			-0.0565***	0.0961***
			(0.0163)	(0.0107)
Ln(Asset)	0.0154***	-0.0281***	-0.0151***	0.0275***
	(0.0007)	(0.0034)	(0.0025)	(0.0028)
ROA	-0.0119***	0.0545***	-0.0535***	-0.0977*
	(0.0031)	(0.0147)	(0.0145)	(0.0508)
Total Debt/Total Assets	0.0003	0.0315***	-0.0046	-0.0297**
	(0.0025)	(0.0103)	(0.0086)	(0.0133)
Sales Growth	-0.0003	0.0506***	-0.0296***	-0.0762***
	(0.0005)	(0.0089)	(0.0082)	(0.0140)
Operating Cash Flow	-0.0000***	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0000***	0.0001***	0.0001***	0.0027
	(0.0000)	(0.0000)	(0.0000)	(0.0028)
Constant	-0.0413***	0.2800***	0.2139***	-0.2489***
	(0.0035)	(0.0179)	(0.0127)	(0.0138)
Observations	35,306	43,563	23,941	21,191
R-squared	0.5552	0.0901	0.0577	0.2085
YEAR FE	YES	YES	YES	YES
COMPANY FE	YES	YES	YES	YES

This table presents the results by testing the relation between regional bank market power and earnings quality. The sample includes all of the unregulated Compustat firms from 1995 to 2019. In this table, we only keep the sample that state bank market experiences a large change. Financials (SIC Codes 6000-6999) and utilities (4900-4949) are not included. Definitions of the variables are summarized in Appendix 1. The independent variable is Lerner index which measures state level bank market power. In Columns (1)-(2), the dependent variables are Accrual_CF, ABS(Accrual_MJ). In columns 3 and 4, our dependent variables are Accural_MJ. In column, we use the subsample if Accrual_MJ >0 and use subsample if Accruak_MJ<0 in column 4. We included dummy variables to capture firm- and year-fixed effects. Standard errors are clustered by firm and year. Standard Errors are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 3-8: Additional state level controls

VARIABLES	(1) Accrual_CF	(2) ABS(Accrual_MJ)	(3) Accrual_MJ>0	(4) Accrual_MJ<0
Lerner	-0.0194***	-0.0650***	-0.1199***	0.0136
	(0.0046)	(0.0182)	(0.0148)	(0.0175)
Accrual_CF_t-1	0.6764***			
	(0.0067)			
ABS(Accrual_MJ)_t-1		0.0897***		
		(0.0137)		
Accrual_MJ_t-1			-0.0508***	0.0896***
			(0.0149)	(0.0097)
Ln(Asset)	0.0156***	-0.0253***	-0.0189***	0.0159***
	(0.0007)	(0.0032)	(0.0020)	(0.0025)
ROA	-0.0132***	0.0505***	-0.0598***	-0.1103**
	(0.0027)	(0.0114)	(0.0136)	(0.0473)
Total Debt/Total Assets	-0.0013	0.0184**	-0.0060	-0.0225**
	(0.0020)	(0.0077)	(0.0075)	(0.0101)
Sales Growth	-0.0003	0.0489***	-0.0338***	-0.0760***
	(0.0005)	(0.0089)	(0.0089)	(0.0145)
Operating Cash Flow	-0.0000***	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0000***	0.0001***	0.0001***	0.0039
	(0.0000)	(0.0000)	(0.0000)	(0.0038)
Ln(GDP)	0.0016	-0.0737***	-0.0418***	0.0674**
	(0.0046)	(0.0254)	(0.0135)	(0.0278)
GDP_growth	-0.0165***	0.0333	-0.0854***	0.0327
	(0.0054)	(0.0278)	(0.0236)	(0.0293)
Ln(Personal Income)	-0.0055	0.0804***	0.0792***	-0.0132
	(0.0060)	(0.0296)	(0.0163)	(0.0311)
Constant	-0.0079	0.3722***	-0.0337	-0.8994***
	(0.0189)	(0.0797)	(0.0459)	(0.1029)
Observations	60,354	73,165	40,915	35,063
R-squared	0.5561	0.0880	0.0674	0.2159
YEAR FE	YES	YES	YES	YES
COMPANY FE	YES	YES	YES	YES

This table presents the results by testing the relation between regional bank market power and earnings quality. The sample includes all of the unregulated Compustat firms from 1995 to 2019. In this table, we add additional state level control variables. Financials (SIC Codes 6000-6999) and utilities (4900-4949) are not included. Definitions of the variables are summarized in Appendix 1. The independent variable is Lerner index which measures state level bank market power. In Columns (1)-(2), the dependent variables are Accrual_CF, ABS(Accrual_MJ). In columns 3 and 4, our

dependent variables are Accural_MJ. In column, we use the subsample if Accrual_MJ >0 and use subsample if Accruak_MJ<0 in column 4. We included dummy variables to capture firm- and year-fixed effects. Standard errors are clustered by firm and year. Standard Errors are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 3-9A: Alternative measurement- HHI

VARIABLES	(1) Accrual_CF	(2) ABS(Accrual_MJ)	(3) Accrual_MJ	(4) Accrual_MJ
HHI	-0.0254***	-0.0567	-0.0185	0.0488
	(0.0069)	(0.0500)	(0.0248)	(0.0417)
Accrual _CF_t-1	0.6718***			
	(0.0063)			
Ln(Asset)	0.0148***	-0.0292***	-0.0172***	0.0250***
	(0.0006)	(0.0030)	(0.0019)	(0.0022)
ROA	-0.0121***	0.0515***	-0.0612***	-0.1008**
	(0.0026)	(0.0122)	(0.0141)	(0.0469)
Total Debt/Total Assets	-0.0008	0.0187**	-0.0068	-0.0269**
	(0.0019)	(0.0084)	(0.0077)	(0.0106)
Sales Growth	-0.0003	0.0480***	-0.0338***	-0.0758***
	(0.0005)	(0.0085)	(0.0091)	(0.0145)
Operating Cash Flow	-0.0000***	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0000***	0.0001***	0.0001***	0.0291***
	(0.0000)	(0.0000)	(0.0000)	(0.0041)
ABS(Accrual_MJ)_t-1		0.0915***		
		(0.0134)		
Accrual_MJ_t-1			-0.0515***	0.0927***
			(0.0157)	(0.0103)
Constant	-0.0461***	0.2622***	0.2008***	-0.2301***
	(0.0035)	(0.0167)	(0.0104)	(0.0122)
Observations	57,442	69,287	39,069	32,947
R-squared	0.5480	0.0849	0.0614	0.2137
YEAR FE	YES	YES	YES	YES
COMPANY FE	YES	YES	YES	YES

This table presents the results by testing the relation between regional bank market power and earnings quality. The sample includes all of the unregulated Compustat firms from 1995 to 2019. Financials (SIC Codes 6000-6999) and utilities (4900-4949) are not included. Definitions of the variables are summarized in Appendix 1. The independent variable is HHI which measures state level bank deposit concentration ratio. In Columns (1)-(2), the dependent variables are Accrual_CF, ABS(Accrual_MJ). In columns 3 and 4, our dependent variables are Accural_MJ. In column, we use the subsample if Accrual_MJ >0 and use subsample if Accruak_MJ<0 in column 4. We included dummy variables to capture firm- and year-fixed effects. Standard errors are clustered by firm and year. Standard Errors are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 3-9B: Alternative measurement- H-statistics

VARIABLES	(1) Accrual_CF	(2) ABS(Accrual_MJ)	(3) Accrual_MJ	(4) Accrual_MJ
H-Statistics	0.0040***	0.0075**	0.0065***	-0.0092***
	(0.0007)	(0.0033)	(0.0022)	(0.0035)
Accrual_CF_t-1	0.6796***			
	(0.0069)			
Ln(Asset)	0.0148***	-0.0273***	-0.0152***	0.0246***
	(0.0006)	(0.0026)	(0.0016)	(0.0019)
ROA	-0.0130***	0.0536***	-0.0627***	-0.1218**
	(0.0022)	(0.0116)	(0.0142)	(0.0509)
Total Debt/Total Assets	-0.0022	0.0197***	-0.0067	-0.0329***
	(0.0018)	(0.0071)	(0.0071)	(0.0099)
Sales Growth	-0.0001	0.0520***	-0.0354***	-0.0806***
	(0.0004)	(0.0092)	(0.0091)	(0.0144)
Operating Cash Flow	-0.0000***	-0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0000***	0.0001***	0.0001***	0.0043
	(0.0000)	(0.0000)	(0.0000)	(0.0040)
ABS(Accrual_MJ)_t-1		0.0907***		
		(0.0128)		
Accrual_MJ_t-1			-0.0497***	0.0986***
			(0.0128)	(0.0101)
Constant	-0.0505***	0.2411***	0.1840***	-0.2014***
	(0.0034)	(0.0135)	(0.0090)	(0.0120)
Observations	63,940	78,242	43,561	37,568
R-squared	0.5685	0.0904	0.0620	0.2158
YEAR FE	YES	YES	YES	YES
COMPANY FE	YES	YES	YES	YES

This table presents the results by testing the relation between regional bank market power and earnings quality. The sample includes all of the unregulated Compustat firms from 1995 to 2019. Financials (SIC Codes 6000-6999) and utilities (4900-4949) are not included. Definitions of the variables are summarized in Appendix 1. The independent variable is H-statistics which measures state level bank market power. In Columns (1)-(2), the dependent variables are Accrual_CF, ABS(Accrual_MJ). In columns 3 and 4, our dependent variables are Accural_MJ. In column, we use the subsample if Accrual_MJ >0 and use subsample if Accruak_MJ<0 in column 4. We included dummy variables to capture firm- and year-fixed effects. Standard errors are clustered by firm and year. Standard Errors are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 3-9C: Alternative measurement- CR3

VARIABLES	(1) Accrual_CF	(2) ABS(Accrual_MJ)	(3) Accrual_MJ	(4) Accrual_MJ
CR3	-0.0164***	-0.0385*	-0.0043	0.0642***
	(0.0037)	(0.0222)	(0.0112)	(0.0206)
Accrual_CF_t-1	0.6722***			
	(0.0063)			
Ln(Asset)	0.0149***	-0.0289***	-0.0173***	0.0239***
	(0.0006)	(0.0030)	(0.0019)	(0.0022)
ROA	-0.0123***	0.0511***	-0.0611***	-0.1003**
	(0.0026)	(0.0121)	(0.0141)	(0.0467)
Total Debt/Total Assets	-0.0009	0.0185**	-0.0068	-0.0263**
	(0.0019)	(0.0084)	(0.0077)	(0.0106)
Sales Growth	-0.0003	0.0479***	-0.0338***	-0.0756***
	(0.0005)	(0.0085)	(0.0091)	(0.0144)
Operating Cash Flow	-0.0000***	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0000***	0.0001***	0.0001***	0.0292***
	(0.0000)	(0.0000)	(0.0000)	(0.0042)
ABS(Accrual_MJ)_t-1		0.0913***		
		(0.0134)		
Accrual_MJ_t-1			-0.0516***	0.0918***
			(0.0157)	(0.0101)
Constant	-0.0421***	0.2716***	0.2016***	-0.2476***
	(0.0038)	(0.0190)	(0.0106)	(0.0150)
Observations	57,442	69,287	39,069	32,947
R-squared	0.5481	0.0849	0.0614	0.2140
YEAR FE	YES	YES	YES	YES
COMPANY FE	YES	YES	YES	YES

This table presents the results by testing the relation between regional bank market power and earnings quality. The sample includes all of the unregulated Compustat firms from 1995 to 2019. Financials (SIC Codes 6000-6999) and utilities (4900-4949) are not included. Definitions of the variables are summarized in Appendix 1. The independent variable is CR3 which measures state level bank deposit concentration ratio of top 3. In Columns (1)-(2), the dependent variables are Accrual_CF, ABS(Accrual_MJ). In columns 3 and 4, our dependent variables are Accural_MJ. In column, we use the subsample if Accrual_MJ >0 and use subsample if Accruak_MJ<0 in column 4. We included dummy variables to capture firm- and year-fixed effects. Standard errors are clustered by firm and year. Standard Errors are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 3-9D: Alternative measurement- Branch density

VARIABLES	(1) Accrual_CF	(2) ABS(Accrual_MJ)	(3) Accrual_MJ	(4) Accrual_MJ
Branch-Density	0.0208*	0.2300***	0.1946***	-0.1559**
	(0.0119)	(0.0546)	(0.0346)	(0.0686)
Accrual_CF_t-1	0.6713***			
	(0.0063)			
Ln(Asset)	0.0145***	-0.0300***	-0.0178***	0.0255***
	(0.0007)	(0.0030)	(0.0018)	(0.0021)
ROA	-0.0118***	0.0519***	-0.0607***	-0.1007**
	(0.0026)	(0.0121)	(0.0143)	(0.0469)
Total Debt/Total Assets	-0.0004	0.0216**	-0.0043	-0.0288***
	(0.0019)	(0.0086)	(0.0077)	(0.0107)
Sales Growth	-0.0003	0.0481***	-0.0336***	-0.0759***
	(0.0005)	(0.0085)	(0.0091)	(0.0145)
Operating Cash Flow	-0.0000***	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0000***	0.0001***	0.0001***	0.0292***
	(0.0000)	(0.0000)	(0.0000)	(0.0041)
ABS(Accrual_MJ)_t-1		0.0915***		
		(0.0134)		
Accrual_MJ_t-1			-0.0512***	0.0931***
			(0.0157)	(0.0103)
Constant	-0.0529***	0.1943***	0.1448***	-0.1833***
	(0.0050)	(0.0215)	(0.0127)	(0.0248)
Observations	57,442	69,287	39,069	32,947
R-squared	0.5479	0.0853	0.0624	0.2138
YEAR FE	YES	YES	YES	YES
COMPANY FE	YES	YES	YES	YES

This table presents the results by testing the relation between regional bank market power and earnings quality. The sample includes all of the unregulated Compustat firms from 1995 to 2019. Financials (SIC Codes 6000-6999) and utilities (4900-4949) are not included. Definitions of the variables are summarized in Appendix 1. The independent variable is Branch-Density which measures state level branch density. In Columns (1)-(2), the dependent variables are Accrual_CF, ABS(Accrual_MJ). In columns 3 and 4, our dependent variables are Accural_MJ. In column, we use the subsample if Accrual_MJ >0 and use subsample if Accruak_MJ<0 in column 4. We included dummy variables to capture firm- and year-fixed effects. Standard errors are clustered by firm and year. Standard Errors are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

3.6 Chapter conclusion

In this paper, we seek to establish empirically a link between the quality of regional financial reporting and local bank market structure at the level of U.S. states. If banks have more incentive and ability to screen and monitor borrowers in the region where they have market power, firms may improve the quality of their financial reporting. We collect state-level bank data from FDIC, measure bank market power using a structural approach (HHI, CR3 and branch density) and a non-structural approach (Lerner and H-statistics). We calculate the quality of financial reporting from 1995 to 2019. We find robust and consistent evidence by demonstrating that firms engage less in earnings management and have higher financial reporting quality in regions where banks have more market power. We also find that the effect of bank market structure on regional financial reporting quality is through the 'screen and monitor' channel, not through the 'incentive channel'. Our results are shown to be robust through a set of tests that use subsamples in regions that experience a significant change in bank market, additional state-level controls, alternative measures of bank market structure, and using 2SLS and a placebo test to address potential endogeneity problems.

Appendix 3-1

VarName	Definition	Source
Dependent Var:		
Accrual_CF	The ratio of accrual earnings management. We follow Francis et al. (2005) to measure this ratio. The higher the ratio, the more earnings management engaged.	Compustat
Accrual_MJ	The ratio of accrual earnings management. We follow Dechow et al. (1995) to calculate this ratio. The higher the ratio, the more earnings management engaged.	Compustat
ABS(Accrual_MJ)	The absolute value of Accrual_MJ.	Compustat
Accrual_MJ>0	The sample if Accrual_MJ is larger than zero, it means firms is taking income increasing earnings management.	Compustat
Accrual_MJ<0	The sample if Accrual_MJ is samller than zero, it means firms is taking income decreasing earnings management.	Compustat
Independent Var:		
Lerner	Measure of bank market structure Lerner (1934). Lerner index ranges from 0 to 1. The higher the ratio, the more power that banks have in this region.	FDIC
H-statistics	Panzar and Rosse (1984) H-statistics of bank market structure, ranging from 0 to 1. The higher the ratio, the more competition for the banks in the region.	FDIC
HHI	Herfindahl-Hirschman index of bank market structure. We calculate this ratio based on the bank deposit share at the state level. The higher the ratio, the more concentration of local bank market.	FDIC
CR3	Concentration ratio of top 3 banks. We calculate this ratio based on the top 3 banks' deposit share at the state level. The higher the ratio, the more concentration of local bank market.	FDIC
Branch density	Branch density by population at state level. We use total branches to divide the number of state population. The higher the ratio, the more competition in the local bank market.	FDIC
Borrower control*:*		
Ln(asset)	Natural Log of the total asset of the borrower at the end of fiscal year prior to the loan origination	Compustat
ROA	Return on Asset	Compustat
Book/Market	Book to Market ratio	Compustat
Sales Growth	Annual sales growth rate	Compustat

Total Debt/Total Assets	Total debt over total asset.	Compustat
Operating Cash Flow	Operating cash flow	Compustat
State control		
Ln(GDP)	Natural log of the annual gross domestic product by state	Federal Reserve Bank of ST. Louis
GDP_Growth	The growth rate of state gross domestic product	Federal Reserve Bank of ST. Louis
Ln(Personal Income)	Natural log of the average personal income in state	Federal Reserve Bank of ST. Louis

Appendix 3-2

	(1)	(2)	(3)	(4)
VARIABLES	Accrual_CF	Accrual_MJ	Accrual_MJ>0	Accrual_MJ<0
Lerner	-0.0245***	-0.0853***	-0.0850***	0.0694***
	(0.0038)	(0.0152)	(0.0114)	(0.0185)
ACC_CF_t-1	0.6763***			
	(0.0064)			
ABS(Acc_MJ)_t-1		0.0905***		
		(0.0138)		
Acc_MJ _tm1			-0.0466***	0.0955***
			(0.0150)	(0.0099)
Ln(Asset)	0.0144***	-0.0271***	-0.0145***	0.0255***
	(0.0006)	(0.0029)	(0.0017)	(0.0020)
ROA	-0.0127***	0.0518***	-0.0648***	-0.1139**
	(0.0025)	(0.0117)	(0.0140)	(0.0489)
Total Debt/Total Assets	-0.0006	0.0200**	-0.0083	-0.0281***
	(0.0019)	(0.0078)	(0.0075)	(0.0101)
Sales Growth	-0.0003	0.0491***	-0.0346***	-0.0775***
	(0.0005)	(0.0089)	(0.0090)	(0.0147)
Constant	-0.0396***	0.2729***	0.2115***	-0.2352***
	(0.0033)	(0.0157)	(0.0092)	(0.0131)
Observations	60,446	73,234	40,961	35,092
R-squared	0.5549	0.0875	0.0641	0.2118
YEAR FE	YES	YES	YES	YES
COMPANY FE	YES	YES	YES	YES

This table presents the results by testing the relation between regional bank market power and earnings quality. The sample includes all of the unregulated Compustat firms from 1995 to 2019. Financials (SIC Codes 6000-6999) and utilities (4900-4949) are not included. Definitions of the variables are summarized in Appendix 1. The independent variable is Lerner index which measures state level bank market power. In Columns (1)-(2), the dependent variables are Accrual_CF, ABS(Accrual_MJ). In columns 3 and 4, our dependent variables are Accural_MJ. In column, we use the subsample if Accrual_MJ >0 and use subsample if Accruak_MJ<0 in column 4. We included dummy variables to capture firm- and year-fixed effects. Standard errors are clustered by firm and year. Standard errors are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Appendix 3-3

VARIABLES	(1) Accrual_CF	(2) Accrual_MJ	(3) Accrual_MJ>0	(4) Accrual_MJ<0
ACC_tm1	1.28	1.06	1.03	1.06
Lerner	2.02	2.08	2.09	2.08
Ln(Asset)	2.03	1.65	1.78	1.73
ROA	1.26	1.20	1.28	1.23
Total Debt/Total Assets	1.15	1.13	1.16	1.11
Sales Growth	1.01	1.04	1.02	1.09
Operating Cash Flow	1.56	1.18	1.22	1.38
Book/Market	1.00	1.00	1.00	1.02
Mean VIF	1.75	1.67	1.77	1.61

This table is the VIF results for the baseline model in Chapter 3. Mean VIF value is less than 5, and we can see that there is no severe correlation between our explanatory variables in the model.

Appendix 3-4

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Accrual_CF	1														
2	Accrual_MJ	0.05***	1													
3	Lerner	0.08***	-0.07***	1												
4	H	-0.04***	0.06***	-0.20***	1											
5	HHI	0.09***	-0.04***	0.45***	-0.14***	1										
6	CRK3	0.12***	-0.04***	0.45***	-0.14***	0.91***	1									
7	Branch Density	-0.14***	-0.02***	-0.26***	-0.14***	-0.29***	-0.42***	1								
8	Asset	-0.22***	-0.09***	0.07***	-0.07***	0.00	-0.01*	0.06***	1							
9	ROA	-0.38***	-0.02***	-0.03***	0.05***	-0.06***	-0.09***	0.10***	0.13***	1						
10	Total Debt/Total Asset	-0.19***	-0.01*	-0.02***	0.04***	-0.05***	-0.08***	0.07***	0.22***	0.05***	1					
11	Sales Growth	0.05***	0.21***	-0.01**	0.01***	-0.00	0.00	-0.04***	-0.02***	-0.06***	-0.00	1				
12	Operating Cash FLow	-0.21***	-0.09***	0.06***	-0.05***	-0.00	-0.01***	0.05***	0.81***	0.21***	0.13***	-0.03***	1			
13	Book/Market	-0.01	0.01	0.00	0.01**	0.00	0.00	-0.00	-0.00	-0.00	0.03***	-0.02***	-0.01***	1		
14	Ln(GDP)	0.14***	-0.02***	0.17***	-0.10***	-0.03***	0.08***	-0.62***	-0.00	-0.11***	-0.10***	0.02***	0.00	-0.01**	1	

15	GDP_Growth	-0.02***	0.06***	-0.13***	0.24***	-0.05***	-0.04***	-0.21***	-0.06***	-0.00	0.03***	0.05***	-0.06***	0.00	-0.03***	1

This table presents the Pearson correlations for all variables used in the test. * means correlations that statistically different from zero at the 1% level

4. Bank Deregulation and the Trade-off between Accrual-Based Earnings Management and Real Activity-Based Earnings Management

4.1 Introduction

The Riegle–Neal Interstate Banking and Branching Efficiency Act (IBBEA), introduced in 1994, enacted nationwide deregulation of the bank sector in the U.S. It permits national or state banks to engage in interstate branching, and it largely changed the bank market structure in the U.S. There is extensive empirical literature that has examined the various consequences of bank deregulation, increased availability of bank credit (Cetorelli and Strahan, 2006), increasing personal bankruptcy rates (Dick and Lehnert, 2010) and the proportions of syndicated loans and bilateral loans (Keil and Müller, 2019). However, there is still the empirical question of how bank market deregulation shifts the regional accounting choices, especially the choice between accrual-based and real-based earnings management. In this paper, we focus on the effect of bank deregulation on corporations' earnings management, especially the trade-off between accrual earnings management and real earnings management.

To examine this question, we employ 72,219 samples from 8,055 firms between 1987 and 2007 in the U.S. market. Our baseline results show that bank deregulation

leads to less accrual earnings management and more real earnings management. For example, if a state removes one bank restriction rule (i.e. to increase *Free* by 1), the firms headquartered in that state will exercise 23% less accrual earnings management and increase their real earnings management in its place. We then use the propensity score matching and difference in difference (PSM-DID) method and find a consistent result. The results of the PSM-DID model show that if the state is currently experiencing a *Free* larger than 2, the firms headquartered in that state will have 31% less accrual earnings management and more real earnings management instead.

We further examine three factors that could influence the link between bank deregulation and choice of earnings management type. The first is the industry factor. If the company is in an industry that is more likely to have business outside its home state, we expect the companies in that industry to be less influenced by bank deregulation in their home state. In this case, we expect that out-of-state finance resources would erode the relation between bank deregulation and earnings management. We then test the effect of information asymmetry. If the firm has an S&P crediting rating above BBB (*Investment Grade*), we expect that company to have a superior ability to access funds from the bond market and other out-of-state bank markets. Therefore, it is less likely to be influenced by bank deregulation in their home state. In our model, we expect the *Investment Grade* will weaken the link between bank market deregulation and earnings management. Finally, we consider the effect of a

firm's financial condition. If the company is in good financial condition, we expect that it would be less influenced by changes in the bank market structure because such firms are not 'hungry for money'. Therefore, we predict that the healthier financial condition would weaken the link between bank market deregulation and earnings management. Overall, most of the results support our expectations.

One potential source of concern for our empirical analysis is endogeneity. In our baseline model, we have controlled various corporation characteristics. We also control the time and company fixed effect, which could eliminate omitted factors driven by time and individual firms. In addition, we also use a placebo test to examine the potential problem of omitted variables. Our empirical analysis concludes with a robustness test in which we use different measures of accrual earnings management and a different sample of firms (1994–2005) to further support the baseline model. Overall, all results support our hypotheses.

The rest of this paper proceeds as follows. We review the literature and present the hypothesis in Section 4.2, describe our data, variables and baseline model specifications in Section 4.3 and report the empirical results in Section 4.4. We conclude our findings with implications in Section 4.5.

4.2 Literature review and hypothesis development

4.2.1 Interstate bank market deregulation: IBBEA-1994

The Riegle–Neal Interstate Banking and Branching Efficiency Act of 1994 (IBBEA) was intended to remove interstate branching restrictions. For example, one of the restrictions said that banks could open branches outside their home state (Keil and Müller, 2019). Under IBBEA, each state may set anti-competitive obstacles to interstate branching. The potential obstacles were: 1) a bank that wants to be acquired in an interstate merger should satisfy the minimum age requirement (e.g., 5 years); 2) de novo interstate branching is permitted only if state law permits; 3) the state-wide deposit concentration cannot exceed 30% to prevent interstate mergers; 4) the state has the option to permit or reject an interstate merger in which one bank acquires a branch or several branches from another bank. The states could lift these restrictions at different times to open the market further. Following IBBEA, interstate bank acquisitions increase sharply (Hubbard and Palia, 1995). Indeed, deregulation opens the market to out-of-state banks, and this leads to greater competition between banks (Bertrand and Mullainathan, 2003). However, Kerr and Nanda (2009) state that the total number of banks across the country fell after IBBEA, mainly driven by the decline in small local banks. The M&A between banks may ultimately lead to a less competitive market of banks that provide funds to the companies (listed and large) in our sample.

4.2.2 Hypothesis development

Researchers have examined the effect on the conditions for bank loans from the both accrual earnings management (Francis et al., 2005) and real earnings management (Pappas et al., 2019). In this paper, we assume that accrual earnings management and real earnings management are substitutes for each other (Cunningham et al., 2020). Studies of this substitution effect show that if accrual earnings management costs are higher, then firms are more likely to move to real earnings management. At least, real earnings management does not involve direct violation of any laws or regulation, and it can be properly disclosed in financial statements (Zang, 2011). Cunningham et al. (2020) also proved that managers are more likely to move to real earnings management after receiving a comment letter from the SEC, because the SEC does not scrutinise real business activities. El Mahdy and Cheng (2016) find that bank lenders are less likely to monitor borrowers' real earnings management. Graham et al. (2005) find that firms' managers are more likely to use real activity earnings management to avoid the negative reaction to investor and analysts' earnings expectations.

Freixas and Rochet (1997) identify monitoring as one of a bank's most important functions. Banks have information advantages over other financial intermediaries (Fama, 1985). There is some evidence that bank monitoring of syndicated loans creates a positive incentive to reduce information asymmetry between

the lead lender and the other participants (Jones et al., 2005, Champagne and Kryzanowski, 2007). In fact, bank monitoring is more effective t reducing agencies' problems at reducing agencies' problems in a concentrated banking system, which makes it easier for firms to access bank loan (Caminal and Matutes, 2002, Beck et al., 2006). Recent banking studies suggest that stronger bank monitoring can reduce borrowers' earnings management as measured by discretionary accrual models, and this reduces credit risk (Ahn and Choi, 2009). Research shows that banks with market power have a stronger monitoring effect on borrowers than those in a competitive market (Guzman, 2000, Caminal and Matutes, 2002). It is possible that IBBEA causes M&A between banks, leading to superior bank groups. Because the sample covered in our paper is listed firms with average assets of $859m, the lenders to these large companies are more likely to be superior banks. If that is the case, IBBEA will decrease competition between large company targeted lenders. As with bank deregulation, less competition in our target bank market will give these banks more market power and superior monitoring ability. Therefore, we speculate that:

H1: After bank deregulation, corporations will decrease accrual earnings management and increase real earnings management as a substitution.

4.3 Data and methodology

4.3.1 Data

The main database we used in this chapter is from three resources: Compustat, the Rs-index from (Rice and Strahan, 2010) and Federal Deposit Insurance Corporation (FDIC). We collect the firm's financial information from Compustat and calculate earnings management ratios based on that database. We exclude financial institutions (SIC codes 6000-6700) and utilities (SIC codes 4900-4942)[6]. We extract bank market deregulation data from Rice and Strahan (2010). We also use bank deposit market share and bank financial statements from FDIC to calculate the bank market structure ratio, such as HHI, CR3 and H-statistics. The resulting dataset contains 72,219 samples for 8,055 corporations from 51 U.S. states during 1987–2007[7].

4.3.2 Bank market deregulation

The Rs-index from Rice and Strahan (2010) measures each state's restrictions of interstate branching. It ranges from 0 to 4, the higher the ratio, the more restriction. If the Rs-index equals zero, there is no restriction on interstate branching. We construct our bank deregulation ratio based on the Rs-index. First, we construct *Free* by using

[6] Because firms in financial and utility industries are highly regulated (Yildirim, 2020)

[7] Our sample ends in 2007 because the Rs-index covers the period from 1994 to 2005 (Rice and Strahan, 2010).We start our sample in 1987 because it is reasonable to assume that states were fully restricted before IBBEA (Keil and Müller, 2019) We extend the Rs-index to 2007 as no state reserved its liberalization decision in 2005—2007.

reverse Rs-index, ranging from 0 to 4. When *Free* equals 4, there is the most freedom of interstate branching. Then, to perform the difference-in-difference (DID) method, we construct another variable, *Post*. It equals 1 if the state has *Free* larger than 2; it is zero otherwise. The treatment group in our sample comprises the corporations in the state which never had a *Free* larger than 2.

4.3.3 Earnings management

Following Roychowdhury (2006), we use the abnormal levels of cash flow from discretionary expenses (the sum of R&D, advertising and SG&A), operations (CFO) and production costs, respectively. The abnormal ABCASH, ABPRO and ABEXP are residuals from the following models (1) through (3), respectively.

$$\text{CFO} = \alpha + \beta_1(1/Asset_{t-1}) + \beta_2(Sales_t/Asset_{t-1}) + \beta_3(\Delta Sales_t/Asset_{t-1}) + \varepsilon_t$$

…(Eq.4-1)

$$\text{Production} = \alpha + \beta_1(1/Asset_{t-1}) + \beta_2(Sales_t/Asset_{t-1}) + \beta_3(\Delta Sales_t/Asset_{t-1}) + \beta_4(\Delta Sales_{t-1}/Asset_{t-1}) + \varepsilon_t$$

…(Eq. 4-2)

$$\text{Expense} = \alpha + \beta_1(1/Asset_{t-1}) + \beta_2(Sales_{t-1}/Asset_{t-1}) + \varepsilon_t$$ …(Eq. 4-3)

We estimate models (1) to (3) by industry-year for all firms. In addition, we follow Cohen and Zarowin (2010) and calculate real activity management by summing ABCASH*(-1) and ABEXP*(-1) (*Real1*), and ABPRO and ABEXP*(-1) (*Real2*), respectively[8].

We measure accrual earnings management (*Accrual*) by following the method in Francis et al. (2005). For *Accrual*, we first compute total current accrual using firm accounting information from Compustat:

$$TCA_{i,t} = \Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta STDEBT_{i,t} - DEPN_{i,t} \ldots\ldots \text{(Eq. 4-4)}$$

where $\Delta CA_{i,t}$ is firm i's change in current assets from year $t-1$ to year t; $\Delta CL_{i,t}$ is firm i's change in current liabilities between year $t-1$ and year t; $\Delta Cash_{i,t}$ is firm i's change in cash from year $t-1$ to year t; $\Delta STDEBT_{i,t}$ is firm i's change in debt from current liabilities between year $t-1$ and year t; $DEPN_{i,t}$is firm i's depreciation and amortisation expense in year t. Then, we estimate the following equation for each industry group by following Fama and French (1997):

[8] We multiply ABCASH by -1, thus a higher value of -ABCASH means a higher level of manipulation. We also multiply ABEXP by -1, so higher value means more manipulation by cutting discretionary expenses to inflate earnings.

$$\frac{TCA_{i,t}}{AT_i} = \partial_1 \frac{1}{AT_i} + \partial_2 \frac{CFO_{i,t-1}}{AT_i} + \partial_3 \frac{CFO_{i,t}}{AT_i} + \partial_4 \frac{CFO_{i,t+1}}{AT_i} + \partial_5 \frac{\Delta REV_{i,t}}{AT_i} + \partial_6 \frac{PPE_{i,t}}{AT_i} + \varepsilon_{it} \ldots$$(Eq. 4-5)

where $CFO_{i,t}$ is firm i's cash flow from operating in year t; $\Delta REV_{i,t}$ is firm i's change in revenues from year $t-1$ to year t; PPE_{it} is firm i's gross value of property, plant and equipment in year t. We predict the firm-year residuals after regression. *Accrual2* is the standard deviation of firm i's 5-year residuals from year $t-4$ to year t. We also follow Francis et al. (2005) to winsorize the extreme values of distribution to 1/99 percentiles. The larger the standard deviation of residuals, the poorer is the accounting quality and the more earnings management is used.

4.3.4 Model development

To test our conjecture, we construct two empirical models. First, we use OLS to test whether a corporation in the U.S. state with a certain level of *Free* in the bank market is more likely to decrease earnings management in *Accrual* and increase earnings management in *Real*. This relation can be represented in the empirical model as:

$$Earnings\ management_{i,t} = \partial_0 + \partial_1 Free_{s,t-1} + \beta_1 \sum Z_{i,t-1} + \mu_i + \tau_t + \varepsilon_{i,t}$$

…… (Eq. 4-6)

In Eq. 4-6, we use *Accrual1* to present the post-earnings management in accrual for firm i at time t, and we use *Real1* and *Real2* to present the post-earnings management in real for firm i at time t, respectively. The larger the ratio in *Accrual*, *Real1* and *Real2*, the higher the earnings management behaviour engaged in accrual and real. For the bank deregulation ratio, we use *Free* to indicate the freedom in the banking market for firm s at time $t-1$. *Free* ranges from 0 to 4, and the larger the ratio, the greater the freedom in the bank market and the less restriction. In this model, we also control a certain level of characteristics for firm i at time $t-1$ to eliminate the potential that the change in earnings management is caused by heterogeneity at the firm level. For example, we include *Asset* to control for company size. We also consider *ROA* (return on asset), *Book/Market* (book to market ratio), *Operating Cash flow* to control for cash flow, *Sales Growth* and *Total Debt/Total Assets* to control for other characteristics of borrowing firms. We report the sources and detailed descriptions of each variable in Appendix 1. We expect that the deregulation of the bank market will lead the target bank group with more market power. Thus, corporations in this state will be more likely to decrease their earnings management in accrual and use more real earnings management in its place. Reflecting on this model, we predict ∂_1 for the accrual earnings management sample will be negative, and ∂_1 for the real earnings management sample will be positive. Therefore, we can say there is a trade-off between

accrual earnings management and real earnings management in the U.S. markets following bank deregulation.

We then use a propensity score matching and difference in difference (PSM-DID) method in a time-varying model to further prove our result. This is our second baseline model, and we use it in the following tests in this chapter. First, to eliminate the heterogeneity between the treatment group and control group, we use the PSM method to match samples from the two groups. It can be written as:

$$Treated_{i,t} = \partial_0 + \beta_1 \sum Z_{i,t-1} + \varepsilon_{i,t} \quad \text{.....(Eq. 4-7)}$$

In Eq. 4-7, *Treated* is a dummy variable equals to one if the state where the headquarters of company i at time t has a *Free* larger than 2 during the sample period, zero otherwise. In Eq. 4-7, we also control for a series of firm characteristics: *Asset*, *ROA* and *Book/Market*. After matching samples between the treated group and the control group, we use a DID method to capture the effect of deregulation. We use *Post* as a time-related dummy variable that equals one if the state has a *Free* larger than 2, zero otherwise. We can write our main baseline model (DID) as[9]:

[9] The original model of DID is:

$$Earnings\ Management_{i,t} = \partial_0 + \partial_1 Treat_s + \partial_2 Post_{s,t-1} + \partial_3 Treat_s * Post_{s,t-1} + \beta_1 \sum Z_{i,t-1} + \varepsilon_{i,t}$$

Because the *Post* applied to each state is not at the same time, it is time varying. For example, the time of *Pos*t applied to state CT is 1995, whereas the time for state HI is 2001. In addition, we use panel data with a fixed effects model Therefore, we rewrite our model as shown in Equation 8.

$$Earnings\ Management_{i,t} = \partial_0 + \partial_1 Treat_s * Post_{s,t-1} + \beta_1 \sum Z_{i,t-1} + \mu_i + \tau_t + \varepsilon_{i,t}$$ ……(Eq. 4-8)

In Eq. 4-8, the coefficient of $Treat_s * Post_{s,t-1}$ indicates the effect of bank deregulation on earnings management and the trade-off between accrual earnings management and real earnings management. We expect ∂_1 is negative for accrual earnings management and positive for real earnings management.

4.4 Empirical Analysis

4.4.1 Statistics and Pearson correlation

Table 4-1 summarises all variables used in the empirical analysis. On average, firms with earnings management in Accrual ratio (*Accrual*) are 0.0819, Real earnings management ratio 1(*Real1*) is -0.0001 and real earnings management ratio 2 (*Real2*) is 0.0203. For the bank market structure, the state freedom ratio in our sample has an average of 1.1633 with a standard deviation of 1.3902. This indicates heterogeneity in bank market deregulation. We also use HHI, CR3 and H-statistics to indicate the bank market structure in our sample and find average ratios of 0.0773, 0.4057 and 0.5435, respectively. In terms of the firms' characteristics, an average firm has an asset value of $859 million with a sales growth ratio of 0.1955. These corporations have a return on assets of 0.0706, a book-to-market ratio of 0.7336 and a total debt-to-total asset ratio of 0.2138.

Table 4-2 reports the average bank market structure ratio for all states used in our sample. The first column is the state code. Columns 2 to Column 5, show *Free*, HHI, CRK3 and H-statistics to present their bank market structure, respectively.

Table 4-3A reports Pearson's correlation matrix between different bank market structure ratios. The *Free* is our main interest variable. The higher the ratio, the less restriction on the bank market. HHI is the Herfindahl-Hirschman Index for each state based on branch deposit market share. The higher the ratio the less competitive is the bank market in that state. CR3 is the concentration ratio of the deposit market share of the top three banks. A high ratio means the top three banks have a larger market share and therefore, more market power. H-statistics is also a measure of bank market competition. It measures the elasticity of the banks' revenues to input prices. We calculate it for the state level The higher the ratio the more competitive is the bank market. *Branches* is the total number of branches under FDIC for each state every year. Based on the results in Table 4-3A, we simply find that the *Free* has the same direction as HHI and CR3, and it has a negative relation with H-statistics and *Branches*. We can conclude that the fewer restrictions in a state, the less competition there is for banks, especially for the top banks.

Table 4-3B reports the difference between earnings management in accrual and real before and after state bank deregulation. We use the dummy variable *Post* to

differentiate the sample[10]. After the t-test, we find that firms increase their earnings management both in accrual and real after state bank deregulation. This result may suffer other unobservable effects, such as time and firm-specific characteristics. We do further analysis later in this paper.

[10] This sample includes only the states that had a *Free* larger than 2 during our sample period.

Table 4-1: Summary statistics

This table reports summary statistics for the variables used in the empirical analysis. Samples collected between 1987 and 2007 with 72,219 observations.

VarName	Obs	Mean	SD	Median	P25	P75
Accrual_CF	56194	0.0819	0.0827	0.0514	0.0255	0.1077
Real1	66670	-0.0001	0.3600	0.0452	-0.1621	0.2107
Real2	62201	0.0203	0.5008	0.0745	-0.2354	0.3471
Free	72219	1.1633	1.3902	1.0000	0.0000	2.0000
Post	72219	0.2110	0.4080	0.0000	0.0000	0.0000
HHI	48473	0.0773	0.0413	0.0733	0.0530	0.0914
CR3	48473	0.4057	0.1075	0.4039	0.3316	0.4776
H-statistic	58572	0.5435	0.2588	0.5825	0.3758	0.7488
AT	72219	859.2961	2326.1975	134.9680	37.1810	576.6260
ROA	72219	0.0706	0.2421	0.1143	0.0310	0.1805
Total Debt/Total Assets	72219	0.2138	0.1932	0.1819	0.0333	0.3438
Sales Growth	72219	0.1955	0.4446	0.1047	-0.0086	0.2874
Operating Cash Flow	72219	75.8636	243.0910	7.0110	-0.2300	46.9440
Book/Market	72219	0.7336	2.5772	0.5257	0.2989	0.8731
Traded	60840	0.8101	0.3922	1.0000	1.0000	1.0000
Investment Grade	72219	0.0535	0.2250	0.0000	0.0000	0.0000
Z-score	70301	0.9725	5.5246	1.7529	0.6538	2.6500

Table 4-2: Bank market structure by State

This table reports the average bank market structure ratio for U.S. states used in our sample. Samples collected between 1987 and 2007 with 72,219 observations.

State code	Free	HHI	CRK3	H-statistic
AL	.415	.088	.469	.705
AR	0	.024	.204	.755
AZ	.82	.174	.681	.553
CA	.658	.087	.458	.601
CO	0	.058	.357	.719
CT	1.994	.089	.44	.571
DC	2.632	.153	.604	.265
DE	.588	.151	.594	.417
FL	.536	.077	.436	.578
GA	.563	.063	.383	.583
HI	1.511	.209	.741	.496
IA	0	.021	.2	.785
ID	.6	.146	.568	.421
IL	.864	.028	.23	.687
IN	1.62	.036	.276	.499
KS	0	.024	.219	.692
KY	.403	.029	.239	.674
LA	.512	.083	.443	.652
MA	1.89	.083	.434	.261
MD	2.724	.064	.357	.446
ME	1.683	.088	.46	.276
MI	2.113	.079	.413	.717
MN	.511	.101	.465	.767
MS	0	.062	.374	.471
MT	0	.057	.361	.65
NC	2.741	.144	.566	.505
ND	1.214	.044	.291	.541
NE	0	.036	.275	.607
NH	1.049	.143	.563	.585
NJ	1.734	.057	.334	.35
NM	.358	.067	.392	.561
NV	.682	.158	.592	.599
NY	1.012	.087	.428	.301
OH	1.916	.047	.291	.213
OK	.914	.029	.223	.753
OR	.539	.133	.528	.492
PA	2.63	.058	.377	.458
RI	2.498	.248	.781	.456
SC	.528	.075	.409	.648
SD	.491	.194	.504	.48

TN	1.329	.061	.365	.707
TX	.829	.046	.325	.793
UT	1.637	.219	.612	.498
VA	2.749	.069	.375	.357
VT	1.869	.106	.457	.116
WA	.986	.102	.493	.351
WI	.554	.04	.279	.555
WV	1.438	.055	.322	.585
WY	.2	.112	.468	.692

Table 4-3A: Correlation-Bank market structure

Samples collected between 1987 and 2007 with 72,219 observations. * shows significance at the 0.1 level.

Variables	(1)	(2)	(3)	(4)	(5)
(1) Free	1.000				
(2) HHI	0.128*	1.000			
(3) CR3	0.115*	0.914*	1.000		
(4) H-statistics	-0.346*	-0.091*	-0.070*	1.000	
(5) Branches	-0.143*	-0.179*	-0.062*	0.142*	1.000

Table 4-3B: Comparing earnings management by pre and post deregulation

This table Samples collected between 1987 and 2007 with 72,219 observations. Earnings management is measured by Accrual, Real1 and Real2. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	Obs(Pre)	Mean(Pre)	Obs(Post)	Mean(Post)	mean-diff	t
Accrual	8,444	0.057	12,970	0.088	-0.031***	-27.619
Real1	10,645	0.008	13,924	0.023	-0.014***	-3.155
Real2	9,696	0.035	13,377	0.054	-0.019***	-2.810

4.4.2 Baseline

Table 4-4 presents the results for *H1*. It examines the relationship between bank market deregulation and the earnings management behaviour of local corporations. The dependent variables are different measures of earnings management: *Accrual_CF* (Column 1), *Real1* (Column 2) and *Real2* (Column 3). Overall, Table 4-4 shows that after controlling for a set of variables and fixed effects, state bank market deregulation leads to a reduction in accrual earnings management and an increase in real earnings management. This shows the trade-off in the use of earnings management after bank market deregulation. The effect of bank market deregulation on earnings management is not only statistically significant but also economically significant. Thus, if a state removes one bank restriction rule (it increases *Free* by 1), the firms headquartered in that state will have 23% less accrual earnings management and they will increase their real earnings management in its place. This result supports our *H1* that bank market deregulation leads to a trade-off between accrual earnings management and real earnings management. That is, corporations are more likely to decrease their accrual earnings management and increase real earnings management behaviour.

Table 4-4: Baseline

This table presents the matching between borrower's earning management and bank market freedom. The dependent variables are the earnings management in accrual (Column 1), earnings management in Real1 (Column 2) and Real2 (Column 3). The independent variable is bank market freedom at state-level, measured by reverse Rs-index. *Free* equals 4 indicates the largest freedom of interstate branching. In regression, we control firm characteristics. We also consider fixed effects of firm and year level. Standard errors are clustered at firm level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)
VARIABLES	Accrual_CF	Real1	Real2
Free	-0.0023***	0.0134***	0.0163***
	(0.0003)	(0.0013)	(0.0018)
Ln(Asset)	-0.0081***	0.0149***	0.0282***
	(0.0002)	(0.0010)	(0.0014)
ROA	-0.0982***	-0.3553***	-0.1675***
	(0.0015)	(0.0066)	(0.0101)
Total Debt/Total Assets	-0.0420***	0.3916***	0.4591***
	(0.0017)	(0.0072)	(0.0107)
Sales Growth	0.0000***	-0.0001**	-0.0002
	(0.0000)	(0.0000)	(0.0001)
Operating Cash Flow	-0.0000***	-0.0000**	-0.0001***
	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0000	0.0068***	0.0082***
	(0.0001)	(0.0005)	(0.0007)
Constant	0.1444***	-0.1471***	-0.2244***
	(0.0011)	(0.0047)	(0.0067)
Observations	56,194	66,670	62,201
R-squared	0.1833	0.0894	0.0502
Number of Year	21	21	21
YEAR FE	YES	YES	YES
COMPANY FE	YES	YES	YES

4.4.3 Baseline: PSM-DID

Table 4-5 presents the results for H1, which examines the relationship between bank market deregulation and local corporation's earnings management behaviour after using the PSM-DID model. The dependent variables are different measures of earnings management: *Accrual_CF* (Column 1), *Real1* (Column 2) and *Real2* (Column 3). Overall, Table 4-5 shows that after controlling for a set of variables and fixed effect, state bank market deregulation leads to a reduction in accrual earnings management and an increase in real earnings management. This illustrates the trade-off created by bank market deregulation. The effect of bank market deregulation on earnings management is not only statistically significant but also economically significant. Such as, if the state is currently experiencing the *Free* large than 2, the firms headquartered in this state will have 31% less accrual earnings management and they will increase their real earnings management in its place. Like the results in Table 4-4, this result also supports our H1 that bank market deregulation leads to a trade-off between accrual earnings management and real earnings management. That is, corporations are more likely to decrease their accrual earnings management and increase real earnings management behaviour[11]. Table 4-5 also suggests that firms with high ROA have less

[11] We further test the relation between bank deregulation and three proxies of real earnings management. The results reported in Appendix 4-3 show that corporations are more likely to increase real earnings management by manipulate expenses (e.g., R&D, advertising, and SG&A) after bank deregulation.

motivation to engage in earnings management. Large firms prefer switching from accrual earnings management to real earnings management. For corporations with high leverage, they will engage with more real earnings management and less accrual earnings management behaviour.

Table 4-5: Baseline: PSM-DID

This table presents the matching between borrower's earning management and bank market freedom using PSM-DID model. The dependent variables are the earnings management in accrual (Column 1), earnings management in Real1 (Column 2) and Real2 (Column 3). The main independent variable is Treat*Post. In regression, we control firm characteristics. We also consider fixed effects of firm and year level. Standard errors are clustered at firm level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)
VARIABLES	Accrual_CF	Real1	Real2
Treat*Post	-0.0025**	0.0302***	0.0394***
	(0.0011)	(0.0060)	(0.0063)
Ln(Asset)	-0.0069***	0.0103**	0.0247***
	(0.0004)	(0.0047)	(0.0019)
ROA	-0.1067***	-0.3438***	-0.1415***
	(0.0062)	(0.0291)	(0.0113)
Total Debt/Total Assets	-0.0411***	0.4079***	0.4708***
	(0.0057)	(0.0139)	(0.0129)
Sales Growth	0.0000***	-0.0001	-0.0006**
	(0.0000)	(0.0000)	(0.0003)
Operating Cash Flow	-0.0000***	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0001	0.0060*	0.0078***
	(0.0001)	(0.0034)	(0.0008)
Constant	0.1349***	-0.1258***	-0.2034***
	(0.0062)	(0.0195)	(0.0077)
Observations	41,700	51,019	46,902
R-squared	0.1695	0.0848	0.0445
Number of Year	21	21	21
YEAR FE	YES	YES	YES
COMPANY FE	YES	YES	YES

4.4.4 The moderating effect of trade

In this paper, we naturally assume that the corporations are influenced only by the local bank market. However, it is highly likely that the company locates in state A and has business in state B in practice. Mi and Han (2020) prove that more and more lending is from out-of-state resources than from home-state ones. Therefore, it is important to consider the demand for home-state bank credits, which depends on the bank market structure in the home-state. If a company is in an industry that is likely to have business in other states, we expect the company to be less influenced by home-state bank deregulation. Instead, we expect that out-of-state finance resources would erode the relation between bank market deregulation and earnings management.

To test out conjecture, we rerun Eq. 4-8 by including the variable of *Trade* and its interaction with bank market deregulation. We define *Trade* as one if the company is in an industry that serves a market beyond where it is located[12] and zero otherwise. Overall, Table 4-6 shows that the interaction term's coefficients between *Treat*Post* and *Trade* are statistically significant, and they bear the opposite signs of the corresponding coefficients on the *Treat*Post* for accrual earnings management. This result is consistent with our conjecture that the level of fund dependence erodes the

[12] We follow Porter (2010) to cluster firms in traded industry that span geographical areas.

effect of state bank deregulation on borrowers' future earnings management. For real earnings management, the results are significant only at the interaction level. This is different from our conjecture. It suggests that *Trade* triggers more real earnings management if state bank deregulation is taken into consideration.

Table 4-6: Trade

This table presents the matching between borrower's earning management and bank market freedom using PSM-DID model. The dependent variables are the earnings management in accrual (Column 1), earnings management in Real1 (Column 2) and Real2 (Column 3). The main independent variable is Treat*Post. In this table, we use dummy variable *Trade* to test if the companies with no-home state business are less affected by the home state bank deregulation. In regression, we control firm characteristics. We also consider fixed effects of firm and year level. Standard errors are clustered at firm level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)
VARIABLES	Accrual_CF	Real1	Real2
Treat*Post	-0.0080***	0.0039	-0.0033
	(0.0013)	(0.0122)	(0.0142)
Trade	0.0044***	-0.1051***	-0.0876***
	(0.0017)	(0.0119)	(0.0084)
Treat*Post*Trade	0.0107***	0.0349**	0.0615***
	(0.0015)	(0.0169)	(0.0150)
Ln(Asset)	-0.0061***	0.0100**	0.0238***
	(0.0004)	(0.0047)	(0.0020)
ROA	-0.1072***	-0.3508***	-0.1544***
	(0.0065)	(0.0286)	(0.0121)
Total Debt/Total Assets	-0.0445***	0.3990***	0.4801***
	(0.0056)	(0.0163)	(0.0143)
Sales Growth	0.0000***	-0.0000*	-0.0001
	(0.0000)	(0.0000)	(0.0004)
Operating Cash Flow	-0.0000***	0.0000	-0.0000*
	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0001	0.0060	0.0079***
	(0.0001)	(0.0040)	(0.0009)
Constant	0.1265***	-0.0328	-0.1259***
	(0.0052)	(0.0275)	(0.0112)
Observations	35,510	43,334	39,924
R-squared	0.1720	0.0942	0.0496
Number of Year	21	21	21
YEAR FE	YES	YES	YES
COMPANY FE	YES	YES	YES

4.4.5 The moderating effect of the firm's information asymmetry

In this section, we test the influence of the firm's information asymmetry on the link between state bank deregulation and earnings management. If the firm has an S&P credit rating above BBB, we expect the company would have a superior ability to access funds from the bond market and other out-of-state bank markets. Therefore, it is less likely to be influenced by the deregulation of the home-state bank market. Our model expects the firm's *Investment Grade* to weaken the link between bank market deregulation and earnings management. Table 4-7 shows the results of this conjecture. We rerun Eq. 4-8 and include the variables of *Investment Grade* and its interaction with bank market deregulation. *Investment Grade* equals one if the firm has an S&P credit rating above BBB, zero otherwise. In Table 4-7, the results in Column 1 show that *Investment Grade* does not have a moderating effect on the relation between bank deregulation and accrual earnings management. Furthermore, results in Column 2 and Column 3 are different from our expectation that *Investment Grade* would erode the relation between home-state bank deregulation and the firm's real earnings management. The results in these two columns also show that firms with less information asymmetry are more likely to use real earning management following bank market deregulation. This finding is like the findings in Section 4.4.4.

Table 4-7: Investment Grade

This table presents the matching between borrower's earning management and bank market freedom using PSM-DID model. The dependent variables are the earnings management in accrual (Column 1), earnings management in Real1 (Column 2) and Real2 (Column 3). The main independent variable is Treat*Post. In this table, we use dummy variable *Investment Grade* to test if the companies with reputation (alternative finance resources) are less affected by the home state bank deregulation. In regression, we control firm characteristics. We also consider fixed effects of firm and year level. Standard errors are clustered at firm level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)
VARIABLES	Accrual_CF	Real1	Real2
Treat*Post	-0.0030***	0.0266***	0.0349***
	(0.0011)	(0.0065)	(0.0064)
Investment Grade	-0.0317***	-0.0255***	-0.0852***
	(0.0020)	(0.0069)	(0.0171)
Treat*Post*Investment Grade	0.0016	0.0614***	0.1202***
	(0.0026)	(0.0141)	(0.0257)
Ln(Asset)	-0.0063***	0.0105**	0.0258***
	(0.0004)	(0.0048)	(0.0019)
ROA	-0.1058***	-0.3433***	-0.1409***
	(0.0061)	(0.0287)	(0.0113)
Total Debt/Total Assets	-0.0419***	0.4079***	0.4682***
	(0.0056)	(0.0138)	(0.0130)
Sales Growth	0.0000***	-0.0001	-0.0006**
	(0.0000)	(0.0000)	(0.0003)
Operating Cash Flow	-0.0000***	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0001	0.0059*	0.0078***
	(0.0001)	(0.0034)	(0.0008)
Constant	0.1335***	-0.1252***	-0.2050***
	(0.0061)	(0.0195)	(0.0077)
Observations	41,700	51,019	46,902
R-squared	0.1995	0.0850	0.0450
Number of Year	21	21	21
YEAR FE	YES	YES	YES
COMPANY FE	YES	YES	YES

4.4.6 The moderating effect of the firm's financial condition

In this section, we consider the effect of financial condition on the link between bank deregulation and earnings management. If a company is in good financial condition, we expect it to be less likely to be influenced by bank market deregulation because borrowers are not 'hungry for money'. Therefore, we predict that a healthier financial condition would weaken the link between bank market deregulation and earnings management. To do this, we use a z-score (Altman, 1968) to measure the financial condition, the higher the ratio, the healthier the firm. We rerun Eq. 4-8, including the variables of z-score and its interaction with bank market deregulation. In Table 4-8, the results in Column 1 show that *Z-score* does weaken the relation between bank deregulation and accrual earnings management. This means firms in good financial condition are less likely to be influenced by bank deregulation on their accrual earnings management. Furthermore, the results in Column 2 and Column 3 are different from our expectation that the Z-score would erode the relation between home-state bank deregulation and the firm's real earnings management. The results in these two columns also show that financial condition would not influence the trade-off between accrual earnings management and real earnings management induced by bank market deregulation.

Table 4-8: Z-score

This table presents the matching between borrower's earning management and bank market freedom using PSM-DID model. The dependent variables are the earnings management in accrual (Column 1), earnings management in Real1 (Column 2) and Real2 (Column 3). The main independent variable is Treat*Post. In this table, we use dummy variable *Z-score* to test if the companies with financial constraint are more affected by the home state bank deregulation. In regression, we control firm characteristics. We also consider fixed effects of firm and year level. Standard errors are clustered at firm level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)
VARIABLES	Accrual_CF	Real1	Real2
Treat*Post	-0.0083**	0.0321***	0.0405***
	(0.0033)	(0.0060)	(0.0064)
Z-score	-0.0006*	0.0034***	0.0054***
	(0.0003)	(0.0010)	(0.0006)
Treat*Post*Z-score	0.0009**	0.0007	0.0010
	(0.0004)	(0.0013)	(0.0011)
Ln(Asset)	-0.0058***	0.0083*	0.0216***
	(0.0005)	(0.0047)	(0.0019)
ROA	-0.1099***	-0.3933***	-0.2101***
	(0.0062)	(0.0347)	(0.0134)
Total Debt/Total Assets	-0.0486***	0.4172***	0.4820***
	(0.0065)	(0.0142)	(0.0132)
Sales Growth	0.0000***	-0.0001	-0.0006**
	(0.0000)	(0.0000)	(0.0003)
Operating Cash Flow	-0.0000***	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0001	0.0059*	0.0077***
	(0.0001)	(0.0034)	(0.0008)
Constant	0.1299***	-0.1213***	-0.1944***
	(0.0057)	(0.0189)	(0.0078)
Observations	41,448	50,161	46,294
Number of Year	21	21	21
YEAR FE	YES	YES	YES
COMPANY FE	YES	YES	YES

4.4.7 Endogeneity: Placebo test

In this section, we deal with the potential problem of endogeneity in our model. Such a problem may arise either from reverse-causality or omitted variables. In our empirical model, we use the lag dependent variable to cope with possible reverse causality, as future earnings management cannot influence past bank market deregulation[13]. We also include various firm characteristics, year and firm fixed effects. This could partially eliminate the problem of omitted variables even though such problems may arise from other factors. For example, unobservable state-level factors varying across states may influence the timing of deregulation and have further impacts on bank market deregulation in different states. To address this issue, we follow Cornaggia et al. (2015) to perform a placebo test to investigate if our results are driven by those unobservable and omitted state-specific factors. We run the placebo test by randomly reordering banking deregulation time. We replace Treat*Post with a Fake_Treat*Post and rerun the baseline model Eq. 4-8. If the Fake_Treat*Post is significant, it means that there is omitted state level factors in our model. Because the Fake_Treat*Post has eliminated the effect of timing and kept the characteristics that

[13] This reverse causality is less likely to happen because bank deregulation is exogenous, and it is impossible to be determined by a single firm's earnings management behaviour.

driven by state. The results in Table 4-9 show that the coefficients of Fake_Treat*Post are statistically insignificant in all columns. Therefore, our earlier results are robust and not subject to endogeneity.

Table 4-9: Placebo-test

This table presents the matching between borrower's earning management and bank market freedom using PSM-DID model. The dependent variables are the earnings management in accrual (Column 1), earnings management in Real1 (Column 2) and Real2 (Column 3). The main independent variable is Fake-Treat*Post. In this table, we use dummy variable *Trade* to test if the companies with no-home state business are less affected by the home state bank deregulation. In regression, we control firm characteristics. We also consider fixed effects of firm and year level. Standard errors are clustered at firm level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)
VARIABLES	Accrual_CF	Real1	Real2
Fake_Treat*Post	-0.0036	-0.0058	0.0030
	(0.0038)	(0.0134)	(0.0148)
Ln(Asset)	-0.0072***	0.0124***	0.0273***
	(0.0005)	(0.0046)	(0.0018)
ROA	-0.1057***	-0.3462***	-0.1437***
	(0.0062)	(0.0286)	(0.0113)
Total Debt/Total Assets	-0.0402***	0.4076***	0.4716***
	(0.0056)	(0.0140)	(0.0129)
Sales Growth	0.0000***	-0.0001	-0.0006**
	(0.0000)	(0.0000)	(0.0003)
Operating Cash Flow	-0.0000***	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0001	0.0059*	0.0078***
	(0.0001)	(0.0034)	(0.0008)
Constant	0.1354***	-0.1261***	-0.2037***
	(0.0062)	(0.0195)	(0.0077)
Observations	41,700	51,019	46,902
R-squared	0.1709	0.0843	0.0437
Number of Year	21	21	21
YEAR FE	YES	YES	YES
COMPANY FE	YES	YES	YES

4.4.8 Robustness test

Table 4-10 shows our robustness test by rerunning Eq. 4-8 in the different sample or different earnings management measures. Column 1-2 shows the results of using different measures of accrual management ratios. In Column 1, we use the modified Jones's model (Dechow et al., 1995), and the ratio used in Column 2 is following Dichev and Dechow (2002). Both these two ratios have the same direction as our main *Accrual*, the higher the ratio, the more earnings management behaviour. To be more specific, bank deregulation will decrease the *Accrual_1* by 7% and *Accrual_2* by 3% .In Column 3-5, we only keep the sample from 1994 to 2005. Because the Rs-index we extract from Rice and Strahan (2010) starts from 1994 and end in 2005. Overall, results in the tests of robustness are consistent with our baseline result.

Table 4-10: Robustness test

This table presents the matching between borrower's earning management and bank market freedom using PSM-DID model. We use different measures of accrual earnings management and subsample as robustness test. In Column 1 and Column 2, we use different measures of accrual earnings management, *Accrual_1* and *Accrual_2* respectively. From Column 3 to Column 5, we use 1994-2005 subsample to rerun the baseline model. The dependent variables are the earnings management in accrual (Column 3), earnings management in Real1 (Column 4) and Real2 (Column 5). The main independent variable is Treat*Post. In regression, we control firm characteristics. We also consider fixed effects of firm and year level. Standard errors are clustered at firm level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)	(4)	(5)
			1994-2005 Sample		
VARIABLES	Accrual_MJ	Accrual_2	Accrual	Real1	Real2
Treat*Post	-0.0097**	-0.0015***	-0.0038***	0.0329***	0.0361***
	(0.0040)	(0.0003)	(0.0013)	(0.0075)	(0.0069)
Ln(Asset)	-0.0239***	-0.0074***	-0.0078***	0.0039	0.0217***
	(0.0017)	(0.0003)	(0.0004)	(0.0075)	(0.0024)
ROA	0.0200	-0.0172***	-0.1054***	-0.3170***	-0.1066***
	(0.0229)	(0.0032)	(0.0081)	(0.0374)	(0.0138)
Total Debt/Total Assets	-0.0020	0.0217***	-0.0454***	0.4132***	0.4822***
	(0.0135)	(0.0016)	(0.0068)	(0.0155)	(0.0163)
Sales Growth	0.0005	0.0000***	0.0000***	-0.0001	-0.0005*
	(0.0003)	(0.0000)	(0.0000)	(0.0000)	(0.0003)
Operating Cash Flow	0.0000***	-0.0000***	-0.0000***	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0013	0.0005*	-0.0002	0.0116*	0.0155***
	(0.0013)	(0.0003)	(0.0003)	(0.0063)	(0.0014)
Constant	0.2646***	0.0858***	0.1492***	-0.1040***	-0.1946***
	(0.0081)	(0.0034)	(0.0045)	(0.0318)	(0.0102)
Observations	53,723	46,570	28,099	32,504	30,164
R-squared	0.5074	0.0661	0.1817	0.0788	0.0458
Number of Year	21	21	12	12	12
YEAR FE	YES	YES	YES	YES	YES
COMPANY FE	YES	YES	YES	YES	YES

4.5 Chapter Conclusion

Since IBBEA was implemented in 1994, the U.S. bank market has changed considerably. However, there has been little evidence on the relationship between bank deregulation policy and earnings management choices. To fill this gas, this paper establishes a relation between U.S. bank deregulation and the trade-off between accrual and real earnings management. We use both OLS and PSM-DID method and find the supporting evidence that corporations prefer to switch from accrual earnings management to real earnings management after IBBEA 1994 because bank market deregulation leads to concentrated bank market and larger institutions which have a strong screen and monitor ability.

Appendix 4-1

VarName	Definition	Source
Dependent Var:		
Accrual_CF	The ratio of accrual earnings management. We follow Francis et al. (2005) to measure this ratio.	Compustat
Accrual_MJ	The ratio of accrual earnings management. We follow Dechow et al. (1995) to measure this ratio.	Compustat
Accrual_2	The ratio of accrual earnings management. We follow Dichev and Dechow (2002) to measure this ratio.	Compustat
Real1	The ratio of real earnings management. We follow Roychowdhury (2006) to measure this ratio. *Real1= ABCASH**(-1) + *ABEXP**(-1)	Compustat
Real2	The ratio of real earnings management. We follow Roychowdhury (2006) to measure this ratio. *Real2=ABPRO + ABEXP**(-1)	Compustat
Independent Var:		
Free	*Free* ranges from 0 to 4, and the large the ratio, the higher freedom in bank market and less restriction	
Post	Equals to 1 if state has *Free* larger than 2, zero otherwise	
HHI	Herfindahl-Hirschman index of bank market structure. We calculate this ratio based on the bank deposit share at the state level. The higher the ratio, the more concentration of local bank market.	FDIC
CR3	Concentration ratio of top 3 banks. We calculate this ratio based on the top 3 banks' deposit share at the state level. The higher the ratio, the more concentration of local bank market.	FDIC
H-statistics	Panzar and Rosse (1984) H-statistics of bank market structure, ranging from 0 to 1. The higher the ratio, the more competition for the banks in the region.	FDIC
Branches	Total number of branches at state level.	FDIC

Borrower control*:*		
Ln(asset)	Natural Log of the total asset of the borrower at the end of fiscal year prior to the loan origination	Compustat
ROA	Return on Asset	Compustat
Book/Market	Book to Market ratio	Compustat
Sales Growth	Annual sales growth rate	Compustat
Total Debt/Total Assets	Total debt over total asset.	Compustat
Operating Cash flow	Operating cash flow	Compustat
Traded	Equals to 1 if the company is located in the industry which is more likely to have business with no-home-state, 0 otherwise	Compustat
Z-score	Altman Z-score = 1.2*working capital/assets + 1.4*retained earnings/assets + 3.3*ebit/assets + 0.6*Market value of equity/Book value of liabilities + Sales/asset (Altman, 1968).	Compustat
Investment Grade	Equals to 1 if the company as a S&P rating from “AAA” to “BBB”.	

Appendix 4-2

VARIABLES	(1) Accrual_CF	(2) Real1	(3) Real2
free	1.68	1.75	1.73
Ln(Asset)	1.78	1.90	1.67
ROA	1.15	1.19	1.20
Total Debt/Total Assets	1.10	1.09	1.09
Sales Growth	1.01	1.02	1.02
Operating Cash Flow	1.46	1.54	1.33
Book/Market	1.01	1.01	1.01
Mean VIF	4.79	3.45	3.47

This table is the VIF results for the baseline model in Chapter 4. Mean VIF value is less than 5, and we can see that there is no severe correlation between our explanatory variables in the model.

Appendix 4-2

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Accrual_CF	1															
2	Real1	-0.02***	1														
3	Real2	-0.08***	0.90***	1													
4	Free	0.02***	0.03***	0.04***													
5	HHI	0.11***	-0.06***	-0.05***	0.16***	1											
6	CRK3	0.14***	-0.07***	-0.07***	0.15***	0.91***	1										
7	H-statistics	-0.01**	0.00	0.01	-0.36***	-0.08***	-0.05***	1									
8	At	-0.19***	0.05***	0.08***	0.09***	0.00	-0.00	-0.01**	1								
9	ROA	-0.40***	-0.15***	-0.03***	-0.01**	-0.06***	-0.10***	0.03***	0.14***	1							
10	Total debt/Total Asset	-0.18***	0.22***	0.21***	-0.01**	-0.08***	-0.11***	0.05***	0.18***	0.07***	1						
11	Sales Growth	0.01*	-0.10***	-0.04***	-0.02***	-0.01	-0.00	0.00	-0.00	-0.04***	-0.00	1					
12	Operating Cash Flow	-0.20***	-0.03***	0.02***	0.07***	-0.00	-0.01	0.00	0.80***	0.24***	0.10***	-0.02***	1				
13	Book/Market	0.01	0.10***	0.10***	0.02***	-0.02***	-0.02***	0.01*	-0.03***	-0.04***	0.08***	-0.05***	-0.06***	1			
14	Traded	0.10***	-0.10***	-0.07***	-0.01	0.02	0.02	0.00	-0.02***	-0.10***	-0.12***	0.02***	-0.02***	-0.05***	1		
15	Investment Grade	-0.15***	-0.02***	-0.00	0.03***	-0.03***	-0.03***	-0.00	0.19***	0.14***	-0.01	-0.03***	0.25***	-0.05***	-0.06***	1	
16	Z-score	-0.30***	-0.05***	0.04***	-0.01	-0.05***	-0.08***	0.01	0.08***	0.66***	0.01**	-0.06***	0.12***	0.02***	-0.11***	0.11***	1

This table presents the Pearson correlations for all variables used in the test. * means correlations that statistically different from zero at the 1% level

Appendix 4-3

VARIABLES	(1) ABCASH	(2) ABEXP	(3) ABPRO
Treat*Post	-0.0159***	0.0480***	-0.0061**
	(0.0025)	(0.0041)	(0.0026)
Ln(Asset)	-0.0084***	0.0289***	0.0190***
	(0.0012)	(0.0019)	(0.0013)
ROA	-0.4227***	0.0251***	-0.3692***
	(0.0051)	(0.0082)	(0.0056)
Total Debt/Total Assets	0.0487***	0.0086	0.0060
	(0.0063)	(0.0103)	(0.0067)
Sales Growth	0.0006	-0.0493***	0.0045***
	(0.0008)	(0.0013)	(0.0009)
Operating Cash Flow	-0.0002***	0.0001***	-0.0001***
	(0.0000)	(0.0000)	(0.0000)
Book/Market	-0.0004	0.0011**	-0.0004
	(0.0003)	(0.0004)	(0.0003)
Constant	0.0407***	-0.1178***	-0.0848***
	(0.0050)	(0.0081)	(0.0055)
Observations	54,504	52,045	49,817
R-squared	0.1489	0.0466	0.0936
Number of gvkey	7,188	6,985	6,819
YEAR FE	YES	YES	YES
COMPANY FE	YES	YES	YES

This table presents the matching between borrower's earning management and bank market freedom using PSM-DID model. The dependent variables are the real earnings management in operation (Column 1, ABCASH), expense (Column 2, ABEXP) and production (Column 3, ABPRO). The main independent variable is Treat*Post. In regression, we control firm characteristics. We also consider fixed effects of firm and year level. Standard errors are clustered at firm level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

5. Earnings management and bank market power: Evidence from loan-level data

5.1 Introduction

Earnings management is a popular topic in the accounting area. There has been ample empirical evidence that businesses manage earnings number before financial events, such as IPO (Teoh et al., 1998a), SEO (Teoh et al., 1998b) and public debt (e.g. bond) offering (Liu et al., 2010). Empirical evidence also shows that earnings management will lead to unfavourable debt contracting (Francis et al., 2005, Sunder et al., 2008). While it is still a question about the relationship between market power and borrowers' earnings management. As the bank with market power has more ability to screen and monitor borrowers, Delis et al. (2017) showed that low-profit borrowers are more easily matched with the bank with market power because those banks have superior screen ability, can find potentially profitable projects and extract profit in the future. Moreover, banks with market power can also improve borrowing firms' future performance. While for borrowers' earnings management, does it follow the same mechanism as low profit? Are high earnings management borrowers more likely to get

fund from the bank with market power, and banks can decrease earnings management behaviour after loan origination?

To examine this question, we employ a sample of 10,914 loan facilities syndicated by 166 lead arrangers between 1994 and 2017 in the U.S. market. Our baseline results show that high earnings management borrowers usually are matched with banks who have market power, and bank market power will further increase borrowers' earnings management (only real earnings management) after loan origination. For example, supposing lead arranger's market power increases by one standard deviation (0.2526), in this case, their corporate borrowers are more likely to be engaged with more earnings management behaviour (2.7% more than the average), those borrowers will increase their total earnings management by 12.7% after taking the loan. We also find a trade-off effect between accrual-based and real earnings management. Borrowers prefer switching from accrual earnings management to real earnings management when their matched banks have market power, and therefore, a strong ability to screen and monitor.

We further examine three factors that could influence banks to exert their market power. The first one is the number of lenders in syndication. A large number of banks in a lending group could lead to the problem of free-riding (Sufi, 2007). We expect that the effect of bank market power on earnings management decreases when

the number of lenders increases. We then test the effect of lead share. In syndicated loan, more share hold by lead arranger means more monitoring incentive after loan origination. We predict that a larger lead share will strengthen the relation between bank market power and earnings management. Finally, we consider the distance effect. As bank market power decrease as distance increase (Degryse and Ongena, 2005). We hypothesise that the link between bank market power and earnings management will be weakened if lender and borrower are at a distance. Overall, the results support our conjecture and can further prove the correctness of the base hypothesis.

One potential source of concern for our empirical analysis is the endogeneity problem. In our baseline model, we have controlled various characteristics, such as loan characteristics, borrower characteristics and lender characteristics. We also control for the time and industry fixed effects, which could eliminate omitted factors by time and industry. In addition, we use 2SLS by employing the bank's enforcement action as an instrumental variable. Our empirical analysis ends up with the robustness test. In this test, we use different loan sample (only revolver facility and excluding loan originated by top 3 banks) and loan level (loan deal level) to support the baseline model further. Overall, the results in 2SLS and the robustness test support our hypothesise.

The rest of this paper proceeds as follows. We explain the literature and hypothesis in Section 5.2, describe our data, variables and baseline model specification

in Section 5.3 and report the empirical results in Section 5.4. Finally, we conclude our findings with implications in Section 5.5.

5.2 Hypothesis development

For creditors, financial statements are a good way to communicate with lenders, banks use accounting information to predict future cash flow and assess their repayment capacity (Berger and Udell, 2006). Therefore, a firm with less earnings management behaviour (both in accrual and real) can reduce information asymmetry and risk with banks and find it easier to access bank loans (García-Teruel et al., 2014). In this paper, we assume that accrual earnings management and real earnings management are substitutes (Cunningham et al., 2020). Researchers have examined this substitution effect that if accrual earnings management costs are higher, then firms are more likely to move to real earnings management. At least, real earnings management do not involve direct violation of any laws or regulation and can be properly disclosed in the financial statement (Zang, 2011). Cunningham et al. (2020) also proved that managers are more likely to move to real earnings management after receiving SEC comment letter because SEC does not scrutinise real business activities.

Given the borrowers with high earnings management behaviour, what kinds of banks more likely to issue the loan to those borrowers, banks with high market power or banks with low market power? Based on the previous literature, banks with market

power have a superior ability to screen the potential profitable borrowers, and they are more likely to provide funds to young (Petersen and Rajan, 1995) and low profitable firms (Delis et al., 2017). Because they can better extract future rents from profitable projects in the long term relationship in the less competitive bank market (Boot and Thakor, 2000). Based on this view, we expect that corporate borrowers with high information asymmetry, e.g., high earnings management, are more likely matched to bank with market power who can access the more private information of borrower, find some profitable investment ideas, support fund now and extract future rents in the long-term relationship. It is also possible that banks with market power ration credit more heavily than those in the less competitive market (Guzman, 2000). Borrowers with high earnings management and high information asymmetry are more likely to be 'kicked out' in a monopolistic banking system. Because banks with market power have a superior ability to screen the private information of borrowers. Those banks could detect the motivation or reason behind the high earnings management, thus refuse loan application from the borrower with high earnings management. Because bank lenders are less likely to monitor borrowers' real earnings management (El Mahdy and Cheng, 2016). Therefore, we develop the following hypothesis.

H1: Borrowers with less accrual earnings management and more real earnings management will be matched with banks with high market power.

After loan origination, banks have the ability and intention to monitor borrower's activity to secure the loan repayment. Traditional theories have suggested that banks with greater market power are more likely to generate costly-monitor activities because market power allows banks to create rents created by monitoring no matter if monitoring is contractible (Caminal and Matutes, 2002, Caminal and Matutes, 1997). Banks with monopoly power would exercise excessive monitoring activities as an alternative method to credit rationing (Guzman, 2000) by advising manager, regular site visiting, covenants, renegotiating loan contract terms and assessing financial statements (Fama, 1985, Dennis and Mullineaux, 2000). A bank with market power can influence managers' decisions about earnings management in several ways: first, banks can get board representation (Kaplan and Minton, 1994); banks can also use enforcing covenant violation and threaten borrowers to default, force renegotiation to gain the administrative control (Berlin and Mester, 1992). Banking literature suggests that stronger banks monitoring can avoid borrowers earnings management as measured by discretionary accrual models, which reduces credit risk (Ahn and Choi, 2009). We expect those monitoring activities would push borrowers to switch from accrual

earnings management to real earnings management[14]. Therefore, we develop the following hypothesis:

H2: Banks with high market power will effectively reduce borrowers' accrual earnings management and increase real earnings management behaviour.

5.3 Data and Methodology

5.3.1 Data and Sample

Our database covers the information of syndicated loan, banks and borrowing firms. We collect them from three main resources. The syndicated loan data from the DealScan dataset, which includes detailed information about loan characteristics, such as loan size, maturity, purpose, the borrower's identity and the lender's identity. We exclude the loan samples issued to foreign borrowers (not in the U.S. market), financial institutions (SIC codes 6000-6700) and utilities (SIC codes 4900-4942)[15]. In the syndicated loan, there are multiple lenders, and we only keep the lead arranger[16] because the lead arranger assumes the role of screening and monitoring.

[14] It is also possible that a bank with market power can reduce the borrower's motivation to manipulate earnings numbers. In a long-term relationship, the bank can provide funds to borrowers constantly, therefore borrowers have less incentive to manipulate earnings numbers. Banks with market power also have large negotiating power, they can help borrowers with other issues, such as tax incentive and political incentives.

[15] Because firms in financial and utility industries are highly regulated (Yildirim, 2020)

[16] For the lead arranger role, we follow (Ivashina, 2009) to define the lead arranger as one who plays the role of 'Lead bank', 'lead arranger', 'book runner', 'administrative agent', 'agent', 'lead manager', 'Mandated lead arranger' or 'agent'.

We collect the bank's financial report from Federal Deposit Insurance Corporation (FDIC) and the borrower's financial information from Compustat. We then use the fuzzy match method to link DealScan and Compustat to get detailed information such as the borrower's name, industry and location. Using the same method, we also match the lead arranger in DealScan with their financial information from FDIC. Finally, our database has 10,914 loan facilities (7,793 loan deals)[17] originated by 166 lead arranger banks, and it involves 1,580 non-financial companies. Our sample covers the period from 1994 to 2017[18]. The number of observations in regression is a little lower depending on the availability of the variables used.

5.3.2 Measuring Earnings Management

In this chapter, we measure earnings management in accrual (*Accrual*), real (*Real*) and the combined total earnings management (*Total_EM*) by following (Cunningham et al., 2020).We measure our earnings management in accrual (*Accrual*) by following the method from (Francis et al., 2005). For *Accrual*, we first compute total current accruals using firm accounting information from Compustat:

[17] Our analysis is based on the facility level, instead of loan-deal level. In syndication, one loan deal may contain several loan facilities. Loan facilities in the same loan deal may vary by lender, loan size, loan maturity etc.

[18] The bank data from FDIC starts from 1994, and we lack data after 2017.

$$TCA_{i,t} = \Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta STDEBT_{i,t} - DEPN_{i,t} \ldots\ldots \text{(Eq. 5-1)}$$

where $\Delta CA_{i,t}$ is firm i's change in current assets from year $t-1$ to year t; $\Delta CL_{i,t}$ is firm i's change in current liabilities between year $t-1$ and year t; $\Delta Cash_{i,t}$ is firm i's change in cash from year $t-1$ to year t; $\Delta STDEBT_{i,t}$ is firm i's change in debt from current liabilities between year $t-1$ and year t; $DEPN_{i,t}$is firm i's depreciation and amortisation expense in year t. Then, we estimate the following equation for each industry group by following Fama and French (1997):

$$\frac{TCA_{i,t}}{AT_i} = \partial_1 \frac{1}{AT_i} + \partial_2 \frac{CFO_{i,t-1}}{AT_i} + \partial_3 \frac{CFO_{i,t}}{AT_i} + \partial_4 \frac{CFO_{i,t+1}}{AT_i} + \partial_5 \frac{\Delta REV_{i,t}}{AT_i} + \partial_6 \frac{PPE_{i,t}}{AT_i} + \varepsilon_{it} \ldots \text{(Eq. 5-2)}$$

where $CFO_{i,t}$ is firm i's cash flow from operating in year t; $\Delta REV_{i,t}$ is firm i's change in revenues from year $t-1$ to year t; PPE_{it} is firm i's gross value of property, plant and equipment in year t. We predict the firm-year residuals after regression, and *Accrual2* is the standard deviation of firm i's 5-year residuals from year $t-4$ to year t. We also follow Francis et al. (2005) to winsorise the extreme values of distribution

to 1/99 percentiles. The larger the standard deviation of residuals, the poorer is the earnings quality.

Following Roychowdhury (2006), we use the abnormal levels of cash flow from discretionary expenses (the sum of R&D, advertising and SG&A expenses), operations (CFO) and production costs, respectively. The abnormal ABCASH, ABPRO and ABEXP are residuals from the following models (A3) through (A5), respectively.

$$\text{CFO} = \alpha + \beta_1(1/Asset_{t-1}) + \beta_2(Sales_t/Asset_{t-1}) + \beta_3(\Delta Sales_t/Asset_{t-1}) + \varepsilon_t$$

… (Eq. 5-3)

$$\text{Production} = \alpha + \beta_1(1/Asset_{t-1}) + \beta_2(Sales_t/Asset_{t-1}) + \beta_3(\Delta Sales_t/Asset_{t-1}) + \beta_4(\Delta Sales_{t-1}/Asset_{t-1}) + \varepsilon_t$$

… (Eq. 5-4)

$$\text{Expense} = \alpha + \beta_1(1/Asset_{t-1}) + \beta_2(Sales_{t-1}/Asset_{t-1}) + \varepsilon_t$$

… (Eq. 5-5)

We estimate models (A3) to (A5) by industry-year for all firms. In addition, we follow Cohen and Zarowin (2010) and calculate measurements of real activity management (*Real*) by summing ABCASH and (-1)* ABEXP (-1) and ABPRO[19].

5.3.3 Measuring bank market power

The index developed by From Lerner (1934) Lerner index has been a popular measurement for bank market power. This ratio derives from the competition between pricing and marginal cost. In this chapter, we follow the method used by (Delis et al., 2017) to measure *Lerner* as:

$$Lerner_{it} = \frac{P_{it} - MC_{it}}{P_{it}} \quad \text{.....(Eq. 5-6)}$$

where P_{it} is the price of bank *i*'s output at time *t*. MC_{it} is the marginal cost of producing this product for bank *i* at time t. We follow Delis et al. (2017) to calculate the marginal cost by estimating a translog cost function and taking its derivative.

5.3.4 Other control variables

To capture various characteristics and factors other than earnings management and bank market power, we control for the characteristics of the loan facilities,

[19] To capture the total real earnings management, we combine the three ratios: *ABCASH,* ABEXP and ABPRO. To make sure these three ratios have the same trend, we multiply *ABEXP* by negative one (the higher the ratio, the more firms are more likely to cut discretionary expenses) and multiply *ABCASH* by negative one (so that the higher the ratio, the more likely firms are more likely to engage in sales manipulation).

corporate borrowers and lenders. We control for various loan characteristics, such as loan size and loan maturity (measured in months). *Collateral* is a dummy variable that equals one if the borrower provides collateral and zero otherwise. *Rep_purpose* is a dummy variable that equals one if this loan facility is intended for repayment. *Corp_purpose* is also a dummy variable that equals one if this loan facility is intended for corporation purpose. For borrower's characteristics, we use *Asset* to control for the company size. We also consider *ROA* (return on asset), *Book/Market* (book to market ratio), *Sales* and *Cash/Debt* to control for other characteristics of the borrowing firms. At lender- level heterogeneity, we use *Bank size* and *Tier1_Asset ratio* to control for the bank's capitalisation; *Loan to deposit ratio* to control for the level that of bank deposits support total loans; return on asset (*ROA*); return on equity (*ROE*); *Efficiency ratio* and *Loss Allowance ratio*. We will report the sources and detailed description of each variable in Appendix 1.

5.3.5 Methodology

To test our two hypotheses, we construct two different empirical models. First, we test whether lead arrangers with higher market power are matched with corporate borrowers with less earnings management behaviour. This relation can be represented in the empirical model as:

$$Bank\ Market\ Power_{b,t}$$

$$= \partial EM_{i,t-1} + \beta_1 Borrower_{i,t-1} + \beta_2 Loan_{l,t} + \beta_3 Bank_{b,t-1} + \varepsilon_{i,b,t}$$

… (Eq. 5-7)

In Eq. 5-7, we use *Lerner* to present the bank market power of bank for bank b at time t. Our main independent variables are is *Accrual*, *Real* and *Total_EM* for firm i at time $t-1$. We also control borrower's characteristics i at time $t-1$, loan characteristics l at time t, and the lead arranger's characteristics b at time $t-1$. In the model, we consider year and industry fixed effects to eliminate the unobservable factors as time and industry level. We can explain this model thus: borrower i with certain characteristics at time $t-1$ is looking to get a loan from bank b with bank market power at time t. At the same time, bank b with bank market power at time t also screens borrower $i's$ earnings management behaviour and other financial condition at time t. Our H1 expects that corporate borrowers with low earnings management behaviour would match with banks with high market power, reflecting in the empirical model. Thus, ∂ should be negative.

In our H2, we plan to examine the relationship between bank market power and earnings management after the loan is issued. We can write this empirical model as:

$$EM_{i,t+1} = \theta_0 EM_{i,t} + \partial Bank\ Market\ Power_{b,t} + \beta_1 Borrower_{i,t-1} + \beta_2 Loan_{l,t} + \beta_3 Bank_{b,t-1} + \varepsilon_{i,b,t}$$ …….(Eq. 5-8)

In Eq. 5-8, apart from the variables explained in Eq. 5-7, we control for borrower $i's$ earnings management behaviour at time t, which could influence the earnings management behaviour at time $t+1$. Our H2 expects that bank b with market power *Lerner* at time t could influence the borrower $i's$ earnings management behaviour at time $t-1$.

5.4 Empirical Analysis

5.4.1 Descriptive statistics and correlation

Table 5-1 shows is the summary statistics for all variables used in the empirical analysis. and on average, corporate borrowers with accrual earnings management ratio of 0.059. Their real earnings management ratio is 0.087, and their combined total earnings management is 0.147. For bank market power, we find that lead arrangers in our sample have an average Lerner of 0.435 with a standard deviation of 0.253. This indicates the heterogeneity in bank market power among all lead arrangers. The average loan size is $244 million with 44 months of maturity, and a 58% share is held by the lead arranger. More than half of the loan facilities have collateral. In terms of characteristics of corporate borrowers, an average borrower has an asset value of $2.3 billion and sales of $1.8 billion. These borrowers have a return on asset of 0.138, a book-to-market ratio of 0.66 and a cash-to-debt ratio of 0.157. In our sample, the lead arranger has average assets of $332 billion and a tier1_core asset ratio of 0.134. Table

5-2 reports Pearson's correlation matrix between the variables used in the baseline. Overall, the results indicate that bank market power is negatively related to accrual earnings management and positively related to real earnings management. This indicates a switching effect of bank market power on earnings management.

Table 5-1: Summary statistics

VarName	Obs.	Mean	SD	Median	P25	P75
Dependent Var:						
Accrual_CF	8635	0.0589	0.0589	0.0213	0.0385	0.0746
Real	8328	0.0867	0.4332	-0.1464	0.1299	0.3701
Total_EM	6778	0.1474	0.4271	-0.0878	0.1852	0.4266
Independent Var:						
Lerner	10914	0.4351	0.2526	0.3680	0.5284	0.5958
Loan control:						
Loan size	10914	2.44e+08	4.86e+08	2.80e+07	1.00e+08	2.80e+08
Leadshare	10912	57.8619	29.5843	50.0000	54.1193	100.0000
Collateral (0,1)	10914	0.5185	0.4997	0.0000	1.0000	1.0000
Maturity	10914	43.7128	24.2951	23.0000	48.0000	60.0000
Rep_purpose	10914	0.2120	0.4088	0.0000	0.0000	0.0000
Corp_purpose	10914	0.3025	0.4593	0.0000	0.0000	1.0000
Borrower control*:*						
Ln(asset)	10914	2277.3312	4495.6388	153.1260	585.3210	2170.7000
ROA	10914	0.1379	0.1335	0.0903	0.1374	0.1924
Book/Market	10914	0.6597	0.7619	0.3085	0.5064	0.7998
Sales	10914	1822.1070	3166.2855	150.8670	566.5475	1964.5000
Cash/Debt	10914	0.1574	0.4420	0.0496	0.1322	0.2507
Bank control:						
Bank size	10914	3.32e+08	4.05e+08	3.91e+07	1.73e+08	5.52e+08
Tier1_Asset ratio	10914	0.1337	0.0773	0.1040	0.1177	0.1361
ROA	10914	1.0914	0.7076	0.9171	1.1630	1.4259
ROE	10914	13.4758	10.0526	11.6048	14.4690	16.9801
Efficiency ratio	10914	60.5360	10.5835	53.8215	59.1679	66.4154
Loss Allowance ratio	10914	1.9594	0.9208	1.3846	1.7805	2.2525
Loan to deposit ratio	10914	84.1256	20.4611	72.1519	83.6685	95.8039

This table reports summary statistics for the variables used in the empirical analysis.

Table 5-2: Correlation Coefficient

This table presents the Pearson correlations for all variables used in Table 5-3&5-4. * means correlations that statistically different from zero at the 1% level.

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
1	*Accrual_CF*	1.000																				
2	*Real*	-0.039*	1.000																			
3	*Total_EM*	0.107*	0.783*	1.000																		
4	*Lerner*	-0.140*	0.028*	0.004	1.000																	
5	*Loan size*	-0.138*	0.011*	-0.001	-0.059*	1.000																
6	*Leadshare*	0.178*	0.052*	0.072*	-0.034*	-0.085*	1.000															
7	*Collateral (0,1)*	-0.108*	0.043*	0.030*	-0.022*	-0.026*	0.120*	1.000														
8	*Maturity*	0.017*	0.031*	0.019*	0.193*	-0.033*	0.090*	0.040*	1.000													
9	*Rep_purpose*	-0.015*	0.020*	0.004	-0.266*	0.027*	-0.181*	-0.058*	-0.304*	1.000												
10	*Ln(asset)*	-0.287*	0.094*	0.046*	-0.057*	0.422*	-0.369*	0.047*	-0.150*	0.178*	1.000											
11	*ROA*	-0.245*	-0.160*	-0.154*	0.136*	0.035*	-0.090*	0.062*	-0.002	-0.037*	0.050*	1.000										
12	*Book/Market*	0.005	0.035*	0.026*	0.010	-0.007*	0.022*	0.002	0.011*	-0.013*	0.001	-0.029*	1.000									
13	*Sales*	-0.159*	0.106*	0.073*	-0.049*	0.389*	-0.151*	-0.040*	-0.068*	0.094*	0.432*	0.005	-0.005	1.000								
14	*Cash/Debt*	-0.096*	-0.109*	-0.123*	0.052*	0.026*	-0.075*	0.038*	-0.034*	-0.010*	0.055*	0.451*	-0.011*	0.006	1.000							
15	*Bank size*	-0.095*	0.023*	0.013	-0.160*	0.207*	-0.142*	0.132*	-0.219*	0.194*	0.495*	0.051*	-0.032*	0.156*	0.109*	1.000						
16	*Tier1_Asset ratio*	0.000	0.004	0.003	-0.010	0.054*	0.018*	0.045*	-0.044*	0.038*	0.105*	-0.030*	0.014*	0.054*	-0.009	-0.024*	1.000					
17	*ROA*	0.034*	-0.010	-0.008	-0.028*	-0.073*	0.030*	-0.028*	0.042*	-0.054*	-0.162*	-0.018*	0.001	-0.070*	-0.014*	-0.185*	0.003	1.000				
18	*ROE*	0.003	-0.007	-0.015*	0.107*	-0.068*	0.018*	-0.028*	0.089*	-0.101*	-0.151*	-0.001	-0.007	-0.061*	-0.026*	-0.156*	-0.077*	0.902*	1.000			
19	*Efficiency ratio*	-0.047*	0.004	0.007	0.070*	0.057*	-0.025*	0.071*	0.025*	-0.010*	0.110*	0.036*	-0.015*	0.061*	-0.006	0.124*	-0.081*	-0.398*	-0.184*	1.000		
20	*Loss Allowance ratio*	-0.012	-0.027*	-0.039*	-0.079*	0.018*	-0.035*	0.000	0.030*	0.066*	0.033*	-0.039*	0.001	0.038*	-0.052*	-0.028*	-0.001	-0.246*	-0.177*	0.231*	1.000	
21	*Loan to deposit ratio*	-0.006	0.001	-0.003	0.229*	-0.017*	-0.009*	-0.018*	0.007	-0.012*	-0.019*	0.006	-0.002	-0.011*	0.023*	-0.076*	0.081*	0.175*	0.022*	-0.060*	-0.043*	1.000

5.4.2 The match between earnings management and bank market power

We report the results from the estimation of Eq. 5-7 in Table 5-3. The R-square value ranges from 0.812 to 0.826. This means that, after considering loan characteristics, borrower characteristics, lender characteristics, time and industry fixed effects, we almost eliminate the problem of omitted variables (Delis et al., 2016). The coefficient on lagged accrual earnings management ratios is negative and statistically significant at the 1% level. This means that corporate borrowers with low accrual earnings management behaviour are more likely to get loans from banks with strong market power. The results also show that those borrowers with low accrual earnings management borrowers always have more real earnings management. The match between earnings management at time $t-1$ and the lead arranger's bank market power at time t is not only statistically significant but also economically significant. For example, if a corporate borrower's ratio of accrual earnings management Accrual ratio increases by one standard deviation (0.059), only the lead arranger with 3% less market power can offer them the funds.

Overall, the results of the multivariate regression analysis results suggest a significant relationship between borrowers' earnings management behaviour and the

lead arranger they seek. These results are consistent with our H1 that if the lead arranger with market power has more ability to screen the borrower, she will only offer loans only to corporate borrowers with low accrual earnings management.

Table 5-3: Matching

This table presents the matching between borrower's earning management and bank market power before loan originated. The dependent variables are the earnings management in accrual (Column 1), earnings management in real (Column 2) and the total earnings management (Column 3). The independent variable is bank market power, measured by Lerner index. In regression, we control loan, borrower and lender characteristics. We also consider fixed effects of borrower industry and year level. Standard errors are clustered at bank level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)
VARIABLES	Accrual_CF	Real	Total
Accrual_m1	-0.2146***		
	(0.0252)		
REM_tm1		0.0332***	
		(0.0031)	
Total_EM_tm1			0.0280***
			(0.0034)
Loan Size	-0.0000	-0.0000**	-0.0000
	(0.0000)	(0.0000)	(0.0000)
Collateral (0,1)	-0.0036	-0.0037	-0.0039
	(0.0028)	(0.0029)	(0.0031)
Maturity	0.0003***	0.0003***	0.0003***
	(0.0001)	(0.0001)	(0.0001)
Rep_purpose	-0.0001	-0.0041	-0.0027
	(0.0034)	(0.0034)	(0.0037)
Corp_purpose	-0.0113***	-0.0148***	-0.0122***
	(0.0029)	(0.0031)	(0.0033)
Ln(asset)	0.0084***	0.0093***	0.0079***
	(0.0012)	(0.0013)	(0.0014)
ROA	0.1181***	0.1868***	0.1794***
	(0.0137)	(0.0135)	(0.0156)
Book/Market	0.0091***	0.0073***	0.0075***
	(0.0017)	(0.0017)	(0.0018)
Sales	-0.0000	-0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
Cash/Debt	0.0134***	0.0172***	0.0110**
	(0.0042)	(0.0036)	(0.0045)
Ln(Bank size)	0.0149***	0.0191***	0.0175***
	(0.0009)	(0.0009)	(0.0010)
Tier1_Asset ratio (Bank)	0.3291***	0.3220***	0.3014***
	(0.0170)	(0.0173)	(0.0180)
ROA (Bank)	-0.1379***	-0.1158***	-0.1292***

	(0.0063)	(0.0061)	(0.0068)
ROE (Bank)	0.0081***	0.0065***	0.0074***
	(0.0004)	(0.0004)	(0.0005)
Efficiency ratio (Bank)	-0.0041***	-0.0038***	-0.0040***
	(0.0002)	(0.0002)	(0.0002)
Loss Allowance ratio (Bank)	-0.0119***	-0.0138***	-0.0097***
	(0.0018)	(0.0018)	(0.0020)
Loan to deposit ratio (Bank)	0.0015***	0.0015***	0.0015***
	(0.0001)	(0.0001)	(0.0001)
Observations	8,144	8,152	6,939
R-squared	0.8261	0.8122	0.8155
YEAR FE	YES	YES	YES
INDUSTRY FE	YES	YES	YES

5.4.3 The effect of bank market power on earnings management after loan origination

Table 5-4 presents the results for H2, which examines the relationship between the lead arranger's bank market power and the borrower's earnings management after loan origination. The dependent variables are different measures of earnings management: Accrual_CF (Column 1), Real (Column 2) and combined Total_EM (Column 3). Overall, Table 5-4 shows that after controlling for a set of variables and fixed effects, the lead arranger's bank market power can further reduce the corporate borrowers' accrual earning management both in accrual and increase real earnings management in real. The effect of bank market power on earnings management is not only statistically significant but also economically significant. If the lead arranger has more than one standard deviation (0.253) more market power, their corporate borrowers will have 2.5% less in accrual earnings management and 30% more in real earnings management. This result also suggests that the lead arranger's bank market power has a more favourable role in monitoring accrual earnings management behaviour. This supports previous studies (El Mahdy and Cheng, 2016, Ahn and Choi, 2009).

Table 5-4: Baseline

This table presents the baseline results. We regress bank market power on borrower's future earnings management. The independent variables are the earnings management in accrual (Column 1), earnings management in real (Column 2) and the total earnings management (Column 3). The dependent variable is bank market power, measured by Lerner index. In regression, we control loan, borrower and lender characteristics. We also consider fixed effects of borrower industry and year level. Standard errors are clustered at bank level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)
VARIABLES	Accrual_CF	Real	Total
Accrual	0.9271***		
	(0.0060)		
REM		0.7464***	
		(0.0065)	
Total_EM			0.7603***
			(0.0071)
Lerner	-0.0058**	0.1066***	0.0739***
	(0.0028)	(0.0227)	(0.0244)
Loan Size	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
Collateral (0,1)	0.0016**	0.0101*	0.0119*
	(0.0007)	(0.0059)	(0.0064)
Maturity	-0.0000**	0.0003***	0.0003**
	(0.0000)	(0.0001)	(0.0001)
Rep_purpose	-0.0013	-0.0060	-0.0032
	(0.0009)	(0.0070)	(0.0077)
Corp_purpose	-0.0008	-0.0057	-0.0071
	(0.0008)	(0.0064)	(0.0069)
Ln(asset)	-0.0013***	-0.0014	-0.0003
	(0.0003)	(0.0028)	(0.0031)
ROA	0.0013	0.1444***	0.1713***
	(0.0035)	(0.0266)	(0.0311)
Book/Market	-0.0015***	0.0216***	0.0215***
	(0.0005)	(0.0037)	(0.0044)
Sales	-0.0000	0.0000***	0.0000
	(0.0000)	(0.0000)	(0.0000)
Cash/Debt	0.0019**	-0.0227***	-0.0211**
	(0.0009)	(0.0081)	(0.0092)
Ln(Bank size)	0.0000	0.0009	0.0020
	(0.0002)	(0.0020)	(0.0021)
Tier1_Asset ratio (Bank)	-0.0017	-0.0216	-0.0234

	(0.0044)	(0.0361)	(0.0377)
ROA (Bank)	0.0004	0.0477***	0.0572***
	(0.0016)	(0.0129)	(0.0139)
ROE (Bank)	0.0000	-0.0032***	-0.0038***
	(0.0001)	(0.0009)	(0.0010)
Efficiency ratio (Bank)	-0.0001**	0.0009***	0.0011***
	(0.0000)	(0.0003)	(0.0004)
Loss Allowance ratio (Bank)	0.0003	-0.0008	-0.0029
	(0.0005)	(0.0037)	(0.0041)
Loan to deposit ratio (Bank)	0.0000	0.0002	0.0002
	(0.0000)	(0.0001)	(0.0002)
Observations	8,028	7,854	6,732
R-squared	0.8036	0.6864	0.6856
YEAR FE	YES	YES	YES
INDUSTRY FE	YES	YES	YES

5.4.4 The moderating effect of the number of lenders

A syndicated loan is normally originated by one or two lead arrangers, and there can be multiple participant lenders (Ivashina, 2009). The lead arranger analyses the borrower's credit quality and negotiates key terms and covenants with the borrower before inviting participants to fund the loan. The lead arranger as the primary lender is most likely to monitor borrowers after loan origination (Esty, 2001). However, a typical syndicated loan agreement contains an extensive disclaimer that states that the lead arranger owes no fiduciary duties to any participants, and each lender is responsible for its own assessment of borrowers' credit risk (Ivashina, 2009). An increase in the number of lenders can lead to a problem of free-riding as lenders are more likely to rely on others to perform costly and unobservable monitoring activities. This effect should be more significant for lead arrangers who play the monitor role based on the contract. Thus, we expect that an increased number of lenders would erode the relation between bank market power and earnings management.

To test this conjecture, we rerun Eq. 5-8 by including the variable of the number of lenders as a variable and determine this variable's interaction with the lead arranger's bank market power. We use *Players* to indicate the total number of lenders in this syndicated loan facility. The results are presented in Table 5-5. They show that the

coefficients on the interaction terms between bank market power and the number of lenders are statistically significant and bear the opposite signs of the corresponding coefficients on the lead arranger's bank market power. These results are consistent with our prediction that the effect of the lead arranger's bank market power on borrowers' future earnings management will be weakened when the number of lenders increases in this syndicated loan facility

Table 5-5: Players

This table presents the result on the effect the number of lenders on the relation between the bank market power and borrower's future earnings management. The independent variables are the earnings management in accrual (Column 1), earnings management in real (Column 2) and the total earnings management (Column 3). The dependent variable is bank market power, measured by Lerner index. Players means the total number of lenders in syndication. In regression, we control loan, borrower and lender characteristics. We also consider fixed effects of borrower industry and year level. Standard errors are clustered at bank level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)
VARIABLES	Accrual_CF	Real	Total
Accrual	0.9265***		
	(0.0060)		
REM		0.7458***	
		(0.0065)	
Total_EM			0.7600***
			(0.0071)
Lerner	-0.0073**	0.1179***	0.0812***
	(0.0029)	(0.0233)	(0.0251)
Players	-0.0002**	0.0031***	0.0026***
	(0.0001)	(0.0009)	(0.0009)
Players_Lerner	0.0004**	-0.0037**	-0.0026
	(0.0002)	(0.0016)	(0.0017)
Loan Size	0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)
Collateral (0,1)	0.0017**	0.0083	0.0098
	(0.0007)	(0.0060)	(0.0065)
Maturity	-0.0000*	0.0003**	0.0002*
	(0.0000)	(0.0001)	(0.0001)
Rep_purpose	-0.0012	-0.0058	-0.0030
	(0.0009)	(0.0070)	(0.0077)
Corp_purpose	-0.0008	-0.0047	-0.0061
	(0.0008)	(0.0064)	(0.0069)
Ln(asset)	-0.0012***	-0.0036	-0.0027
	(0.0003)	(0.0029)	(0.0033)
ROA	0.0016	0.1411***	0.1679***
	(0.0035)	(0.0265)	(0.0311)
Book/Market	-0.0015***	0.0218***	0.0218***
	(0.0005)	(0.0037)	(0.0044)
Sales	-0.0000	0.0000***	0.0000
	(0.0000)	(0.0000)	(0.0000)
Cash/Debt	0.0019**	-0.0220***	-0.0203**

	(0.0009)	(0.0081)	(0.0092)
Ln(Bank size)	0.0000	0.0007	0.0019
	(0.0002)	(0.0020)	(0.0021)
Tier1_Asset ratio (Bank)	-0.0023	-0.0169	-0.0186
	(0.0045)	(0.0361)	(0.0378)
ROA (Bank)	0.0006	0.0470***	0.0568***
	(0.0016)	(0.0129)	(0.0139)
ROE (Bank)	0.0000	-0.0032***	-0.0038***
	(0.0001)	(0.0009)	(0.0010)
Efficiency ratio (Bank)	-0.0001**	0.0009***	0.0011***
	(0.0000)	(0.0003)	(0.0004)
Loss Allowance ratio (Bank)	0.0002	-0.0004	-0.0025
	(0.0005)	(0.0037)	(0.0041)
Loan to deposit ratio (Bank)	0.0000	0.0002	0.0002
	(0.0000)	(0.0001)	(0.0002)
Observations	8,028	7,854	6,732
R-squared	0.8038	0.6870	0.6861
YEAR FE	YES	YES	YES
INDUSTRY FE	YES	YES	YES

5.4.5 The moderating effect of lead share

In a syndicated loan, the share obtained by the lead arranger can be another factor that determines the lead arranger's monitoring activities after loan origination. Normally, the lead arranger takes only part of the loan and sells the other parts to participants (Beatty et al., 2019). After selling the remaining parts to participants, the lead arranger may shirk the costly and unobservable efforts to monitor the borrower (Lin et al., 2012). This could cause a moral hazard between the lead arranger and the participants. In such a condition, participants may ask the lead arranger to hold more share in syndication, which could guarantee that the lead arranger conducts the future monitoring effort. In this section, we use the share obtained by the lead arranger as the monitoring effort that lead arranger will put. We expect that increased lead share will strengthen the link between the lead arranger's bank market power and the borrower's earnings management.

Table 5-6 shows the results of this conjecture. We rerun Eq. 5-8 by including the variable of lead share and its interaction with the lead arranger's bank market power. The results in Column 1 of Table 5-6 show that lead share does not have a moderating effect on the relation between bank market power and accrual earnings management and total earnings management. However, the results in Column 2 support our

expectation that large lead shareholdings would strengthen the relationship between lead bank market power and borrowers' future real earnings management.

Table 5-6: Leadshare

This table presents the result on the effect the leadshare on the relation between the bank market power and borrower's future earnings management. The independent variables are the earnings management in accrual (Column 1), earnings management in real (Column 2) and the total earnings management (Column 3). The dependent variable is bank market power, measured by Lerner index. Leadshare means the total share obtained by lead arranger in syndication. In regression, we control loan, borrower and lender characteristics. We also consider fixed effects of borrower industry and year level. Standard errors are clustered at bank level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)
VARIABLES	Accrual_CF	Real	Total
Accrual	0.9271***		
	(0.0060)		
REM		0.7459***	
		(0.0066)	
Total_EM			0.7601***
			(0.0071)
Lerner	-0.0078*	0.0714*	0.0559
	(0.0047)	(0.0407)	(0.0432)
Leadshare	0.0000	-0.0004*	-0.0002
	(0.0000)	(0.0002)	(0.0002)
leadshare_Lerner	0.0000	0.0006*	0.0002
	(0.0000)	(0.0002)	(0.0005)
Loan Size	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
Collateral (0,1)	0.0015**	0.0105*	0.0121*
	(0.0007)	(0.0059)	(0.0064)
Maturity	-0.0000*	0.0003**	0.0003**
	(0.0000)	(0.0001)	(0.0001)
Rep_purpose	-0.0011	-0.0065	-0.0034
	(0.0009)	(0.0071)	(0.0078)
Corp_purpose	-0.0009	-0.0045	-0.0067
	(0.0008)	(0.0064)	(0.0069)
Ln(asset)	-0.0010***	-0.0034	-0.0011
	(0.0003)	(0.0030)	(0.0033)
ROA	0.0018	0.1382***	0.1683***
	(0.0035)	(0.0267)	(0.0312)
Book/Market	-0.0015***	0.0215***	0.0214***
	(0.0005)	(0.0037)	(0.0044)
Sales	-0.0000	0.0000***	0.0000
	(0.0000)	(0.0000)	(0.0000)
Cash/Debt	0.0019**	-0.0225***	-0.0210**

	(0.0009)	(0.0081)	(0.0092)
Ln(Bank size)	-0.0000	0.0007	0.0019
	(0.0002)	(0.0020)	(0.0021)
Tier1_Asset ratio (Bank)	-0.0015	-0.0184	-0.0217
	(0.0045)	(0.0362)	(0.0379)
ROA (Bank)	0.0004	0.0472***	0.0568***
	(0.0016)	(0.0129)	(0.0139)
ROE (Bank)	0.0000	-0.0032***	-0.0038***
	(0.0001)	(0.0009)	(0.0010)
Efficiency ratio (Bank)	-0.0001*	0.0009**	0.0011***
	(0.0000)	(0.0003)	(0.0004)
Loss Allowance ratio (Bank)	0.0003	-0.0005	-0.0027
	(0.0005)	(0.0038)	(0.0041)
Loan to deposit ratio (Bank)	0.0000	0.0002	0.0002
	(0.0000)	(0.0001)	(0.0002)
Observations	8,027	7,853	6,731
R-squared	0.8037	0.6866	0.6856
YEAR FE	YES	YES	YES
INDUSTRY FE	YES	YES	YES

5.4.6 The moderating effect of distance

With the development of transaction and communication technologies, borrowers can search for sources of funds that are farther away from them (Felici and Pagnini, 2008). In the market for syndicated loans, more and more borrowers seek cheaper funds from distant banks (Mi and Han, 2020), and this distance matching between borrower and lenders in the US market became more popular, especially after the Riegle–Neal Interstate Branching and Banking Efficiency Act of 1994 (IBBEA) (Keil and Müller, 2019). The power that the bank can exert decreases as the distance between the lender and borrower increases (Tian et al., 2019). In this case, we expect that the distance between the lead arranger and the borrower would erode the relation between bank market power and earnings management.

To test our conjecture, we rerun Eq. 5-8 by including the variable of *Distant* and its interaction with the lead arranger's bank market power. We define *Distant* as one if the headquarters of the lead arranger and the borrower are not in the same state[20], and zero otherwise. Overall, Table 5-7 shows that the interaction term's coefficients between bank market power and distance are statistically significant, and they bear the opposite sign of the corresponding coefficients on the lead arranger's bank market

[20] It is possible that the lead arranger has branches in the borrower's state. However, the branch does not have market power like the headquarters.

power. This result is consistent with our conjecture that distance will erode the effect of the lead arranger's bank market power on the borrower's future earnings management.

Table 5-7: Distant

This table presents the result on the effect the distance on the relation between the bank market power and borrower's future earnings management. The independent variables are the earnings management in accrual (Column 1), earnings management in real (Column 2) and the total earnings management (Column 3). The dependent variable is bank market power, measured by Lerner index. Distant equals to one if headquarter of lead arranger and borrower are in same state, zero otherwise. In regression, we control loan, borrower and lender characteristics. We also consider fixed effects of borrower industry and year level. Standard errors are clustered at bank level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)
VARIABLES	Accrual_CF	Real	Total
Accrual	0.9266***		
	(0.0060)		
REM		0.7460***	
		(0.0066)	
Total_EM			0.7607***
			(0.0072)
Lerner	-0.0139***	0.1373***	0.0917***
	(0.0036)	(0.0286)	(0.0313)
Distant	-0.0054***	0.0136	0.0131
	(0.0016)	(0.0130)	(0.0141)
Distant_Lerner	0.0123***	-0.0445*	-0.0263
	(0.0032)	(0.0260)	(0.0284)
Loan Size	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
Collateral (0,1)	0.0018**	0.0089	0.0112*
	(0.0007)	(0.0059)	(0.0064)
Maturity	-0.0000**	0.0003***	0.0003**
	(0.0000)	(0.0001)	(0.0001)
Rep_purpose	-0.0011	-0.0054	-0.0027
	(0.0009)	(0.0071)	(0.0078)
Corp_purpose	-0.0008	-0.0059	-0.0075
	(0.0008)	(0.0064)	(0.0069)
Ln(asset)	-0.0013***	-0.0014	-0.0004
	(0.0003)	(0.0028)	(0.0031)
ROA	0.0022	0.1434***	0.1733***
	(0.0035)	(0.0267)	(0.0312)
Book/Market	-0.0015***	0.0217***	0.0218***
	(0.0005)	(0.0038)	(0.0044)
Sales	-0.0000	0.0000***	0.0000
	(0.0000)	(0.0000)	(0.0000)
Cash/Debt	0.0020**	-0.0246***	-0.0229**
	(0.0009)	(0.0082)	(0.0093)
Ln(Bank size)	-0.0001	0.0014	0.0018

	(0.0002)	(0.0021)	(0.0022)
Tier1_Asset ratio (Bank)	-0.0026	-0.0172	-0.0209
	(0.0045)	(0.0365)	(0.0382)
ROA (Bank)	0.0003	0.0490***	0.0569***
	(0.0016)	(0.0130)	(0.0140)
ROE (Bank)	0.0000	-0.0033***	-0.0037***
	(0.0001)	(0.0009)	(0.0010)
Efficiency ratio (Bank)	-0.0001**	0.0009***	0.0011***
	(0.0000)	(0.0004)	(0.0004)
Loss Allowance ratio (Bank)	0.0002	-0.0014	-0.0024
	(0.0005)	(0.0038)	(0.0041)
Loan to deposit ratio (Bank)	0.0000	0.0002	0.0002
	(0.0000)	(0.0001)	(0.0002)
Observations	7,948	7,775	6,663
R-squared	0.8039	0.6875	0.6867
YEAR FE	YES	YES	YES
INDUSTRY FE	YES	YES	YES

5.4.7 Endogeneity

In this section, we deal with the potential problems of endogeneity in our model. Such a problem may arise either from reverse causality or from omitted variables. In our empirical model, we used a lag dependent variable, which could effectively cope with the problem of reverse causality as future earnings management cannot influence past bank market power. We also include various characteristics of the loan, borrower and lender, as well as year and industry fixed effects. This could partially eliminate the problems of omitted variables. We use the 2SLS method to further reduce endogeneity by employing *Sanction* as an instrumental variable. We hand collect this variable from three sources: the Federal Deposit Insurance Corporation (FDIC), the Office of the Comptroller of the Currency (OCC) and the Federal Reserve Board (FRB). $Sanction_{b,t}$ is a dummy variable that equals one if the lead arranger b receives an enforcement action[21] (e.g. violation of rules, regulations and laws) at time t, and 0 otherwise. The enforcement action should be positively related to bank market power as banks with market power have less transparent internal control and audit systems, and they are more likely to hide their power from regulatory authorities (Delis et al., 2017). At the

[21] Here, we keep the enforcement actions related with internal control, audit system of banks and management of information (Delis et al., 2017)

same time, enforcement actions should not directly influence borrowers' earnings management after controlling for a set of bank characteristics. Table 5-8 shows the results of using the 2SLS method. The lead arranger's bank market power still has a significant effect on the borrower's future choice of earnings management behaviour.

Table 5-8: 2SLS

This table presents the results of 2SLS. We rerun the baseline model by employing sanction as instrumental variable. The independent variables are the earnings management in accrual (Column 1), earnings management in real (Column 2) and the total earnings management (Column 3). The dependent variable is bank market power, measured by predicted Lerner index. Sanction is a dummy variable equals to one if the lead arranger receives the enforcement actions, zero otherwise. In regression, we control loan, borrower and lender characteristics. We also consider fixed effects of borrower industry and year level. Standard errors are clustered at bank level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)	(4)
VARIABLES	Accrual_CF	Real	Total	First Stage
Accrual	0.9265***			
	(0.0060)			
REM		0.7470***		
		(0.0066)		
Total_EM			0.7607***	
			(0.0071)	
Lerner (2SLS)	-0.0097***	0.0919***	0.0579**	
	(0.0032)	(0.0258)	(0.0278)	
Loan Size	0.0000	0.0000	0.0000	
	(0.0000)	(0.0000)	(0.0000)	
Collateral (0,1)	0.0015**	0.0102*	0.0118*	
	(0.0007)	(0.0059)	(0.0064)	
Maturity	-0.0000**	0.0003***	0.0003**	
	(0.0000)	(0.0001)	(0.0001)	
Rep_purpose	-0.0013	-0.0059	-0.0031	
	(0.0009)	(0.0071)	(0.0077)	
Corp_purpose	-0.0008	-0.0061	-0.0074	
	(0.0008)	(0.0064)	(0.0069)	
Ln(asset)	-0.0012***	-0.0013	-0.0001	
	(0.0003)	(0.0028)	(0.0031)	
ROA	0.0017	0.1474***	0.1747***	
	(0.0035)	(0.0266)	(0.0311)	
Book/Market	-0.0015***	0.0217***	0.0216***	
	(0.0005)	(0.0038)	(0.0044)	
Sales	-0.0000	0.0000***	0.0000	
	(0.0000)	(0.0000)	(0.0000)	
Cash/Debt	0.0019**	-0.0222***	-0.0209**	
	(0.0009)	(0.0081)	(0.0092)	
Ln(Bank size)	0.0001	0.0013	0.0024	
	(0.0002)	(0.0020)	(0.0021)	
Tier1_Asset ratio (Bank)	-0.0004	-0.0174	-0.0185	

	(0.0045)	(0.0363)	(0.0379)	
ROA (Bank)	0.0003	0.0432***	0.0536***	
	(0.0016)	(0.0128)	(0.0138)	
ROE (Bank)	0.0000	-0.0029***	-0.0036***	
	(0.0001)	(0.0009)	(0.0010)	
Efficiency ratio (Bank)	-0.0001**	0.0008**	0.0010**	
	(0.0000)	(0.0003)	(0.0004)	
Loss Allowance ratio (Bank)	0.0002	-0.0011	-0.0031	
	(0.0005)	(0.0037)	(0.0041)	
Loan to deposit ratio (Bank)	0.0000	0.0002	0.0002	
	(0.0000)	(0.0001)	(0.0002)	
Sanction				0.0098***
				(0.0017)
Observations	8,028	7,854	6,732	
R-squared	0.8037	0.6861	0.6853	
YEAR FE	YES	YES	YES	
INDUSTRY FE	YES	YES	YES	
LM statistic Chi-sq(2)				6381***
Rubin Wald test Chi-sq(2)				332***

5.4.8 Robustness test

Table 5-9 shows the results of our test for robustness. We rerun Eq. 5-8 with different samples or loan levels. Columns 1–3 show the results of using only the samples that used revolving loans because such loans are the ones most used in syndication and they are a popular liquidity instrument for corporations. We exclude other loan types to double-check that our results are still significant. In Columns 4–6, we exclude the loan sample originated by the Top 3 lead arrangers[22] because these Top 3 banks account for a large number of loan facilities in our sample. Our baseline results use the loan facility level, and we also rerun Eq. 5-8 in the loan deal level in Columns 7–9. The results in Table 5-9 are not only statically significant, but also economically significant. For example, one standard deviation increase in *Lerner* (0.2526), real earnings management will increase by 27% for Revolver sample, 31% for Top 3 samples and 22% for Deal level sample. Overall, results from the robustness test are consistent with our baseline results.

[22] Using the whole DealScan database, the Top 3 are defined as the lead arrangers who rank highest in their origination of loan facilities for the previous 5 years.

Table 5-9: Robustness test

This table presents the regression results of a series of robustness tests. The dependent variables are earnings management in accrual, earnings management in real and total earnings management. The independent variable is bank market power, measured by Lerner index. In column 1-3, we only keep the revolver sample. Revolver is a dummy variable equals to one is the loan type is revolver, zero otherwise. In column 3-6, we exclude loan sample originated by top 3 lead arrangers. Top 3 is a dummy variable equals to one if the lead arranger is ranked in top 3 based on previous 5 years loan originated, and zero otherwise. From column 7 to 9, we rerun our baseline model in loan deal level. In regression, we control loan, borrower and lender characteristics. We also consider fixed effects of borrower industry and year level. Standard errors are clustered at bank level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Revolver			Top3			Deal level	
VARIABLES	Accrual_CF	Real	Total	Accrual_CF	Real	Total	Accrual_CF	Real	Total
Accrual	0.9128***			0.9287***			0.9155***		
	(0.0076)			(0.0078)			(0.0072)		
Real		0.7727***			0.7430***			0.7622***	
		(0.0080)			(0.0087)			(0.0077)	
Total_EM			0.7887***			0.7596***			0.7774***
			(0.0086)			(0.0096)			(0.0084)
Lerner	-0.0047	0.0948***	0.0771**	-0.0068**	0.1060***	0.0689**	-0.0066*	0.0739***	0.0482*
	(0.0036)	(0.0284)	(0.0303)	(0.0034)	(0.0267)	(0.0287)	(0.0034)	(0.0266)	(0.0285)
Loan Size	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Collateral (0,1)	0.0009	0.0079	0.0076	0.0023**	0.0210**	0.0274***	0.0017*	-0.0001	0.0006
	(0.0009)	(0.0072)	(0.0078)	(0.0010)	(0.0083)	(0.0091)	(0.0009)	(0.0070)	(0.0076)
Maturity	-0.0001***	0.0006***	0.0004**	-0.0000	0.0005***	0.0004**	-0.0000*	0.0003**	0.0003*
	(0.0000)	(0.0002)	(0.0002)	(0.0000)	(0.0002)	(0.0002)	(0.0000)	(0.0001)	(0.0002)

Rep_purpose	-0.0017	-0.0081	-0.0044	-0.0015	-0.0118	-0.0090	-0.0025**	-0.0033	-0.0004
	(0.0011)	(0.0088)	(0.0097)	(0.0012)	(0.0093)	(0.0102)	(0.0011)	(0.0086)	(0.0094)
Corp_purpose	-0.0023**	-0.0002	-0.0019	-0.0012	-0.0026	-0.0022	-0.0017*	-0.0044	-0.0056
	(0.0010)	(0.0079)	(0.0085)	(0.0011)	(0.0088)	(0.0096)	(0.0009)	(0.0074)	(0.0080)
Ln(asset)	-0.0010**	-0.0053	-0.0030	-0.0009**	-0.0009	-0.0019	-0.0014***	-0.0019	-0.0003
	(0.0004)	(0.0037)	(0.0041)	(0.0004)	(0.0038)	(0.0042)	(0.0004)	(0.0033)	(0.0037)
ROA	0.0026	0.1683***	0.1692***	0.0060	0.1283***	0.1690***	0.0009	0.1324***	0.1624***
	(0.0043)	(0.0326)	(0.0370)	(0.0044)	(0.0320)	(0.0378)	(0.0041)	(0.0310)	(0.0361)
Book/Market	-0.0021***	0.0200***	0.0215***	-0.0017***	0.0149***	0.0159***	-0.0011*	0.0211***	0.0217***
	(0.0007)	(0.0047)	(0.0055)	(0.0006)	(0.0045)	(0.0054)	(0.0006)	(0.0046)	(0.0054)
Sales	-0.0000	0.0000***	0.0000	-0.0000	0.0000**	0.0000	-0.0000	0.0000**	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Cash/Debt	0.0022*	-0.0222**	-0.0133	0.0009	-0.0089	-0.0080	0.0026**	-0.0195**	-0.0155
	(0.0012)	(0.0097)	(0.0109)	(0.0011)	(0.0097)	(0.0113)	(0.0012)	(0.0094)	(0.0106)
Ln(Bank size)	-0.0003	0.0040	0.0035	0.0007**	0.0025	0.0055*	-0.0003	0.0024	0.0027
	(0.0003)	(0.0025)	(0.0027)	(0.0003)	(0.0028)	(0.0030)	(0.0003)	(0.0024)	(0.0026)
Tier1_Asset ratio (Bank)	-0.0168*	-0.0304	-0.0836	-0.0015	-0.0228	-0.0162	-0.0107	0.0036	-0.0047
	(0.0099)	(0.0761)	(0.0858)	(0.0048)	(0.0379)	(0.0394)	(0.0091)	(0.0717)	(0.0802)
ROA (Bank)	-0.0013	0.0533***	0.0551***	0.0003	0.0421***	0.0580***	0.0001	0.0426***	0.0534***
	(0.0020)	(0.0155)	(0.0165)	(0.0019)	(0.0147)	(0.0159)	(0.0019)	(0.0148)	(0.0159)
ROE (Bank)	0.0001	-0.0037***	-0.0038***	0.0001	-0.0031***	-0.0040***	0.0000	-0.0031***	-0.0037***
	(0.0001)	(0.0011)	(0.0012)	(0.0001)	(0.0010)	(0.0011)	(0.0001)	(0.0010)	(0.0011)

Efficiency ratio (Bank)	-0.0001	0.0014***	0.0015***	-0.0001**	0.0008**	0.0010**	-0.0001	0.0011**	0.0012***
	(0.0001)	(0.0004)	(0.0005)	(0.0000)	(0.0004)	(0.0004)	(0.0001)	(0.0004)	(0.0005)
Loss Allowance ratio (Bank)	0.0007	-0.0030	-0.0030	-0.0005	-0.0007	-0.0036	0.0005	-0.0032	-0.0054
	(0.0006)	(0.0048)	(0.0053)	(0.0005)	(0.0043)	(0.0047)	(0.0006)	(0.0046)	(0.0050)
Loan to deposit ratio (Bank)	-0.0000	0.0004**	0.0003	-0.0000	0.0002	0.0002	-0.0000	0.0003*	0.0003
	(0.0000)	(0.0002)	(0.0002)	(0.0000)	(0.0002)	(0.0002)	(0.0000)	(0.0002)	(0.0002)
Observations	4,989	4,922	4,251	4,564	4,513	3,778	5,732	5,536	4,761
R-squared	0.7929	0.7111	0.7127	0.8158	0.6864	0.6832	0.7925	0.6996	0.6988
YEAR FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
INDUSTRY FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

5.5 Chapter conclusion

Motivating by the first two chapters of the thesis, we empirically investigate the correspondence between bank market power and firm earnings management, both before and after loan origination. We employ a sample of 10,914 loan facilities syndicated by 166 lead arrangers between 1994 and 2017 in the U.S. market. The baseline results show that firms with less accrual earnings management and more real earnings management match banks with high market power. This finding reveals that banks with market power have strong screening and information collecting ability, and they prefer borrowers with less accrual earnings management. Of even more importance, we find that more firms switch from accrual earnings management to real earnings management after loan origination. This result supports the position that banks with market power have a superior monitoring ability, and they are less likely to monitor borrowers' real earnings management (El Mahdy and Cheng, 2016).

Appendix 5-1

VarName	Definition	Source
Dependent Var:		
Accrual_CF	The ratio of accrual earnings management. We follow Francis et al. (2005) to measure this ratio.	Compustat
Real	The ratio of real earnings management. We follow Roychowdhury (2006) to measure this ratio.	Compustat
Total_EM	The total earnings management in this company, including accrual and real. This ratio measured as the sum of *Accrual_CF* and *Real.*	Compustat
Independent Var:		
Lerner	$Lerner_{it} = \frac{P_{it} - MC_{it}}{P_{it}}$ where P_{it} is the price of bank i's output at time t. MC_{it} is the marginal cost of the production of this product for bank i at time t. The higher the ratio, the larger the market power bank has.	FDIC
Loan control:		
Loan size	The total loan amount	DealScan
Leadshare	Loan share hold by lead arranger	DealScan
Collateral (0,1)	=1 if the facility has a collateral, zero otherwise	DealScan
Maturity	Loan maturity, measured in months	DealScan
Rep_purpose	=1 if the syndication is for repayment purpose, zero otherwise	DealScan
Corp_purpose	=1 if the syndication is for corporation purpose, zero otherwise	DealScan
Revolver	=1 if the loan type is revolver, zero otherwise	
Borrower control*:*		
Ln(asset)	Natural Log of the total asset of the borrower at the end of fiscal year prior to the loan origination	Compustat

ROA	Return on Asset	Compustat
Book/Market	Book to Market ratio	Compustat
Sales	Sales value of the borrower	Compustat
Cash/Debt	Cash to debt ratio	Compustat
Bank control:		
Bank size	Total asset of lead arranger bank	FDIC
Tier1_Asset ratio	Tier 1 core capital/Total asset	FDIC
ROA	Return on Asset	FDIC
ROE	Return on Equity	FDIC
Efficiency ratio	Noninterest expense less amortization of intangible assets as a percent of net interest income plus noninterest income. This ratio measures the proportion of net operating revenues that are absorbed by overhead expenses, so that a lower value indicates greater efficiency.	FDIC
Loss Allowance ratio	Allowance for loan and lease losses as a percent of total loan and lease financing receivables, excluding unearned income.	FDIC
Loan to deposit ratio	Total loan/Total deposit F	FDIC
Top 3	Top 3 banks based on the amount of loan originated from previous 5 years.	DealScan
Distant	=1 if headquarter of lead arranger and borrower are not in the same state, zero otherwise	
Sanction	=1 if bank has enforcement action, zero otherwise	FDIC, OCC,FRB

Appendix 5-2

VARIABLES	(1) Accrual_CF	(2) Real	(3) Total
Lerner	5.45	4.95	4.93
Loan Size	1.50	1.57	1.56
Collateral (0,1)	1.36	1.31	1.32
Maturity	1.19	1.21	1.20
Rep_purpose	1.32	1.32	1.35
Corp_purpose	1.29	1.29	1.28
Ln(asset)	2.87	3.02	3.01
ROA	1.71	1.68	1.65
Book/Market	1.15	1.17	1.18
Sales	2.08	2.34	2.39
Cash/Debt	1.47	1.52	1.47
Ln(Bank size)	2.08	2.16	2.08
Tier1_Asset ratio (Bank)	1.38	1.37	1.32
ROA (Bank)	3.99	3.58	4.13
ROE (Bank)	3.33	2.91	3.53
Efficiency ratio (Bank)	2.24	2.12	2.13
Loss Allowance ratio (Bank)	1.90	1.87	1.89
Loan to deposit ratio (Bank)	1.44	1.42	1.39
Mean VIF	4.86	4.05	4.65

This table is the VIF results for the baseline model in Chapter 5. Mean VIF value is less than 5, and we can see that there is no severe correlation between our explanatory variables in the model.

Appendix 5-3

VARIABLES	(1) Accrual_CF	(2) Real	(3) Total
Accrual	0.9145***		
	(0.0141)		
REM		0.7182***	
		(0.0172)	
Total_EM			0.7325***
			(0.0161)
Lerner	-0.0110**	0.1691***	0.1550***
	(0.0048)	(0.0550)	(0.0511)
Loan Size	0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)
Collateral (0,1)	0.0016*	0.0100	0.0115
	(0.0009)	(0.0070)	(0.0077)
Maturity	-0.0000**	0.0003**	0.0003
	(0.0000)	(0.0002)	(0.0002)
Rep_purpose	-0.0012	-0.0015	0.0010
	(0.0007)	(0.0102)	(0.0112)
Corp_purpose	-0.0007	-0.0017	-0.0031
	(0.0006)	(0.0091)	(0.0087)
Ln(asset)	-0.0013***	-0.0073	-0.0115**
	(0.0005)	(0.0054)	(0.0054)
ROA	0.0045	0.0770	0.0892*
	(0.0090)	(0.0529)	(0.0532)
Book/Market	-0.0012	0.0314***	0.0263***
	(0.0008)	(0.0099)	(0.0090)
Sales	-0.0000	0.0000***	0.0000***
	(0.0000)	(0.0000)	(0.0000)
Cash/Debt	0.0023*	-0.0165	-0.0149
	(0.0014)	(0.0199)	(0.0225)
Ln(Bank size)	0.0000	0.0013	0.0021
	(0.0003)	(0.0029)	(0.0028)

Tier1_Asset ratio (Bank)	-0.0009	-0.0344	-0.0320
	(0.0042)	(0.0461)	(0.0438)
ROA (Bank)	0.0006	0.0564***	0.0706***
	(0.0019)	(0.0151)	(0.0180)
ROE (Bank)	-0.0000	-0.0039***	-0.0048***
	(0.0001)	(0.0011)	(0.0012)
Efficiency ratio (Bank)	-0.0001**	0.0012***	0.0013***
	(0.0000)	(0.0004)	(0.0005)
Loss Allowance ratio (Bank)	0.0002	-0.0033	-0.0065
	(0.0006)	(0.0062)	(0.0069)
Loan to deposit ratio (Bank)	0.0000	-0.0001	-0.0001
	(0.0000)	(0.0002)	(0.0002)
Observations	8,028	7,521	6,513
R-squared	0.7976	0.6274	0.6251
YEAR FE	YES	YES	YES
BANK FE	YES	YES	YES
INDUSTRY FE	YES	YES	YES

We regress bank market power on borrower's future earnings management. The independent variables are the earnings management in accrual (Column 1), earnings management in real (Column 2) and the total earnings management (Column 3). The dependent variable is bank market power, measured by Lerner index. In regression, we control loan, borrower and lender characteristics. We also consider fixed effects of bank, borrower industry and year level. Standard errors are clustered at bank level and reported in parentheses. ***, **, and * denotes statistical significance level of 1%, 5% and 10% respectively

6. Thesis Conclusion

6.1 Conclusion

This thesis explores the mechanism underlying the linkage between bank market structure and enterprises' earnings quality. I particularly test how regional bank market structure ratios influence local firms' earnings quality at the level of the U.S. states in Chapter 3. I further analyse the trade-off between accrual earnings management and real earnings management as firms react to the change of bank regulation policy (1994-IBBEA) in Chapter 4. To deal with the limitation of regional analysis, I use a 1-to-1 matched sample (lender to borrower) to investigate the relationship between bank market structure and a firm's earnings management behaviour.

Chapter 3 shows supporting evidence of the bank's screen and monitor role. Firms increase their earnings quality in the regions where banks have more market power. That chapter also shows that the relationship between earnings quality and bank market structure is determined by the bank's 'screen and monitor channel' instead of the 'incentive channel'.

Chapter 4 focuses on earnings management in the period of bank deregulation. Measures of bank market structure have endogeneity problems, even though I have used technical issues, such as fixed effect, 2SLS and placebo test, to deal with them. In

contrast, the change of policy (1994-IBBEA) is an exogenous factor. In Chapter 4, I test the effect of state banking deregulation on the trade-off between accrual earnings management and real earnings management. The results show that enterprises use less accrual earnings management and more real earnings management as bank market freedom increases. This finding supports Chapter 3. The state bank market tends to be more consolidated (after M&A and the failures of small local banks), and bank lenders are less likely to monitor borrowers' real earnings management (El Mahdy and Cheng, 2016). Chapter 5 further tests the relationship between earnings quality and bank market structure based on 1-to-1 matched data (loans). This sample eliminates the limitations of the regional tests in Chapter 3 and Chapter 4. The regional bank market structure assumes that all firms borrow locally and it cannot distinguish the ex-ante screen role from the ex-post monitor role. The results in Chapter 5 support the earlier chapters, and I find both screen and monitor work in determining borrowers' earnings quality. In each empirical chapter, I applied extensive robustness tests. I used different measures of bank market structure (e.g. Lerner index, HHI, CRn, H-statistics and bank deregulation ratio) and different measures of earnings quality (e.g. modified Jones model (Dechow et al., 1995), the method from Francis et al. (2005) and real earnings management ratios (Roychowdhury, 2006)). I also use various methods to deal with endogeneity, such as fixed effects, 2SLS and placebo tests. Overall, these additional tests show my results to be consistent and robust.

6.2 Contribution, Implication and Limitation

This study is expected to deepen our understanding of the relationship between bank market structure and firm earnings quality. It can contribute to the existing literature in at least three important ways. First, this study explores the mechanism underlying the linkage between bank market structure and borrowers' earnings management. Chapter 3 provides a full explanation that borrowers' increasing earnings quality are triggered by the screening and monitoring roles played by the banks that have market power. This explanation is different from earlier studies. For example, Gormley et al. (2012) and Chen and Vashishtha (2017) state that borrowers actively provide more hard information to feed the needs of lenders. Second, in terms of research methodology, I examine the effect of bank market structure on earnings quality by considering the effects of regional bank markets (Chapters 3 and 4), individual banks (Chapter 5), deregulation in U.S. regional banking policy (Chapter 4) and the continuous measures of the bank market (e.g., Lerner and HHI; Chapters 3 and 5). Finally, this study shows how corporate borrowers engage in earnings management over the banking market structure, and it offers an important practical factor in determining corporations' earnings quality. Overall, this study relates to the literature on bank market structure (e.g., Delis et al., 2017, Mi and Han, 2020, Tian et al., 2019) and earnings quality (earnings management) (e.g., Francis et al., 2005, Ball and Shivakumar, 2008, Liu, 2019).

This thesis has implications for studies of earnings quality, especially for lenders, policymakers and public investors. First, this thesis finds a solid relationship between bank market structure and corporations' earnings quality by considering the regional bank market structure (both competition ratios and policy change), and 1-to-1 matched effect. The finding could contribute to the literature regarding the determinants of choices in accounting practices (e.g., Ball and Shivakumar, 2008) and the theory of bank market structure (e.g., Mi and Han, 2020, Tian et al., 2019). Second, the main finding in this thesis is that firms increase their earnings quality in regions where banks have more market power. This finding would guide policymakers in their decisions about bank market regulation and M&A issues. Third, the finding can help investors. When firms are in concentrated bank markets or are linked with banks with market power, this can be a positive signal that these firms have high-quality earnings (especially in less accrual earnings management). Finally, this thesis finds that firms switch from accrual earnings management to real earnings management when a bank market is concentrated (banks have market power). The bank lenders should invest more resources in detecting real earnings management which could erode earnings predictability.

This thesis also has limitations. First, because of data restriction, this thesis focusses on the market structure of commercial banks. In practice, corporations can generate funds from other resources (e.g. investment banks, hedge funds and insurance

companies). Second, Chapter 3 tries to differentiate between the ‘screen and monitor channel’ and the ‘incentive channel’. I use a dummy variable (Poor_performance or Top_performance) to interact with the bank market structure, which is an indirect test. In this thesis, I emphasise only accrual earnings management and real earnings management. Other ratios of earnings quality, such as restatement and investors’ reaction to earnings (Dechow et al., 2010) have not been tested. I call for future research to cope with these limits.

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