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ACCOUNTING STANDARD-INDUCED REGULATORY CAPITAL MANAGEMENT: EVIDENCE FROM THE NEW LEASE ACCOUNTING STANDARD ASC 842

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Accounting Standard-Induced Regulatory Capital Management: Evidence from the New Lease Accounting Standard ASC 842

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Abstract

The new lease accounting standard, ASC 842, exerts a downward pressure on the regulatory capital ratio of U.S. banks due to the requirement to fully risk-weight capitalized operating lease assets for regulatory capital purposes. To mitigate regulatory risk associated with breaching or getting close to the regulatory minimum, banks may exercise discretion in adjusting their balance sheets, ex-post. Such a discretion may not align with regulators' expectations given the potential real economic implications. In this study, we examine whether and how U.S. banks manage their balance sheets to mitigate the potential adverse impact of ASC 842 on their regulatory capital ratios. Using a difference-in-differences design around the effective date of ASC 842, we find that ex-ante less capitalized banks shore up their Tier 1 capital ratio higher upon adoption of ASC 842, relative to better-capitalized banks, achieved primarily through a reduction in lending growth rather than an increase in shareholders' equity (ordinary share capital and retained earnings). Further results suggest that the cut in lending growth is accounted for by a reduction in the growth rates of real estate loans and loans to individuals, in line with banks shrinking their assets in compliance with the new rule. In the cross-section, the results (increase in Tier 1 ratio growth and decline in lending growth) are particularly pronounced among banks with higher levels of ex-ante operating lease commitments, consistent with a lease-induced regulatory capital management. Moreover, the results are stronger in banks that are riskier and those that pay higher dividends, ex-ante, but muted for advanced approaches banks relative to non-advanced approaches banks. Overall, the evidence in this study suggests that banks reveal prefer shrinking credit growth to raising equity levels in response to the new lease accounting standard, highlighting a potential unintended consequence of operating lease capitalization.

Keywords: ASC 842; Operating Lease Capitalization; Regulatory Risk; Regulatory Capital Management; Credit Growth

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Table of Contents

1. Introduction

Operating leases represent a substantial source of financing for entities.[1] Under codification ASC 840, operating leases are primarily disclosed as footnote items while capital leases are recognized on firms' balance sheets. Critics argue that such differential accounting treatment of leases creates a distortion where firms may exploit operating leases for related reporting benefits (Caskey & Ozel, 2019; Imhoff & Thomas, 1988) which exacerbates the opacity and lack of comparability of firms' underlying economic activities (Cornaggia et al., 2013; FASB, 2016; SEC, 2005).[2] In response, the Financial Accounting Stability Board (FASB) issued codification ASC 842 (under ASU No. 2016-02), which mandates the capitalization of all operating leases (except short term and variable leases) by recognizing a lease liability and a related right-of-use (ROU) asset on firms' balance sheet, in addition to the recognition of rental expense in the income statement (BIS, 2022; FASB, 2016).[3]

In its post-implementation review, the FASB issued calls for insights on the economic implications of the new lease accounting standard (Financial Accounting Standards Board, 2020). In this regard, a growing body of literature shows that adoption of ASC 842 is associated with a decrease in operating lease use (Chatterjee, 2020; Ma & Thomas, 2023), a substitution of operating leases with short term and variable leases (Yoon, 2021), and a decrease in investment (Chen et al., 2018). Similarly, other studies show that capitalization of operating leases is associated with negative stock returns (Milian & Lee, 2023), a reduction in firms' perceived credit risk (He et al., 2023), a decline in existing debt (Ferreira et al., 2022), an increase in firm-specific lease discounting rates (Binfarè et al., 2020), and an increase in loan spreads (Li et al., 2023). While these streams of studies examine the effect of the new lease standard on firm outcomes, evidence of its potential impact on banks remains unexplored. In this paper,

[1] For instance, banks are active users of operating leases primarily relating to their real estate branches, office space and equipment, vehicles, ATMs, and other fixed assets.

[2] Hidden in plain sight (https://www.cfo.com/risk-compliance/2005/08/hidden-in-plain-sight/).

[3] For U.S. public business entities (including banks) under GAAP, the new standard is effective for fiscal years beginning after December 15, 2018 (i.e., January 1, 2019), with an option to adopt earlier. For non-public business entities, the effective date is after December 15, 2021 (i.e., January 1, 2022).

we provide further insights on the real economic implications of operating lease capitalization by examining the extent to which banks manage their regulatory capital ratios in response to ASC 842.

Capitalization of operating leases can induce banks' capital management behavior through a regulatory channel (Cortés et al., 2020; De Jonghe et al., 2020; Gropp et al., 2019).[4] Under ASC 842, U.S. banks are required by regulators to risk-weight the related ROU asset at 100 percent for regulatory capital purposes (BIS, 2022; FFIEC, 2019).[5] That is, the ROU asset must be fully added to banks' total risk-weighted assets (the denominator in regulatory capital ratios). Moreover, the recognition of rental expense in the income statement remains unchanged under ASC 842, and hence retained earnings is not materially affected.[6] Thus, the addition of a ROU asset increases banks' total (and risk-weighted) assets whilst capital levels remain materially unchanged. Consequently, operating lease capitalization is expected to (mechanically) lower the regulatory capital ratios of most U.S. banks (Cornaggia et al., 2013), particularly those with substantial operating lease commitments prior to adoption of the new standard.[7]

For example, Comerica Incorporated expects that adding between $450 million to $ 550 million of leased assets to its balance sheet will lower its common equity tier 1 ratio between 8 to 10 basis points.[8] Similarly, Valley National Bancorp notes in its 2018 Form 10-K that recognizing ROU assets of approximately $216 million and operating lease obligation of $241 million is expected to negatively impact their total capital ratio by about 10 to 12 basis points and tier 1 capital ratio by approximately 7 to 9 basis points. Additionally, First Citizens Bancshares Incorporated indicates that capitalizing

[4] In this study, we use the terms "manage/management/managing" and "adjust/adjustment/adjusting" interchangeably.

[5] FAQs on treatment of ROU Asset (https://www.bis.org/press/p170406a.htm).

[6] To the extent that most US banks adopted ASC 842 using the modified retrospective approach, retained earnings may be affected by a cumulative effect adjustment in the quarter of adoption. However, most banks note in their 2018 Form 10-Ks that such adjustments to retained earnings (typically related to banks' deferred gains or losses on sale and lease-back transactions) were not material.

[7] Leasing standard ASC 842 creates notable changes for banks. (https://www.pinionglobal.com/leasing-standard-update-842-creates-changes-for-banks)

[8] https://www.sec.gov/Archives/edgar/data/28412/000002841218000146/cma-2018q210q.htm

approximately $70 million in ROU assets will adversely impact their regulatory capital ratios by 3 to 4 basis points.[9]

To circumvent regulatory pressures associated with minimum capital thresh holds and/or rebalance their regulatory capital ratios back to its desired level, banks may, in principle, manage their capital ratios upward either by increasing their regulatory capital levels through retained earnings or new equity issues (Cohen & Scatigna, 2016; De Jonghe & Öztekin, 2015) or by downsizing their risk-weighted assets via a reduction in lending growth (Bostandzic et al., 2022; Bridges et al., 2015; De Jonghe et al., 2020; Dou & Xu, 2021; Gropp et al., 2019), replacement of riskier (higher-weighted) loans with safer ones (Cortés et al., 2020), and selective asset sales (de-Ramon et al., 2022). Alternatively, banks may undertake a combinations of these responses (Bakkar et al., 2019; Cohen & Scatigna, 2016; de-Ramon et al., 2022).

While adjusting regulatory capital ratios through new equity issues will align with regulators' expectations (Hanson et al., 2011), shrinking risk-weighted assets, particular by running down on loans, will reflect an undesirable consequence of the new lease accounting standard given the potential effect on overall economic activity (Gropp et al., 2019; Juelsrud & Wold, 2020). This may particularly be the case when cutting credit supply becomes the dominant strategy among banks (Hanson et al., 2011). Similarly, banks may resort to accounting discretion over accruals by under-provisioning (over-provisioning) loan losses to increase retained earnings (Tier 2 capital through loan loss reserve add-backs), and hence regulatory capital levels (Barth et al., 2017; Beatty & Liao, 2014; Ng & Roychowdhury, 2014). This may compromise the essence of regulatory capital as a gatekeeper to the financial stability of banks given the potential deterioration in the quality thereof (Ng & Roychowdhury, 2014; Orozco & Rubio, 2018). To this end, whether and how banks adjust their regulatory capital ratios, following adoption of the new lease accounting standard, thus remains an open empirical question with potential policy implications.

To examine this question, we base our inference on the identifying assumption that banks that are less-capitalized prior to the adoption of ASC 842 have a stronger incentive

[9] See 2018 Form 10-K, First Citizens Bancshares Incorporated.

to adjust their regulatory capital ratios, relative to better-capitalized banks. Such an incentive may arise from an increase in regulatory risk (i.e., the probability of breaching or getting close to the regulatory minimum) and/or the need to rebalance regulatory capital ratios, which may have been distorted upon adoption, to desired levels. Accordingly, we analyze banks' standard-induced adjustment behavior in a difference-in-differences framework with ex-ante less-capitalized banks (those with below-median levels of Tier 1 ratio, based on 2018q4 values) as the treatment group and better-capitalized banks (banks with above-median Tier 1 ratio levels) as the control group.

Our empirical results show that ex-ante less-capitalized banks did indeed increase the growth rate of Tier 1 ratio more, relative to better-capitalized banks, in the post-adoption period, consistent with the former having a greater incentive to manage their balance sheet upon adoption. Examining the various paths of adjustment indicates that the increase in Tier 1 ratio growth is achieved primarily through a reduction in loan growth rather than an increase in the growth rate of shareholders' equity (ordinary share capital and retained earnings) or a selective sale of investment securities. Further analysis suggests that the reduction in credit growth is accounted for by a reduction in the growth rates of real estate loans (which typically have lower risk-weights) and loans to individuals (which usually have higher risk-weights), suggesting that treated banks reveal prefer shrinking their assets to re-balancing the risk profile of their portfolio and/or recalibrating their internal risk-weight models upon adoption. To validate this preceding evidence, we further show that (a) ex-ante less-capitalized banks experience a significant decline in risk-weighted assets growth (by about 1.5 percentage points) relative to better capitalized banks, yet (b) there is no significant difference in the risk-taking behavior between treatment and control banks ex-post, corroborating an asset shrinking argument rather than a risk-reduction behavior.

Next, we perform our main cross-sectional analysis based on banks' *as-if* capitalized future operating lease commitments. To the extent that fully risk-weighting capitalized operating lease commitments exerts a mechanical downward pressure on banks' regulatory capital ratio upon adoption, we expect the effect of the new lease standard to be stronger among treatment banks with substantial amounts of operating lease

commitments prior to adoption. Consistent with our conjecture of a standard-induced adjustment behavior, we find that the results (increase in Tier 1 ratio growth and decline in lending growth) are more pronounced for treatment banks with ex-ante above-median levels of *as-if* capitalized operating lease commitments. In additional cross-sectional tests, we find that the results are also stronger among treatment banks that are riskier and those that pay higher dividends, ex-ante, consistent with such banks having a stronger incentive to adjust their regulatory capital ratios, ex-post, due to a potential volatility-induced uncertainty and a heightened likelihood of payout restrictions, respectively. Moreover, we also find that the results are muted for advanced approaches banks (i.e., banks with at least $250 billion in assets or $10 billion in on-balance sheet foreign exposures, or those that elect to employ the advanced approaches framework) relative to non-advanced approaches banks, in line with anecdotal evidence which suggest that ASC 842 had little impact on the regulatory capital ratios of the former that are typically the largest U.S. banks with regulatory capital buffers far beyond the required minimum.

Our results are robust to the parallel trend assumption, a PSM-matched sample of treatment and control banks, the use of levels rather than growth rates of outcome variables, and an alternative definition of the treatment group. Overall, our results suggest that banks reveal prefer shrinking their level of risk-weighted assets to increasing shareholders' equity in the event of a standard-induced adjustment. Such an adjustment path runs contrary to regulators' expectations given its potential implications on real economic activity. In essence, our findings highlight an unintended consequence of the new lease accounting standard and provide support for recent calls to substantially reduce the assigned risk-weight to capitalized operating leases or eliminate the inclusion of operating lease assets in banks' risk-weighted assets for regulatory capital purposes.[10]

Our contribution to the existing literature is in three folds. First, while most studies largely focus on the effect of the new lease accounting standard, ASC 842, on non-

[10] Lease Accounting Rules Add to Bank Capital Woes: Topic 842 May Cause Credit Crunch in 2019 (https://www.monitordaily.com/article-posts/lease-accounting-rules-add-bank-capital-woes-topic-842-may-cause-credit-crunch-2019/).

financial firms (e.g., see Ferreira et al., 2022; Li et al., 2023; Ma & Thomas, 2021), we are the first to examine its direct impact on banks' behavior by investigating the capital management implications thereof. By so doing, we provide novel empirical evidence on the real effect of ASC 842 from an alternative perspective, providing additional insights that are potentially relevant to the FASB's post-implementation review process of ASC 842 and future accounting standards. For instance, whether banks should be required to fully risk-weight, partially risk-weight (10%, 20%, 50%, etc.), or zero-weight capitalized assets for regulatory capital purposes are potential policy insights which may be relevant for future standard setting.

Following the Office of the Controller of the Currency, Federal Deposit Insurance Corporation, and Federal Reserve Board's decision to require all U.S. banks to fully risk-weight operating lease assets for regulatory capital purposes, industry experts have openly expressed concerns that banks may be induced to meet the additional lease-induced capital requirement by running down on their loan portfolios. For instance, in a Monitor*daily* article, equipment leasing expert Bill Bosco notes "I predict the worldwide availability of bank lending will shrink by $2.6 trillion in 2019 when banks transition to the new lease accounting rules".[11] Yet, no formal empirical analysis in this regard exists to date. This study thus fills this gap by providing suggestive evidence consistent with ex-ante predictions by practitioners: banks most affected by the new lease accounting standard adjust their regulatory capital ratios by shrinking loan growth, ex-post.

Finally, we contribute to the existing literature that examines the balance sheet adjustment behavior of banks in response to changes in capital requirements. Existing studies typically focus on adjustment behaviors induced by system-wide (Gropp et al., 2019; Juelsrud & Wold, 2020) or bank-specific (Cortés et al., 2020; de-Ramon et al., 2022) capital requirements. In this paper, we examine an alternative trigger - an accounting rule change - which exerts a downward pressure on banks' regulatory capital ratios, inducing their balance sheet adjustment. By so doing, we add to a limited body of recent studies that examine the impact of statutory financial reporting standards on

[11] https://www.monitordaily.com/article-posts/lease-accounting-rules-add-bank-capital-woes-topic-842-may-cause-credit-crunch-2019/

financial institutions' regulatory capital management behaviors. Dong et al. (2022) examine the extent to which US life insurance companies manage their regulatory capital ratio upon adoption of Actuarial Guidelines 43.[12] They find that affected insurers shore up their regulatory capital ratio by ceding insurance coverage to captive insurance firms and delaying other-than-temporary impairment of investment securities. Similarly, Dou et al. (2018) find that banks that capitalized significant amounts of securitized off-balance sheet assets related to their variable interest entities (VIEs) upon adoption of SFAS 166/167 tend to circumvent the additional capital requirements by reducing mortgage approval rates.[13] In a later study, Dou & Xu (2021) show that such banks also increase loan spreads and reduce loan amounts, upon adoption of SFAS 166/167.

The remainder of the paper proceeds as follows. **Section 2** presents the institutional background while **Section 3** introduces the related literature and develops the hypothesis; **Section 4** discusses the empirical design; **Section 5** presents the empirical results; and **Section 6** offers the concluding remarks.

2. Institutional Background

Under the Statement of Financial Accounting Standards No. 13 (SFAS 13), *Accounting for Leases*, codified as ASC 840, *Leases*, a lessee can designate a lease as either a capital lease or an operating lease conditional on meeting a set of four criteria, commonly referred to as the "bright line tests": (a) the lease transfers ownership of the asset to the lessee at the end of the lease term, (b) the lease includes a bargain purchase option that allows the lessee to purchase the asset, (c) the lease term exceeds 75 percent of the asset's useful life, and (d) the present value of the minimum lease payment is over 90 percent of the asset's fair value. In the event of a lease failing to meet all of these criteria, the lessee must designate the lease as an operating lease. For financial reporting

[12] The provisions of Actuarial Guideline (AG) 43 increased the reserves on insurers' variable annuities thus increasing the size of their balance sheet liabilities and decreasing their surplus (which forms part of the numerator of their regulatory capital ratio (i.e., available capital)). AG 43 thus exerts a downward pressure on insurance firm's regulatory capital ratios.

[13] SFAS 166/167 required US banks to consolidate the assets and related loan reserves of their variable interest entities (VIEs) effective as of January 2010. Regulators further required consolidating banks to fully risk-weight the consolidated assets for regulatory capital purposes, thus exerting a downward pressure on the regulatory capital ratios of such banks.

purposes, under ASC 840, capital leases were akin to debt-financing purchases whereas operating leases were akin to rental agreements.

In effect, an asset and a corresponding liability is recognized in the balance sheet for capital leases whilst operating lease liabilities were only disclosed as footnote items (besides the recognition of an expense in the income statement) over the lease term. Critics of ASC 840 thus argued that such a differential accounting treatment of leases allowed managers to exploit operating leases for related reporting benefits (Caskey & Ozel, 2019; Imhoff & Thomas, 1988). For instance, a lessee can opportunistically structure a lease transaction such that the lease term falls right below the 75 percent threshold (say 74 percent of the asset's useful life) and by so doing, avoids recognizing a liability in the balance sheet. In this regard, economically similar lease transactions will be treated differently by different firms, thus exacerbating the opacity and incomparability of accounting information (Cornaggia et al., 2013; FASB, 2016; SEC, 2005; Weidner, 2017).

In response, the FASB issued ASC 842 (under ASU No. 2016-02), which overhauled ASC 840. ASC 842 became effective for public business entities (both financial and non-financial) in fiscal years beginning after December 15, 2018, with an option to adopt early.[14] The main innovation of the new lease accounting standard, ASC 842, is that lessees are now required to recognize a right-of-use operating lease asset and a corresponding lease liability in the balance sheet, in addition to recognizing a rental expense in the income statement for operating leases.[15] Moreover, ASC 842 maintains the four bright line tests under ASC 840 but applies such tests in a more principle-based framework.[16]

For regulatory capital purposes, the Office of the Controller of the Currency, Federal Deposit Insurance Corporation, and Federal Reserve Board additionally mandates all

[14] For private entities, the effective date for adoption is after December 15, 2021.

[15] Under ASC 842, leases are now classified as either a finance lease or operating lease. Finance leases are the same as capital leases under ASC 840 and treated in the same fashion. Also, lessees do not have to capitalize operating leases with a lease term of 12 months or less and variable leases.

[16] In addition to the pre-existing 4 criteria of recognition under ASC 840, ASC 842 adds a fifth criterion under which a lease is designated as a finance lease if the leased asset is of a specialized nature such that it will have no other use to the lessor at the end of the lease term.

U.S. banks to fully risk-weight the capitalized operating lease right-of-use asset (BIS, 2022; FFIEC, 2019). The implication is that U.S. banks will need to add the full value of the right-of-use asset in their calculations of risk-weighted assets (the denominator in banks' regulatory capital ratios). Given that ASC 842 has no effect on the income statement (i.e., recognition of operating lease rentals in the income statement remained unchanged under ASC842), banks' level of regulatory capital (numerator in regulatory capital ratios) remains unchanged.[17] Coupled with the fact that U.S. banks are heavy users of operating leases, primarily for their real estate branch offices, ATMs, and office equipment, capitalization of operating leases is expected to exert a downward pressure on the regulatory capital ratios of most U.S. banks, thus posing a potential increase in regulatory risk (Argimón et al., 2018).[18]

To mitigate regulatory pressures associated with breaching minimum capital requirements and/or rebalance their capital ratios towards desired levels, banks may seek to manage their regulatory capital ratios upward by either increasing the level of regulatory capital through new equity issues or retaining more earnings or by shrinking risk-weighted assets through a reduction in lending growth, portfolio rebalancing, or selective sale of assets. Given the potential financial stability and real economic repercussions of each of the foregoing available adjustment options, examining whether and how banks manage their regulatory capital ratios, upon adoption, is imperative.

3. Literature Review and Hypothesis Development

The question of whether banks do adjust their capital ratios has been extensively explored in the literature and the results are largely consistent. Existing studies examine a partial adjustment framework which assumes an optimal (target) capital ratio towards which banks constantly adjust. Particularly, these studies estimate banks' target capital ratios and examine the speed of adjustment towards this target (Berger et al., 2008; De

[17] Regulatory capital typically includes common equity, retained earnings, accumulated other comprehensive income, hybrid instruments, and loan loss reserves.

[18] For many banks, adding leases could alter balance sheets by $1B or more. (https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/for-many-banks-adding-leases-could-alter-balance-sheets-by-1b-or-more-49081634).

Jonghe et al., 2020; Francis & Osborne, 2010; Memmel & Raupach, 2010). In this regard, Berger et al. (2008) finds that U.S. publicly listed bank holding companies actively manage their capital by setting target capital ratios and making periodic adjustments towards such targets. This result was also observed in later studies such as De Jonghe & Öztekin (2015); Francis & Osborne (2010); and Memmel & Raupach (2010), who focus on a sample of global banks, UK banks, and German banks, respectively.

Banks' regulatory capital management may be induced by sudden increases in loan losses which depletes their capital or changes in bank-specific (de-Ramon et al., 2022) and system-wide regulatory capital requirements (Gropp et al., 2019). In each respective case, the incentive to adjust may derive from the need to achieve banks' own desired (target) capital ratios and/or circumvent regulatory pressures associated with deviating (getting close) from (to) the required regulatory minimum. Another potential source of adjustment, which remains largely underexplored, is an accounting rule change. In this study, we examine how the new lease accounting standard, ASC 842, affects banks' regulatory capital management behavior.

The new standard requires U.S. banks to capitalize previously disclosed operating leases by recognizing a right of use (ROU) asset and lease liability. Moreover, banks are required to fully risk-weight the ROU asset for regulatory capital purposes. Given that banks' level of regulatory capital remains materially unchanged upon adoption of the new standard, we expect a significant downward pressure on key regulatory capital ratios of most U.S. banks, particularly ex-ante less-capitalized banks with substantial amounts of operating leases prior to adoption. In response, plausibly to minimize regulatory pressure associated with getting close to or breaching minimum requirements, banks may seek to adjust their capital ratios upward either by shrinking their level of risk-weighted assets (i.e., *a denominator effect*) or shoring up their level of regulatory capital (i.e., *a numerator effect*), and/or both (i.e., *a mixed effect*).

Shrinking risk-weighted assets can be achieved by running down the loan portfolio or slowing down lending growth, replacing riskier loans with safer ones (portfolio re-balancing), selling investment securities (particularly, available-for-sale securities with

accumulated unrealized gains), and disposing off non-core assets. In the foregoing regard, Gropp et al. (2019) examines the responses of EU banks to higher capital requirements by exploiting the 2011 European Banking Authority's capital exercise as a quasi-natural experiment.[19] They find that affected banks increased their core tier 1 capital ratios by reducing their risk-weighted assets and not by increasing equity levels. Further results show that affected banks shrink risk-weighted assets primarily by reducing lending to corporate and retail borrowers. Gropp et al. (2019)'s result aligns with Bostandzic et al. (2022); Bridges et al. (2015); De Jonghe et al. (2020);and Dou & Xu (2021), who document a similar effect on bank lending.

In related studies, Cortés et al. (2020) finds that banks affected by stress-test induced increases in capital requirements tend to re-allocate credit away from riskier markets towards safer ones (i.e., rebalance their loan portfolio), consistent with Juelsrud & Wold (2020) who find that Norwegian banks increased capital ratios, following Norway's implementation of the Basel III accord, by substituting high risk assets (e.g., corporate loans) for relatively low risk assets (e.g., household loans). The effect of such a re-balancing strategy is that it reduces banks' average loan risk-weights and hence, the total value of risk-weighted assets for credit risk, all else equal. In effect, the bank's regulatory capital ratio mechanically trickles up.

Beyond cutting back on loan growth or rebalancing the loan portfolio, selectively disposing off investment securities remains a plausible option to reduce the level of risk-weighted assets, particularly because investment securities constitute a major portion of banks' risk-weighted assets after loans (Beatty & Liao, 2014). To manage regulatory capital ratios, banks typically exploit the accounting treatment of such securities by selling non-zero weighted securities (e.g., non-agency sponsored mortgage-backed securities), particularly available-for-sale securities, with unrealized fair value gains.[20]

[19] The 2011 EBA capital exercise required a set of EU banks to increase and maintain their core tier 1 capital ratio from 5% to 9% by the end of June 2012. A total of 61 banks were affected by this capital exercise.

[20] Under the Accounting Standard Codification (ASC) 320, US banks are required to classify their securities holdings in three broad categories: trading, held-to-maturity (HTM), and available-for-sale (AFS). For measurement subsequent to initial recognition, trading securities are measured at fair value through net income; HTM securities are measured at historical cost, with changes in fair values only

Doing so has the combined effect of taking such securities out of the stock of credit risk-weighted assets (i.e., a positive denominator effect) as well as moving the realized gain from accumulated-other-comprehensive-income to net income (i.e., a positive numerator effect).[21]

For instance, Orozco & Rubio (2018) find that banks selectively sell available-for-sale securities with unrealized fair value gains to exceed the 10% capitalization threshold introduced by the FDIC Act of 1991, consistent with Barth et al. (2017) who show that less-capitalized US banks manage their total capital ratio by realizing gains on available-for-sale securities. Taken together, the preceding evidence implies that in response to the downward pressure on the regulatory capital ratios of U.S. banks, following adoption of the new lease standard, banks are likely to adjust their balance sheet by shrinking their risk-weighted assets, leading to the following hypothesis:

H1: *Following adoption of ASC 842, banks adjust their regulatory capital ratios by shrinking their risk-weighted assets.*

As an alternative tool in the list of available options, banks may shore up the level of regulatory capital by either issuing additional common equity or retaining earnings. In this sense, Cohen & Scatigna (2016) document that banks from both advanced and emerging economies manage their post-2008 financial crisis regulatory capital ratios primarily through retained earnings rather than via sharp adjustments in risk-weighted assets. They show that lower dividend payouts and higher loan spreads are the main channels banks use to boost up retained earnings.[22] In a related vein, De Jonghe &

disclosed; AFS securities are measured at fair value through accumulated other comprehensive income (AOCI). This implies that, fair value gains or losses on AFS securities can only be recognized in net income when such securities are sold or when their impairment is sufficiently deemed other that temporary. Unlike AFS securities, HTM securities can not be readily sold since doing so will taint a bank's entire HTM portfolio with a 2-year moratorium typically imposed on classifying future securities as HTM. Only under specific scenarios, known as the safe harbor conditions, can a bank sell HTM securities. This includes when the security is very close to maturing; when the sale occurs under an event that is isolated, non-recurring, unanticipated, and unusual for the reporting entity, etc.

[21] This approach will only yield a positive numerator effect, i.e. increase the level of regulatory capital, only for non-advanced approaches banks since such banks do not include accumulated-other comprehensive income in regulatory capital.

[22] It is imperative to note that a spread strategy may work best when all other banks are keen on increasing loan spreads to boost capital levels, i.e., if there is a cartel behavior. This is important because if only a

Öztekin (2015) find that under-capitalized banks from economies with developed capital markets (including the US) achieve recapitalization mainly by issuing new ordinary equity relative to liquidating assets

Besides issuing additional equity, cutting dividends, or increasing loan spreads, banks may also increase regulatory capital levels by exercising accounting discretion over loan loss provisioning and securities sales (Barth et al., 2017; Beatty & Liao, 2014; Ng & Roychowdhury, 2014). For instance, under-provisioning loan losses has the direct effect of increasing CET 1 capital through a mechanical increase in retained earnings. This is particularly effective if banks view Tier 1 capital (which includes CET 1 and AT1 capital) as the target. If total capital (Tier 1 plus Tier 2 capital) is rather the target, banks can equally increase loan loss reserves by over-provisioning loan losses. In this case, Tier 1 capital reduces by the extent of the decrease in net income (due to over-provisioning) but the full effect of the decrease is mitigated by the add-back of loan loss reserves in Tier 2 capital (Ng & Roychowdhury, 2014). The overall effect, all else equal, is a potential increase in banks' total regulatory capital level.

As mentioned earlier, selectively selling AFS securities with unrealized fair value gains could also be used by banks to increase regulatory capital levels as long such gains are not already included in regulatory capital through AOCI (Barth et al., 2017). The foregoing evidence and discussion suggests that adjusting regulatory capital ratios by increasing shareholders' equity, following adoption of ASC 842, remains a plausible path. Accordingly, we formulate the corresponding prediction as follows:

H2: *Following adoption of ASC 842, banks adjust their regulatory capital ratios by increasing shareholders' equity (i.e., the level of regulatory capital).*

We acknowledge that the path of adjustment depends on the cost and benefits of each alternative and hence, it is not unreasonable to expect that banks may adopt a mix of options, upon adoption of ASC 842. Indeed, Bakkar et al. (2019) finds that in an

few banks employ such an approach, borrowing firms have a stronger incentive to switch banks, rendering the approach less-attractive to banks. Also, a substantial body of evidence show that banks are reluctant to cut dividends due to the strong signaling effect of dividend cuts to deposits and shareholder (e.g., see Acharya et al., 2011; Floyd et al., 2015). To the extent that shrinking dividends is perceived to send negative signals to depositors and other financiers, banks may be unwilling to opt for dividend cuts.

attempt to achieve their target capital ratios, under-capitalized banks de-lever by an aggressive growth reduction in loans and other assets, but at the same time, raise external capital. According to this supporting evidence, banks may employ a mixed strategy in adjusting their capital ratios upon adoption of the new lease accounting standard.

4. Research Design

4.1 Sample and Data

In this study, we obtain a sample of U.S. public bank holding companies, spanning 2015q1 to 2019q4, using the PERMCO-RSSD link table from the Federal Reserve Bank of New York. We begin our sample period in 2015q1 to rule out the impact of prior regulations such as the Dodd-Frank Act and the Basel III capital framework. We restrict the period to 2019q4 to directly exclude the potential impact of the Covid-19 pandemic and the Current Expected Credit Loss (CECL) model adoption on banks' adjustment behavior (e.g., see Anani & Elwasify, 2023; Chen et al., 2022). Data for the analysis is primarily retrieved from the Bank Regulatory Database (WRDS) and supplemented with information from banks' FR Y-9C - Consolidated Financial Statements for Bank Holding Companies. One useful piece of data that we employ in our analysis is banks' future operating lease commitments. Because this data is only found in disclosures prior to the adoption of the new lease standard and major databases such as Compustat and Bank Regulatory (WRDS) do not have information on banks' pre-adoption and post-adoption operating lease commitments, we hand-collect this data from banks' form 10-K and 10-Q.

To be included in the sample, we require sample banks to have at least two quarters of data both before and after the effective date of ASC 842. Given that our sample period ends in 2019q4, we exclude 3 bank holding companies with a November-October and December-November calendar year-end. Such banks will adopt the new standard in a period beginning in 2020 (which straddles the Covid-19 period and may thus be confounded). We also exclude banks that adopted the standard early and banks with missing disclosed operating lease data. Finally, we exclude banks with missing observations on key regression variables including total assets, Tier 1 capital ratio, deposits, and common equity capital. The above process leads to a final sample of 297 publicly traded bank holding companies, of which 149 are treatment banks and 148 are

in the control group.

4.2 Model Specification

Banks' regulatory capital ratio can be simplified as shown in **Eq. (1):**

$$Regulatory\ capital\ ratio = \frac{C}{RWA} \quad (1)$$

where C denotes banks' regulatory capital level and RWA is banks' risk-weighted assets. By taking the natural logarithm and first difference of **Eq. (1)**, we obtain a direct relationship between changes in banks' regulatory capital ratio, regulatory capital level, and risk-weighted assets as follows:

$$\Delta\, Ln(Regulatory\ capital\ ratio_t) = \Delta\, Ln(C_t) - \Delta\, Ln(RWA)_t \quad (2)$$

The expression in **Eq. (2)** implies that banks can increase the growth in regulatory capital ratio by either increasing regulatory capital growth or reducing the growth in risk-weighted assets (see Juelsrud & Wold, 2020). For our analysis, we focus on banks' Tier 1 capital ratio (i.e., the LHS of **Eq. (1)**) given that it constitutes banks' core capital ratio which is of most significance to banks and regulators (Beatty & Liao, 2014). Tier 1 capital (numerator in Tier 1 capital ratio) consists of Common Equity Tier 1 (CET1) capital plus Additional Tier 1 (AT1) capital. CET1 capital is made up of banks' ordinary share capital, share premiums, retained earnings, and accumulated other comprehensive income (AOCI) (if the bank is an advanced approaches banks), whereas AT1 capital consists of contingent convertibles (CoCos) or hybrid securities, noncumulative, nonredeemable preference shares, and minority interest.

We narrow our analysis to banks' ordinary share capital (CE) and retained earnings (RE) as constituents of C in **Eq. (2).** Our choice is informed by the fact that ordinary share capital and retained earnings constitute banks' core (highest quality) capital and hence are most likely to be the candidates for adjustment. In terms of banks' risk-weighted assets (RWA), we focus our attention on two key components: loans (L) and investment securities (IS). These two form a major portion of banks' risk-weighted assets (Beatty & Liao, 2014) and therefore most likely to be altered in the event of banks' balance sheet adjustment. Given these decompositions, we can now rewrite **Eq. (2)** as follows:

$$\Delta\, Ln(Tier\ 1\ ratio_t) = \Delta\, Ln\, C_t(CE, RE) - \Delta\, LnRWA_t(L, IS) \quad (3)$$

In the first part of our analysis, we examine whether U.S. banks adjust (increase) their Tier 1 ratio upon adoption of ASC 842. To do this, we employ a difference-in-differences estimation technique that examines the differences in the growth rates of Tier 1 ratio between treatment banks and control banks upon adoption of the new lease standard. Our identifying assumption is that banks that are weakly-capitalized/less-well capitalized prior to adoption of ASC 842 are most likely to have a stronger incentive to adjust their regulatory capital ratios upon adoption since operating lease capitalization will most likely draw the capital ratios of such banks much closer to the regulatory minimum, relative to ex-ante better capitalized banks. Accordingly, we define our treatment group as less-capitalized banks (based on Tier 1 capital ratio) and identify the control group as better-capitalized banks, prior to adoption. Following prior literature (e.g, see Gropp et al., 2019; Juelsrud & Wold, 2020), we specify the following static difference-in-differences model:

$$\Delta\, Ln(Tier\ 1\ ratio_{it}) = \beta_1 + \beta_2 Treat_i \times ASC\_842_t + \sum_{k=3}^{K} \beta_k X_{ki,t} + \theta_i + \theta_t + \varepsilon_{it} \quad (4)$$

$\Delta\, Ln\ Tier\ 1\ ratio_{it}$ is the growth rate in Tier 1 ratio for bank i in quarter t; $Treat_i$ is the treatment group indicator which equals 1 for banks below the median Tier 1 ratio (in 2018q4) and 0 otherwise;[23] ASC_842_t is the indicator for the post-adoption period which is coded as 1 from 2019q1 onward and 0 otherwise; We set the quarter of adoption to 2019q1 given that ASC is effective for fiscal years commencing after December 15, 2018; Following prior literature (Cortés et al., 2020; De Jonghe & Öztekin, 2015; Gropp et al., 2019; Juelsrud & Wold, 2020; Ng & Roychowdhury, 2014), we include a set of bank-quarter control variables represented as $X_{ki,t}$; θ_i and θ_t are bank and quarter fixed effects, respectively; ε_{it} is the error term;[24] The coefficient of interest is β_2 which

[23] We use the median as our defining threshold because most of the banks in our sample have a Tier 1 ratio above the required level of 6 percent. Given the serious implications of violating regulatory capital, most banks maintain a buffer above the regulatory minimum (Amel-Zadeh et al., 2017; Barth et al., 2017). The level to use is therefore an empirical issue.

[24] We cluster standard errors at the bank level.

captures the differences in Tier 1 ratio growth rates between treatment and control banks before and after the adoption of ASC 842; If banks shore up their regulatory capital ratio upon adoption of ASC 842, we expect β_2 to be significantly positive.

Next, we examine in detail how banks adjust the various components of Tier 1 ratio and risk-weighted assets following adoption of the new lease accounting standard (i.e., we now focus on the RHS of **Eq. (3)**). Accordingly, we extend the specification in **Eqn.4**. with the dependent variables of interest as the growth rates in ordinary share capital (CE), retained earnings (RE), loans (Loan), and investment securities (IS). We specify the following equations, with $\mathrm{Y_{it}} = \mathrm{f}\,(\mathrm{CE_{it}}, \mathrm{RE_{it}}\,, \mathrm{Loan_{it}}, \mathrm{IS_{it}})$:

$$\Delta\, Ln(Y_{it}) = \beta_1 + \beta_2 Treat_i \times ASC\_842_t + \sum_{k=3}^{K} \beta_k\, X_{ki,t} + \theta_i + \theta_t + \varepsilon_{it} \qquad (5)$$

If banks adjust Tier 1 capital ratio, upon adoption of ASC 842, by issuing new equity and/or retaining earnings (i.e., increasing shareholders' equity or regulatory capital levels) we expect β_2 to be significantly positive when $\mathrm{Y_{it}} = \mathrm{f}\,(\mathrm{CE_{it}}, \mathrm{RE_{it}}\,)$. However, if banks shore up Tier 1 capital ratio by running down on loan growth and/or selectively selling investment securities (i.e., shrinking risk-weighted assets), we predict β_2 is significantly negative when $\mathrm{Y_{it}} = \mathrm{f}\,(\,\mathrm{Loan_{it}}, \mathrm{IS_{it}})$.

4.3 **Descriptive Statistics**

Table 1 presents the summary statistics of variables employed in the regressions. To control for potential outliers in the data, all continuous variables are winsorized at the 1st and 99th percentile of their distribution. The mean (median) Tier 1 ratio is 13.705 (12.588) percent, which suggests that the average bank in our sample holds a buffer above the minimum required Tier 1 ratio of 6 percent. The mean (median) growth rate of Tier 1 ratio (Δ *Ln (Tier 1 ratio)*) is -0.001(0.001). Size is the natural logarithm of total assets with a mean (median) of 15.831 (15.461).

The mean (median) operating lease commitment (*Op_Lease*) for the full sample of 0.027 (0.004) implies that, on average, banks' pre-adoption levels of operating lease commitments represent 2.7 percent (0.4 percent) of their total assets. In terms of observable average differences between the treatment and control group, ex-ante less-capitalized banks tend to be bigger and less-liquid, relative to ex-ante better-capitalized banks. Moreover, less-capitalized banks tend to advance more loans (as a proportion of

total assets) and have relatively lower values of pre-adoption level operating lease obligations (as a proportion of total assets).

5. Empirical Results

5.1 Baseline Analysis

5.1.1 Regulatory Capital Adjustment (Table 2)

In **Table 2**, we present empirical results for **Eq. (4**) in which we test whether banks shore up their regulatory capital ratio upon adoption of the new lease accounting standard. Consistent with our expectations, we find that ex-ante less-capitalized banks adjust their tier 1 ratio higher than better-capitalized banks upon adoption of ASC 842, as indicated by the significantly positive coefficient on $Treat_i \times ASC\_842_t$ in all columns of **Table 2**. Specifically, the fully parameterized result in Column 3 suggests that ex-ante less-capitalized banks have, on average, about one percentage point higher growth in tier 1 ratio in the post adoption period, relative to better-capitalized banks, consistent with our conjecture of the former having a stronger incentive to manage their regulatory capital ratios upon adoption.

In comparison, the increase in the growth of tier 1 ratio we document is about three times that of Berger et al.'s (2008) estimate that US bank holding companies tend to adjust their tier 1 capital ratio by approximately 35 basis points, on average. Similarly, our results are close to the estimate of Gropp et al. (2019) who find that EU banks affected by the European Banking Authority's 2011capital exercise adjusted their core tier 1 ratio by 1.86 percentage points higher, relative to unaffected banks. Overall, the results we document are economically meaningful in that banks significantly adjusted their tier 1 ratio capital ratio following adoption of the new lease accounting standard.

5.1.2 Adjustment Paths (Table 3)

Our next set of results present evidence on the various channels of adjustment of banks' Tier 1 ratio. For this analysis, we focus on banks' ordinary share capital (*CE*) and retained earnings (*RE*) as constituents of banks' regulatory capital level (i.e., the numerator); loans (*Loan*) and investment securities (*IS*) as constituents of banks' risk-weighted assets (i.e., the denominator). **Table 3** shows the results of estimates based on **Eq. (5).** Results using the growth in ordinary share capital Δ *Ln(CE)* and retained earnings Δ *Ln(RE)* as the dependent variables are presented in Columns 1 and 2,

respectively. The results indicate that there is no statistically significant difference in the growth rates of ordinary share capital and retained earnings, respectively, between treatment and control banks in the post-adoption period. Columns 3 and 4 reports results using the growth in loans Δ *Ln(Loan)* and investment securities Δ *Ln(IS)*, respectively.

Column 3 shows that less-capitalized banks had on average approximately one (1) percentage point lower growth in outstanding loans relative to better-capitalized banks, in the post-adoption period. The difference is statistically significant at the 1 percent level. A back-of-the envelope calculation shows that, with the standard deviation of loan growth at 0.067 (un-tabulated), the co-efficient on Δ *Ln(Loan)* implies that less-capitalized banks reduced loan growth by approximately 15% ((0.010/0.067)*100) of its standard deviation, an economically meaningful impact. We, however, find no evidence of a selective sale of investment securities in the post-adoption period (Column 4).

Overall, the results in **Table 3** suggest that banks reveal prefer shrinking their level of risk-weighted assets (through a reduction in credit growth) to increasing the growth in shareholders' equity upon adoption of the new lease accounting standard. This result is consistent with that of Dou & Xu (2021) who finds that banks required to risk-weight capitalized off-balance sheet securitized assets (which were previously disclosed) under SFAS 166 and 167, cut back on lending and raise spreads, relative to unaffected banks, in the post-implementation period. However, unlike Dou & Xu (2021), we examine a wide range of banks' adjustment paths beyond loans, thus providing a comprehensive understanding of banks' plethora of options in the event of a standard-induced adjustment.

5.1.3 **Asset Shrinking and Risk Reduction (Table 4 and 5)**

Given the different risk weights assigned to different categories of loans for regulatory capital purposes (i.e., some loan categories are deemed riskier than others), the observed reduction in credit growth may either reflect a reduction in risk (i.e., portfolio rebalancing), recalibration of internal risk-weight models (particularly for advanced approaches banks), or simply highlight pure asset shrinking (Gropp et al., 2019). If the first two channels hold, then we should observe a decrease in the growth of commercial and industrial loans (Δ *Ln(C&I loans)*) and individual loans (Δ *Ln(IDV*

loans)), which typically have higher risk-weights, and a corresponding increase in the growth rate of real-estate loans (Δ *Ln(RE loans)*) and agricultural loans (Δ *Ln(Agric loans)*), which have relatively lower risk weights, coupled with a reduction in the growth of average risk weights (total risk-weighted assets/total assets). On the other hand, if less-capitalized banks engage in asset shrinking rather than risk reduction or model recalibration, then we should observe a reduction in the growth of outstanding loans of different categories, while growth in average risk weights (Δ *Ln(Avg. Risk Weight)*) remain unchanged.

We test these possibilities by estimating **Eq. (5)** with the dependent variables as the growth rates in the indicated loan categories above and banks' average risk weights. The evidence provided in **Table 4** suggests that the reduction in outstanding loan growth is accounted for by a reduction in the growth of both outstanding real estate loans (column 1) and household (individual) loans (column 2). Columns 2, 3, and 4 of **Table 4** show that there is no statistically significant difference in the growth of outstanding commercial and industrial loans, agricultural loans, and average risk weights, respectively, between treatment and control banks. In sum, these results tend to be consistent with an asset shrinking argument rather than risk reduction.

We further validate the preceding results by performing two additional tests. If the above conclusion is valid, then we expect to observe an overall reduction in the growth of risk-weighted assets (which is simply average risk weights multiplied by total assets) with no significant change in banks' risk-taking. We proceed by examining changes in banks' growth in risk-weighted assets (Δ *Ln(Risk Weighted Assets)*) and two measures of risk-taking - Z-score (*Z_score*) and growth in non-performing loans (Δ *Ln(Non-Performing Loans)*). We present the results in **Table 5.** Column 1 shows a statistically significant reduction in the growth of risk-weighted assets for treated banks relative to banks in the control group. Specifically, less-capitalized banks reduce risk-weighted assets growth by approximately 1.5 percentage points compared to better-capitalized banks in the post adoption period. On the other hand, Columns 2 and 3 of **Table 5** show that there is no observed statistically significant difference in risk-taking between less capitalized and better capitalized banks. The coefficient on $Treat_i \times ASC_t$ is negative

and insignificant in both columns. Overall, the above results corroborate our findings in **Table 4** above.

5.2 Cross-Sectional Analyses

5.2.1 Operating Lease Intensity (Table 6)

Our baseline results test the identifying assumption that the effect of the new lease accounting standard on banks' capital adjustment behavior depends on their prevailing capital ratios prior to adoption. That is, ex-ante less-capitalized banks are the ones expected to have the strongest incentive to shore up their regulatory capital ratios upon adoption. Moreover, to the extent that fully risk-weighting capitalized operating lease commitments mechanically exerts a downward pressure on banks' regulatory capital ratios, we expect that less-capitalized banks with substantial levels of ex-ante (future) operating lease commitments will have a greater incentive to manage their existing regulatory capital ratios in the post-adoption period. To test this conjecture, we proceed in two ways.

First, we attempt to estimate the *as-if* capitalized amounts of banks' operating lease commitments using hand-collected data on disclosed future minimum operating lease payments as of 2018 year-end. The implicit assumption here is that banks will eventually capitalize all lease commitments existing as of 2018 year-end upon adoption of ASC 842 in 2019q1. Our assumption is premised on the idea that since most banks' operating leases relate to their office buildings and equipment, which form a core infrastructure for their operations, it is not unreasonable to assume that banks may not necessarily shut down branch offices or halt the usage of equipment just to comply with the new standard. Doing so will be suboptimal given the potential adverse effect on operations.

Following Cornaggia et al. (2013), we estimate banks' *as-if* capitalized operating lease commitments using the equation below:

$$Op\_Lease = \sum_{t=1}^{5} \frac{MLP_t}{(1+r)^t} + \sum_{t=6}^{q+6} \frac{BMLP_t}{(1+r)^t} \quad (6)$$

where r is the bank-specific implicit interest rate which we estimate as total interest expense over total liabilities (mainly including deposits and subordinated debt) based on 2018q4 values. MLP is the disclosed minimum operating lease payments over the next five years as of 2018 year-end; q = disclosed thereafter minimum operating lease

payments/MLP_5; and $BMLP$ = disclosed thereafter minimum operating lease payments / q.

Next, we split our sample into two groups based on the median value of Op_Lease. Banks above the median are assigned to the *High* group , otherwise they are assigned to the *Low* group . We then re-estimate Eq. (4) for each sub-sample and present the results in **Panel A** of **Table 6**. The coefficient for banks in the high operating lease group (*Coeff*=0.012) in Column (1) of Table 6 is larger than for banks in the low group (*Coeff*=0.010) in Column (2), and the difference in coefficients is significant. This result is in line with our conjecture that less-capitalized banks with substantial amounts of ex-ante lease commitments have a greater incentive to shore up their regulatory capital ratios upon adoption, consistent with a standard-induced adjustment behaviour.

For consistency, we present results for loan growth in a similar fashion as above. We report the results in Columns (3) and (4) of **Table 6** Panel A. The results show that the reduction in credit growth following the adoption of ASC 842 is driven by treated banks in the high group, corroborating our earlier findings. In **Panel B** of **Table 6**, we test the sensitivity of the above results to the use of an alternative discounting rate. In this regard, we follow Cornaggia et al. (2013) and set r in Eq. (6) to 10%. Overall, our inferences remains unchanged in this regard.

5.2.2 **Risk-taking (Table 7)**

A key theoretical prediction is that excessive risk-taking is associated with significant volatility in banks' earnings, thus exposing shareholders' equity to an increased likelihood of losses (Hellmann et al., 2000; Repullo, 2004; Repullo & Suarez, 2004). Coupled with the increase in banks' level of risk-weighted assets (denominator in regulatory capital ratios) upon adoption of ASC 842, regulatory capital ratio could shrink substantially in the likely event where excessive bank risk-taking yields significant net losses than gains given the potential material reduction in the level of regulatory capital (numerator in regulatory capital ratios) induced by the associated decline in net income. In this sense, riskier banks tend to be exposed to a higher degree of uncertainty in their regulatory capital ratios, ex-ante. To circumvent any potential regulatory risk associated with significant declines in regulatory capital ratios upon adoption, we thus expect that banks that are relatively riskier will have a stronger

incentive to adjust their regulatory capital ratios.

We measure banks' ex-ante risk-taking using the standard deviation of interest income (Sd_Income). We then partition the sample into *High* and *Low* groups based on median values of Sd_Income. The results are reported in **Table 7**. The coefficient for banks in the high-risk group (0.012) in Column (1) of **Table 7** is larger than for banks in the low-risk group (0.007) in Column (2), and the difference is significant at the 5% level. The results suggest that banks with the most volatile earnings, potentially due to excessive risk-taking, tend to have a stronger incentive to shore up their regulatory capital ratios ex-post. In Columns (3) and (4) where we present the results for loan growth, we continue to obtain evidence consistent with our conjecture.

5.2.3 **Capital Distribution (Table 8)**

Due to the strong signaling effect of dividends to depositors and shareholders, banks reveal-prefer keeping dividend payments stable rather than shrinking them (Acharya et al., 2011). This fact is highlighted by existing evidence which suggests that banks prefer to maintain or sometimes increase dividend payments even when doing so might be suboptimal (Acharya et al., 2011; Brav et al., 2005). In this sense, regulators tend to constrain bank payouts when they believe a banks' loss absorbing capacity may be potentially impaired following a payment (Fabrizi et al., 2021). This is typically the case when a bank is less-capitalized or draws closer to a regulatory or bank-specific capital threshold. To the extent that the new lease accounting standard shrinks banks' regulatory capital ratios, we expect that ex-ante less-capitalized banks that pay relatively higher dividends (hereafter, dividend-paying banks) will have a stronger incentive to adjust their regulatory capital ratios to mitigate potential regulatory restrictions on future capital distributions due to a likely lease-induced capital deficiency, upon adoption.

We test our prediction in the cross-section by splitting our sample based on banks' ex-ante levels of the median dividends on ordinary share, defined as ordinary share dividends scaled by the book value of total equity (see Chronopoulos et al., 2022; Luu et al., 2023; Onali, 2014) - *Dividends*. We place banks with above median levels of *Dividends* in the *High* group, otherwise they are assigned to the *Low* group. We report the results in **Table 8**. As shown in Columns (1) to (4) of **Table 8**, the effects are more pronounced among dividend-paying banks, consistent with our conjecture.

5.2.4 **Regulatory Structure (Table 9)**

Anecdotal evidence suggests that the new lease accounting standard had no impact on the regulatory capital ratios of the largest U.S. banks. For example, JPMorgan Chase & Co. and Bank of America Corporation, both of which are advanced approaches (hereafter "AA") banks (i.e., banks with at least $250 billion in assets or $10 billion in on-balance sheet foreign exposures, or those that elect to employ such advanced approaches), expect no material effect on their regulatory capital ratios upon adoption.[25][26] On the other hand, non-advanced approaches (hereafter "non-AA") banks such as Comerica Incorporated expect about an 8 to 10 basis points decrease in their regulatory capital upon adoption. Similarly, Fifth Third Bancorp, a non-advanced approaches bank, expects the new lease standard to exert a significant downward pressure on its pre-adoption regulation capital ratios.

Based on the foregoing, we expect treatment banks that are advanced approaches banks to have a lower incentive to adjust their regulatory capital ratios in the post-adoption period. In other words, we expect the results to be more pronounced for non-advanced approaches banks, relative to advanced approaches banks. Accordingly, we re-estimate Eq. (4) and Eq. (5) separately for AA banks and non-AA banks in **Table 9**.[27] Consistent with our reasoning, we find that the main result is particularly concentrated among non-AA banks.[28] The documented effect could possibly be explained by the notion that AA banks, being the largest U.S banks, tend to enjoy an implicit government guarantee and hence face a lower regulatory burden. In effect, such banks have a lower incentive to adjust their regulatory capital ratios, relative to non-AA banks who do not enjoy such protection (Fiechter et al., 2017).

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[25] See: For Many Banks, Adding Leases Could Alter Balance Sheets by $1B or More. (https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/for-many-banks-adding-leases-could-alter-balance-sheets-by-1b-or-more-49081634)

[26] Under the current provisions of the Economic Growth, Regulatory Relief, and Consumer Protection Act (EGRRCPA), effective as of December 31st, 2019, advanced approaches banks include the 8 global systemically important banks (GSIBs) and non-GSIBs with at least $700 billion in consolidated total assets or $75 billion in foreign exposures, or if the bank elects to use the advanced approaches.

[27] We identify advanced approaches and non-advanced approaches banks based on banks' FR Y-9C data item "BCHAP83" as of 2018q4.

[28] We only present the loan growth results with respect to Eq. (2) given the results related to the other adjustment paths continue to remain insignificant.

5.2.5 **Additional Cross-Sectional Tests**

To ensure that our cross-sectional tests reflect the effect of adopting the new lease accounting standard rather than capturing alternative explanations, we re-perform the tests in **Tables 7, 8,** and **9** by conditioning on banks' ex-ante operating lease commitments. In each of the additional (cross-sectional) tests, we partition our sample based on banks with above-median values of both *Sd_Income* and *Op_Lease*, *Dividends* and *Op_Lease*, and are *Non-AA banks* with above-median values of *Op_Lease*. Such banks are grouped under the "*High*" subsample, otherwise they are assigned to a subsample we label as "*Others*".

As an example, the "*High*" group with respect to banks' risk-taking behavior will include banks with both above-median values of *Sd_Income* and *Op_Lease*, while the "*Others*" group consists of a combination of banks with below-median values of both *Sd_Income* and *Op_Lease*, below-median values of *Sd_Income* but above-median values of *Op_Lease*, or above-median values of *Sd_Income* but below-median values of *Op_Lease*. If our identifying assumption holds and, if our reasoning backing the cross-sectional tests reflects the effect of the new lease accounting standard, then we expect the results, in all cases, to be concentrated in the "*High*" group relative to the "*Others*" group. The results, presented in **Appendix Tables A2 to A4**, support the empirical validity of the original cross-sectional tests in Tables 7, 8, and 9.

5.3 **Robustness**

5.3.1 **Propensity Score Matching**

One major concern is that our results may be potentially driven by systematic differences in characteristics between treatment and control banks rather than capturing the effect of the new lease accounting standard. This is a valid concern as **Table 1** shows that treatment and control banks tend to differ on various bank-specific characteristics, on average. Moreover, even though including bank-specific controls in our regressions may alleviate the above concerns, there is still a chance that our models do not correctly specify the relation between our outcomes and these bank-specific controls **(**i.e., functional form misspecification). In that case, our models may have insufficiently adjusted for such controls thus biasing our estimates (Shipman et al., 2017)**.**

To ensure that less-capitalized and better-capitalized banks are similar across bank-

specific covariates and reduce bias related to functional form misspecification, we employ the propensity score matching (PSM) technique. Specifically, we employ a kernel-based propensity score matching, with common support, based on observed pre-adoption levels of bank size (*Size*), return on assets (*ROA*), and liquidity (*Liquid*), to identify comparable control groups for treated banks.[29] We set a kernel bandwidth of 0.06 of the estimated propensity score difference between treatment and control banks.

We assess the quality of our matching process by performing a univariate test for differences in means across covariates between treatment and control banks before and after the matching. We present the results in **Table 10, Panel A**. Panel A shows that after matching, the differences between treatment and control banks are statistically insignificant across all observable covariates. The implication is that our matching process significantly achieved a great degree of balance between the two groups. In **Panel B** of **Table 10**, we present estimation results of the PSM-matched sample for Eq. (4) and (5). The results suggest that our inferences remain unchanged when we use propensity score matching.[30]

5.3.2 **Parallel Trend Assumption**

Next, we propose a dynamic difference-in-differences design to test for the assumption that treatment and control banks exhibit similar trends in outcomes prior to adoption of ASC 842. The specification provides preliminary evidence on the treatment effect dynamics across the observation window (i.e., 2015q1 to 2019q4). The model is specified as follows, where:

$\Delta\, Ln(Z_{it}) = f\ (Tier\ 1\ ratio_{it}, CE_{it}, RE_{it}\ , Loans_{it}, IS_{it})$*:*

[29] Kernel-based propensity score matching assigns weights to observations of the control group using a kernel function. For each treated bank, the kernel function assigns weights to control banks based on the difference in the propensity scores. The bandwidth specified determines the extent to which weights are assigned. In our matching process, we assign a smaller bandwidth of 0.06 to ensure more weight is assigned to control banks who are closer in propensity scores to banks in the treatment group. The idea under kernel matching is thus very similar to the other PSM techniques such as nearest-neighbor or interval matching.

[30] In unreported tables, our inferences remain unchanged when we re-perform our matching estimations with an entropy-balanced sample of the treatment and control group in the first moment of pre-adoption values of covariates.

$$\Delta\, Ln\,(Z_{it}) = \beta_1 + \beta_{-3} Treat_i \times I\{Y_t \leq -3\} + \sum_{y=-2}^{3} \beta_y Treat_i \times I\{Y_t = y\} + \sum_{k=1}^{K} \beta_k X_{ki,t} + \theta_i + \theta_t + \varepsilon_{it} \quad (7)$$

β_{-3} is the single co-efficient for far leads. Y_t are the relative quarters from adoption of the new lease standard, $Y_t = t - 2019q1$; The observation window runs from 2015q1 to 2019q4, whereas the event window is restricted to be within the interval [-3; +3]; Dummies at the left extreme of the event window, i.e., $Y_t \leq -3$, are assigned a value of 1; and 2018q4 is set as the omitted category, following standard practice in the literature.

The point estimates, based on a 95 percent confidence interval, from Eq. (7) are presented graphically in **Figure 1**. In the pre-ASC 842 period, there is no significant difference in the growth rate of Tier 1 ratio, common equity, retained earnings, loans, and investment securities between less-capitalized and better capitalized banks. Point estimates, in this regard, are insignificant and close to zero.

We however observe an emerging trend from the quarter of adoption of ASC 842. There is a sharp increase in the growth rate of Tier 1 ratio in the quarter of adoption, which suggests that less-capitalized banks tend to adjust their Tier 1 regulatory capital ratio higher than better-capitalized banks, ex-post. As expected, the effect is only transitory as seen by the positive but insignificant coefficients in relative quarters 1 and 2, after which the effect re-emerges in relative quarter 3.

In terms of banks' adjustment paths, we observe no significant difference in post-adoption changes in the growth rates of ordinary share equity, retained earnings, and investment securities between less-capitalized and better-capitalized banks. Instead, we observe a clear downward trend in the growth rate of outstanding loans in the post-adoption period. That is, less-capitalized banks tend to have a significantly lower growth rate in loans following adoption of ASC 842, consistent with our main results. Interestingly, the treatment effect dynamics of the growth rate in loans mirrors that of the growth rate in Tier 1 ratio (i.e., a sharp decline in the quarter of adoption)

corroborating our argument that banks reveal prefer shrinking loan growth in the event of a standard-induced adjustment. Overall, the parallel trend results in **Figure 1**, generally support a causal interpretation of our main results.

5.3.3 Levels and Alternative Treatment Group Definition

Next, we test the robustness of our results to the use of levels rather than change in Tier 1 ratio, ordinary equity, retained earnings, loans, and investment securities. We present results for the dynamic specification in **Figure 2**. In sum, the results do not deviate from our inferences. Finally, we examine the sensitivity of our results to an alternative definition of our treatment group. Specifically, we re-define our treatment banks as those in the lowest 2 deciles of the Tier 1 ratio distribution in 2018q4. We present the results in **Table 11**. Overall, our inferences remain unchanged.

6. Conclusion

In its effort to ensure improved comparability and transparency of operating lease recognition, the FASB issued ASC 842, which mandates all lessees to capitalize previously disclosed operating lease commitments by recognizing an asset and a corresponding liability on their balance sheet. An additional requirement for banks is that capitalized operating lease assets should also be fully risk-weighted for regulatory capital purposes, upon adoption of the new standard. Industry experts argue that such a mandate could trigger banks to adjust their balance sheets in ways that may yield negative real economic effects. In this vein, this study examines whether, and most importantly, how banks manage their regulatory capital ratios following adoption of ASC 842.

We find that banks most affected by the new lease accounting standard – ex-ante less capitalized banks – adjust their Tier 1 ratio higher, relative to better-capitalized banks, by cutting back on loan growth rather than issuing new equity, retaining earnings, or selling investment securities. This finding is consistent with Dou & Xu (2021) who document that banks required to fully risk-weight capitalized securitized assets under SFAS 166 and 167 tend to run down on their loan portfolio to meet the capital shortfall, but contrary to studies that show that banks shore up their level of shareholders' equity rather than shrink lending in response to bank-specific or system-wide higher capital

requirements (Cohen & Scatigna, 2016; De Jonghe & Öztekin, 2015; Memmel & Raupach, 2010).

Our results thus suggest that banks reveal-prefer running down on their loan portfolio in the event of a standard-induced adjustment. Such a preference, consistent with ex-ante expert predictions about the likely impact of ASC 842, may not align with regulators' expectations given its potential to slow down overall economic activity. Perhaps, regulators could re-consider the full risk-weight applied to capitalized operating leases probably by applying differential weights based on the substance of specific operating lease arrangements, e.g., bankruptcy liquidation implication, rather than their mere form.

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Table 1

Summary Statistics

		Full Sample					Less-capitalized Banks			Better-capitalized Banks		
Variables	N	Mean	Median	St.D	Min	Max	N	Mean	Median	N	Mean	Median
Panel A: Adjustment Variables												
Tier 1 ratio	5940	13.705	12.588	4.071	8.919	34.508	2980	11.533	11.433	2960	15.892***	14.532***
Δ *Ln (Tier 1 ratio)*	5643	-0.001	0.001	0.051	-0.480	0.644	2831	-0.003	0.000	2812	0.000**	0.002***
CE	5643	0.010	0.000	0.024	0.000	0.121	2831	0.009	0.000	2812	0.011***	0.001***
RE	5643	0.058	0.058	0.038	-0.039	0.175	2831	0.053	0.051	2812	0.063***	0.064***
Loans	5643	0.696	0.724	0.154	0.153	0.982	2831	0.749	0.749	2812	0.643***	0.679***
IS	5643	0.193	0.171	0.114	0.003	0.656	2831	0.163	0.153	2812	0.224***	0.200***
RE loans	5643	0.478	0.499	0.193	0.002	0.910	2831	0.511	0.525	2812	0.444***	0.456***
IDV loans	5643	0.044	0.013	0.080	0.000	0.535	2831	0.045	0.014	2812	0.042	0.012***
C&I loans	5643	0.121	0.099	0.085	0.000	0.436	2831	0.141	0.123	2812	0.102***	0.077***
Agric loans	5643	0.010	0.001	0.021	0.000	0.120	2831	0.011	0.001	2812	0.009***	0.001
Panel B: Control Variables												
Size	5940	15.831	15.461	1.535	13.404	21.359	2980	15.904	15.599	2960	15.758***	15.360***
ROA	5643	0.007	0.006	0.004	0.000	0.024	2831	0.007	0.006	2812	0.007	0.006
Liquid	5643	0.052	0.036	0.046	0.008	0.266	2831	0.043	0.033	2812	0.060***	0.041***
Loans_Deposits	4755	0.892	0.906	0.210	0.232	1.542	2427	0.935	0.933	2328	0.847***	0.869***
LLR growth	5346	-0.011	-0.003	0.091	-3.139	1.081	2682	-0.012	-0.003	2664	-0.010	-0.004
Panel C: Other Variables												
Op_Lease	5320	0.027	0.004	0.114	0.000	1.344	2679	0.021	0.004	2641	0.033***	0.004***
RWA_TA	5940	0.747	0.763	0.119	0.375	0.984	2980	0.797	0.802	2960	0.696***	0.716***
Z_score	5605	1.565	1.569	1.194	-1.149	4.661	2819	1.528	1.536	2786	1.603**	1.606***
Non-Performing Loans	5508	0.006	0.004	0.008	0.000	0.059	2772	0.005	0.005	2736	0.007***	0.004***
Sigma_Int Income	5346	0.011	0.010	0.004	0.004	0.026	2682	0.011	0.011	2664	0.011	0.010***
Dividend	5433	107.414	0.548	608.714	0.000	5318.182	2829	112.418	0.663	2604	101.978	0.487**

Notes: This table presents descriptive statistics for the full sample and univariate tests for differences in means and medians of estimation variables between treatment and control banks. *, **, and *** denote statistical significance in the means and medians of comparing samples at the 10%, 5%, and 1% levels, respectively. To control for outliers, all continuous variables are winsorized at the 1st and 99th percentile of their distribution. Variable definitions are presented in Appendix Table A1.

Table 2

ASC 842 and Adjustment of Tier 1 ratio

Variables	(1)	(2)	(3)
	Δ *Ln(Tier 1 ratio)*	Δ *Ln(Tier 1 ratio)*	Δ *Ln(Tier 1 ratio)*
*Treat*ASC_842*	0.008***	0.008***	0.010***
	(3.120)	(2.820)	(2.961)
Size		-0.015*	-0.028***
		(-1.950)	(-3.330)
Liquid		0.036	0.046
		(0.672)	(0.873)
ROA		0.478*	1.954***
		(1.744)	(3.223)
Loans_Deposits		-0.002	-0.009
		(-0.090)	(-0.368)
LLR_growth		-0.025	-0.028
		(-1.236)	(-1.420)
Constant	-0.010***	0.230**	0.436***
	(-3.292)	(2.016)	(3.269)
Observations	5,643	4,323	4,323
Adj. R^2	0.011	0.004	0.018
Bank FE	Yes	Yes	Yes
Quarter FE	Yes	No	Yes

Notes: This table reports estimation results for Eq. (4) in which we examine whether banks adjust their Tier 1 ratio upon adoption of the new lease accounting standard. The dependent variable of interest is the growth rate in banks' Tier 1 ratio. The growth rate for $quarter\ t$ denotes the (approximate) percentage change from $quarter\ t-1$ to $quarter\ t$. t-statistics, based on robust standard errors clustered by bank, are in parentheses. *. **, and *** represent statistical significance at the 10%, 5%, and 1% levels respectively.

Table 3

ASC 842 and Channels of Regulatory Capital Management

Variables	(1)	(2)	(3)	(4)
	Δ *Ln(CE)*	Δ *Ln(RE)*	Δ *Ln(Loan)*	Δ *Ln(IS)*
*Treat*ASC_842*	0.002	-0.013	-0.010***	-0.008
	(0.161)	(-1.577)	(-2.755)	(-1.044)
Size	0.011	-0.002	0.040***	0.035*
	(0.354)	(-0.097)	(4.280)	(1.820)
Liquid	0.316**	0.146*	0.199***	0.170
	(2.535)	(1.897)	(2.950)	(1.447)
ROA	4.819*	10.125***	1.852***	3.148***
	(1.874)	(3.883)	(3.215)	(3.005)
Loans_Deposits	0.068	0.012	0.137***	-0.227***
	(1.095)	(0.317)	(4.580)	(-3.628)
LLR_growth	0.620***	0.402***	0.412***	0.466***
	(3.918)	(6.618)	(5.558)	(6.237)
Constant	-0.296	-0.029	-0.766***	-0.392
	(-0.622)	(-0.096)	(-5.138)	(-1.310)
Observations	3,997	4,134	4,323	4,323
Adj. R^2	0.042	0.071	0.244	0.106
Bank FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes

Notes: This table reports estimation results for Eq. (5) in which we examine the various paths of banks' Tier 1 ratio adjustment upon adoption of ASC 842. The dependent variables in columns 1 and 2 are the growth rates in ordinary share capital and retained earnings, respectively; the dependent variables in columns 3 and 4 are the growth rates in outstanding loans and investment securities, respectively. Accordingly, columns 1 and 2 capture banks' regulatory capital management via shareholders' equity (numerator effect) whilst columns 3 and 4 reflect regulatory capital management through risk-weighted assets (denominator effect). The growth rate for $quarter\ t$ denotes the (approximate) percentage change from $quarter\ t-1$ to $quarter\ t$. *t*-statistics, based on robust standard errors clustered by bank, are in parentheses. *. **, and *** represent statistical significance at the 10%, 5%, and 1% levels respectively.

Table 4

Regulatory Capital Management and Asset Shrinking

Variables	(1)	(2)	(3)	(4)	(5)
	Δ Ln(RE loans)	*Δ Ln(IDV loans)*	*Δ Ln(C&I loans)*	*Δ Ln(Agric loans)*	*Δ Ln(Avg. Risk Weight)*
*Treat*ASC_842*	-0.016***	-0.028**	-0.003	0.006	0.001
	(-3.194)	(-2.300)	(-0.319)	(0.214)	(0.532)
Size	0.055***	0.035	0.034*	-0.023	-0.014**
	(3.648)	(1.290)	(1.683)	(-0.444)	(-2.254)
Liquid	0.436***	0.602**	0.111	0.154	-0.547***
	(3.538)	(2.492)	(0.945)	(0.351)	(-13.533)
ROA	2.490*	0.344	3.322***	6.793*	-0.570*
	(1.752)	(0.234)	(3.509)	(1.808)	(-1.909)
Loans_Deposits	0.139***	-0.009	0.101*	-0.068	-0.001
	(2.915)	(-0.113)	(1.726)	(-0.315)	(-0.044)
LLR_growth	0.485***	0.656***	0.530***	0.524***	-0.005
	(6.282)	(6.083)	(4.598)	(5.226)	(-0.385)
Constant	-1.015***	-0.580	-0.652**	0.394	0.251***
	(-3.912)	(-1.327)	(-2.004)	(0.504)	(2.691)
Observations	4,323	4,234	4,275	3,124	4,323
Adj. R^2	0.207	0.067	0.097	0.025	0.176
Bank FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes

Notes: In this table we examine the extent to which the observed reduction in credit growth reflects banks' asset shrinkage or risk reduction. Δ *Ln(RE loans)* is the growth in real estate loans; Δ *Ln(IDV loans)* is the growth in loans to households; Δ *Ln(C&I loans)* is the growth in commercial and industrial loans; Δ *Ln(Agric loans)* is the growth in agricultural loans; and Δ *Ln(Avg. Risk Weight)* is the growth in average risk weights. The growth rate for $quarter\ t$ denotes the (approximate) percentage change from $quarter\ t-1$ to $quarter\ t$. *t*-statistics, based on robust standard errors clustered by bank, are in parentheses. *. **, and *** represent statistical significance at the 10%, 5%, and 1% levels respectively.

Table 5

Validation Test: Regulatory Capital Management and Asset Shrinking

Variables	(1)	(2)	(3)
	Δ Ln(Risk Weighted Assets)	*Z_score*	*Δ Ln(Non-Performing Loans)*
*Treat*ASC_842*	-0.015***	-0.072	-0.037
	(-3.350)	(-1.585)	(-1.650)
Size	0.081***	-0.005	0.146***
	(5.715)	(-0.031)	(3.855)
Liquid	0.248***	0.739	-0.459
	(3.674)	(1.360)	(-1.295)
ROA	0.829*		-0.566
	(1.871)		(-0.155)
Loans_Deposits	0.086***	-0.596	0.086
	(3.296)	(-1.468)	(0.756)

LLR_growth	0.067***	0.408**	0.502***
	(3.063)	(2.469)	(2.971)
Constant	-1.348***	2.524	-2.386***
	(-5.999)	(0.984)	(-4.118)
Observations	4,323	4,285	4,188
Adj. R^2	0.055	0.738	0.012
Bank FE	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes

Notes: In this table we validate the extent to which the observed reduction in credit growth reflects banks' asset shrinkage rather than risk reduction. Δ *Ln(Risk Weighted Assets)* is the growth in risk-weighted assets; *Z_score* is banks' Z-score; and Δ *Ln(Non-Performing Loans)* is the growth in non-performing loans. The Z-score model in column 2 does not include the control for *ROA* because the latter is included in the computation of the former, which makes the two mechanically correlated. The growth rate for $quarter\ t$ denotes the (approximate) percentage change from $quarter\ t-1$ to $quarter\ t$. *t*-statistics, based on robust standard errors clustered by bank, are in parentheses. *. **, and *** represent statistical significance at the 10%, 5%, and 1% levels respectively.

Table 6

Regulatory Capital Management and Operating Lease Commitments

Panel A: Lease intensity based on a bank-specific implicit discount rate

Dependent Variable:	Δ *Ln(Tier 1 ratio)*		Δ *Ln(Loan)*	
	(1)	(2)	(3)	(4)
Op_Lease	High	Low	High	Low
*Treat*ASC_842*	0.012**	0.010**	-0.017**	-0.008
	(2.242)	(1.982)	(-2.555)	(-1.296)
p-value of diff. in coefficients	**0.024**		**0.010**	
Size	-0.049**	-0.037***	0.094***	0.068***
	(-2.523)	(-2.783)	(3.891)	(4.482)
Liquid	0.122	-0.047	0.110	0.283***
	(1.620)	(-0.723)	(1.139)	(3.196)
ROA	2.049**	1.862	1.254	3.282***
	(2.577)	(1.637)	(1.520)	(3.410)
Loans_Deposits	-0.018	0.007	0.165***	0.127***
	(-0.413)	(0.212)	(3.863)	(2.710)
LLR_growth	-0.039**	-0.017	0.459***	0.372***
	(-2.312)	(-0.487)	(9.966)	(2.750)
Constant	0.760**	0.576***	-1.618***	-1.236***
	(2.490)	(2.653)	(-4.183)	(-4.911)
Observations	1,960	2,094	1,960	2,094
Adj. R^2	0.025	0.011	0.295	0.214
Bank FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes

Panel B: Lease intensity based on a flat 10 percent discount rate for all banks

	(5)	(6)	(7)	(8)
Op_Lease	High	Low	High	Low
*Treat*ASC_842*	0.014***	0.011**	-0.020***	-0.007
	(2.637)	(2.138)	(-2.925)	(-1.260)
p-value of diff. in coefficients	**0.008**		**0.010**	
Size	-0.051***	-0.036***	0.093***	0.066***
	(-2.633)	(-2.750)	(3.900)	(4.279)
Liquid	0.124	-0.036	0.121	0.269***

	(1.638)	(-0.557)	(1.227)	(3.073)
ROA	2.010**	2.015*	1.334	3.169***
	(2.536)	(1.805)	(1.609)	(3.294)
Loans_Deposits	-0.019	0.015	0.162***	0.121**
	(-0.450)	(0.474)	(3.832)	(2.581)
LLR_growth	-0.040**	-0.017	0.462***	0.369***
	(-2.389)	(-0.481)	(10.005)	(2.724)
Constant	0.785***	0.562**	-1.603***	-1.189***
	(2.614)	(2.587)	(-4.198)	(-4.710)
Observations	1,947	2,107	1,947	2,107
Adj. R^2	0.025	0.013	0.295	0.210
Bank FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes

Notes: This table presents cross-sectional results of our baseline based on banks' ex-ante as-if capitalized operating lease commitments (*Op_Lease*). Banks with above median levels of *Op_Lease* are categorized in the *High* group, otherwise they are categorized under the *Low* group. Panel A shows cross-sectional results for Tier 1 growth *(*Δ *Ln(Tier 1 ratio)*) and Loan growth (Δ *Ln(Loan)*) in which *Op_Lease* is computed based on a bank-specific implicit discount rate defined as total interest expense over total liabilities. Panel B presents results for *Op_Lease* computed based on a flat rate of 10 percent for all banks. The growth rate for $quarter\ t$ denotes the (approximate) percentage change from $quarter\ t-1$ to $quarter\ t$. Differences in the coefficients of Treat*ASC are reported. *t*-statistics, based on robust standard errors clustered by bank, are in parentheses. *. **, and *** represent statistical significance at the 10%, 5%, and 1% levels respectively.

Table 7

Regulatory Capital Management and Risk-Taking Behavior

Dependent Variable:	Δ *Ln(Tier 1 ratio)*		Δ *Ln(Loan)*	
	(1)	(2)	(3)	(4)
Sd_Income	High	Low	High	Low
*Treat*ASC_842*	0.012**	0.007*	-0.012**	-0.006
	(2.200)	(1.748)	(-2.369)	(-1.105)
p-value of diff. in coefficients	**0.027**		**0.017**	
Size	-0.036***	-0.022*	0.030***	0.044***
	(-3.335)	(-1.677)	(2.805)	(2.929)
Liquid	0.127*	-0.049	0.095	0.293***
	(1.814)	(-0.598)	(1.353)	(2.647)
ROA	2.453***	1.471**	1.981**	1.227
	(2.853)	(1.992)	(2.555)	(1.556)
Loans_Deposits	0.032	-0.042	0.124***	0.143***
	(1.016)	(-1.052)	(4.073)	(3.024)
LLR_growth	0.002	-0.060***	0.298***	0.530***
	(0.071)	(-4.379)	(2.662)	(10.757)
Constant	0.485***	0.382*	-0.591***	-0.848***
	(2.854)	(1.888)	(-3.673)	(-3.335)
Observations	2,174	2,149	2,174	2,149
Adj. R^2	0.020	0.026	0.156	0.342
Bank FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes

Notes: This table presents cross-sectional results of our baseline based on banks' ex-ante risk-taking. Risk taking is measured as the standard deviation of banks' interest income (*Sd_Income*). Banks with above median levels of *Sd_Income* are categorized in the *High* group, otherwise they are categorized under the *Low* group. The growth rate for $quarter\ t$ denotes the (approximate) percentage change from $quarter\ t-1$ to $quarter\ t$. *t*-statistics, based on robust standard errors clustered by bank, are in parentheses. *. **, and *** represent statistical significance at the 10%, 5%, and 1% levels respectively.

Table 8

Regulatory Capital Management and Capital Distribution Behavior

Dependent Variable:	Δ *Ln(Tier 1 ratio)*		Δ *Ln(Loan)*	
	(1)	(2)	(3)	(4)
Dividends	High	Low	High	Low
*Treat*ASC_842*	0.015***	0.007	-0.012**	-0.008
	(3.300)	(1.142)	(-2.169)	(-1.251)
p-value of diff. in coefficients	**0.001**		**0.029**	
Size	-0.014	-0.038**	0.044***	0.038***
	(-1.320)	(-2.578)	(2.922)	(2.765)
Liquid	0.060	0.069	0.193*	0.261***
	(0.774)	(0.816)	(1.894)	(2.807)
ROA	1.248*	2.347***	1.847**	1.916**
	(1.693)	(2.929)	(2.213)	(2.006)
Loans_Deposits	-0.013	-0.010	0.164***	0.133***
	(-0.453)	(-0.183)	(3.968)	(2.958)
LLR_growth	0.008	-0.045***	0.312**	0.496***
	(0.271)	(-2.723)	(2.310)	(10.530)
Constant	0.221	0.570**	-0.869***	-0.711***
	(1.280)	(2.608)	(-3.528)	(-3.311)
Observations	2,010	1,975	2,010	1,975
Adj. R^2	0.012	0.021	0.162	0.327
Bank FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes

Notes: This table shows cross-sectional results of our baseline based on banks' ex-ante dividend paying behavior. Banks with above median levels of *Dividends* (i.e., high dividend paying banks*)* are categorized in the *High* group, otherwise they are categorized under the *Low* group. The growth rate for $quarter\ t$ denotes the (approximate) percentage change from $quarter\ t-1$ to $quarter\ t$. *t*-statistics, based on robust standard errors clustered by bank, are in parentheses. *. **, and *** represent statistical significance at the 10%, 5%, and 1% levels respectively.

Table 9

Regulatory Capital Management, Advanced Approaches and Non-Advanced Approaches Banks

Dependent Variable:	Δ *Ln(Tier 1 ratio)*		Δ *Ln(Loan)*	
	(1)	(2)	(3)	(4)
Regulatory Structure	Non-AA	AA	Non-AA	AA
*Treat*ASC_842*	0.010***	0.003	-0.010**	-0.001
	(2.828)	(0.387)	(-2.534)	(-0.158)
p-value of diff. in coefficients	**0.005**		**0.011**	
Size	-0.033***	0.049	0.044***	0.046
	(-3.772)	(1.217)	(4.497)	(0.555)
Liquid	0.054	-0.227	0.208***	0.183
	(0.998)	(-1.642)	(2.961)	(1.373)
ROA	1.987***	-0.028	1.903***	1.351
	(3.165)	(-0.026)	(3.135)	(1.549)
Loans_Deposits	-0.013	-0.047	0.150***	-0.018
	(-0.513)	(-0.446)	(4.972)	(-0.157)
LLR_growth	-0.028	-0.053	0.416***	0.285***
	(-1.383)	(-0.897)	(5.449)	(4.080)
Constant	0.497***	-0.919	-0.824***	-0.950

	(3.706)	(-1.135)	(-5.390)	(-0.555)
Observations	4,071	252	4,071	252
Adj. R^2	0.020	0.135	0.247	0.161
Bank FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes

Notes: This table presents cross-sectional tests based on advanced-approaches (AA) and non-advanced approaches (non-AA) banks. AA banks (prior to December 31st, 2019) are defined as those with at least $250 billion in assets or $10 billion in on-balance sheet foreign exposures, or those that elect to employ such advanced approaches. Non-AA banks are those that do not meet the above thresholds. We identify AA and non-AA banks based on banks' FR Y-9C data item "BCHAP83" as of 2018q4. The growth rate for $quarter\ t$ denotes the (approximate) percentage change from $quarter\ t-1$ to $quarter\ t$.*t*-statistics, based on robust standard errors clustered by bank, are in parentheses. *. **, and *** represent statistical significance at the 10%, 5%, and 1% levels respectively.

Table 10

Robustness: PSM-Matched Sample

Panel A: Quality of matching

Variables		Treat	Control	Diff	*t*-statistics
Size	Unmatched	16.073	15.859	0.214	1.23
	Matched	16.051	16.014	0.037	0.22
Liquid	Unmatched	0.039	0.057	-0.018	-3.65
	Matched	0.039	0.040	-0.001	-0.17
ROA	Unmatched	0.012	0.012	0.000	-0.51
	Matched	0.012	0.012	0.000	-0.13
Loans_Deposits	Unmatched	0.952	0.874	0.078	3.19
	Matched	0.953	0.904	0.049	1.15
LLR_growth	Unmatched	-0.004	-0.003	-0.001	-0.08
	Matched	-0.004	-0.003	-0.001	-0.07

Panel B: Matched-sample estimation results

Variables	(1)	(2)	(3)	(4)	(5)
	Δ *Ln(Tier 1 ratio)*	Δ *Ln(CE)*	Δ *Ln(RE)*	Δ *Ln(Loan)*	Δ *Ln(IS)*
*Treat*ASC_842*	0.019***	-0.017	-0.003	-0.011**	-0.007
	(4.306)	(-1.446)	(-0.358)	(-2.019)	(-0.766)
Size	-0.027***	0.006	-0.017	0.039***	0.020
	(-2.795)	(0.192)	(-1.167)	(4.151)	(1.105)
Liquid	0.059	0.327**	0.151*	0.213***	0.248
	(0.946)	(2.512)	(1.831)	(2.620)	(1.198)
ROA	1.456**	5.336*	9.821***	2.140***	4.228***
	(2.431)	(1.968)	(3.507)	(3.420)	(3.081)
Loans_Deposits	-0.026	0.093	-0.013	0.144***	-0.288***
	(-0.833)	(1.334)	(-0.385)	(3.347)	(-3.143)
LLR_growth	-0.024	0.635***	0.402***	0.413***	0.469***
	(-1.167)	(3.817)	(6.182)	(5.145)	(5.824)
Constant	0.433***	-0.246	0.226	-0.757***	-0.106
	(2.785)	(-0.520)	(1.008)	(-4.814)	(-0.375)
Observations	4,134	3,808	3,945	4,134	4,134
Adj. R^2	0.016	0.043	0.072	0.243	0.095
Bank FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes

Notes: This table presents results of estimation of both Eq. (4) and Eq. (5) using a PSM-matched sample of ex-ante less-capitalized (treatment group) and better-capitalized banks (control group). Matching is based on pre-ASC levels of bank size, return on assets, and liquidity. Panel A reports the quality of the matching algorithm by showing the differences in the mean of bank covariates for the unmatched sample and matched sample in the pre-adoption period (i.e., 2018q4). Differences in mean values and *t*-statistics are also reported. Panel B presents re-estimates of the baseline results (i.e., column (3) in Table 2 and all columns in Table 3) with the PSM-matched sample. The growth rate for $quarter\ t$ denotes the (approximate) percentage change from $quarter\ t-1$ to $quarter\ t$. *t*-

statistics, based on robust standard errors clustered by bank, are in parentheses. *. **, and *** represent statistical significance at the 10%, 5%, and 1% levels respectively.

Table 11

Robustness: Alternative Treatment Group Definition

Variables	(1)	(2)	(3)	(4)	(5)
	Δ *Ln(Tier 1 ratio)*	Δ *Ln(CE)*	Δ *Ln(RE)*	Δ *Ln(Loan)*	Δ *Ln(IS)*
*Treat*ASC_842*	0.017***	-0.012	-0.012	-0.011**	-0.002
	(4.956)	(-1.268)	(-0.936)	(-2.588)	(-0.225)
Size	-0.029***	0.015	-0.003	0.039***	0.033*
	(-3.527)	(0.517)	(-0.182)	(4.187)	(1.738)
Liquid	0.049	0.312**	0.143*	0.196***	0.169
	(0.933)	(2.511)	(1.856)	(2.911)	(1.444)
ROA	1.897***	4.865*	10.165***	1.887***	3.152***
	(3.165)	(1.894)	(3.901)	(3.258)	(3.000)
Loans_Deposits	-0.010	0.067	0.012	0.137***	-0.226***
	(-0.370)	(1.064)	(0.318)	(4.579)	(-3.615)
LLR_growth	-0.028	0.621***	0.401***	0.411***	0.465***
	(-1.401)	(3.911)	(6.602)	(5.553)	(6.239)
Constant	0.447***	-0.360	-0.004	-0.752***	-0.356
	(3.467)	(-0.792)	(-0.013)	(-5.052)	(-1.226)
Observations	4,323	3,997	4,134	4,323	4,323
Adj. R^2	0.020	0.042	0.071	0.244	0.105
Bank FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes

Notes: In this table Treat is redefined based on banks in the lowest 2 deciles of the Tier 1 ratio distribution in 2018q4. We present results for Tier 1 growth and the various adjustment paths examined in Tables 2 and 3, respectively. The growth rate for $quarter\ t$ denotes the (approximate) percentage change from $quarter\ t-1$ to $quarter\ t$. t-statistics, based on robust standard errors clustered by bank, are in parentheses. *. **, and *** represent statistical significance at the 10%, 5%, and 1% levels respectively.

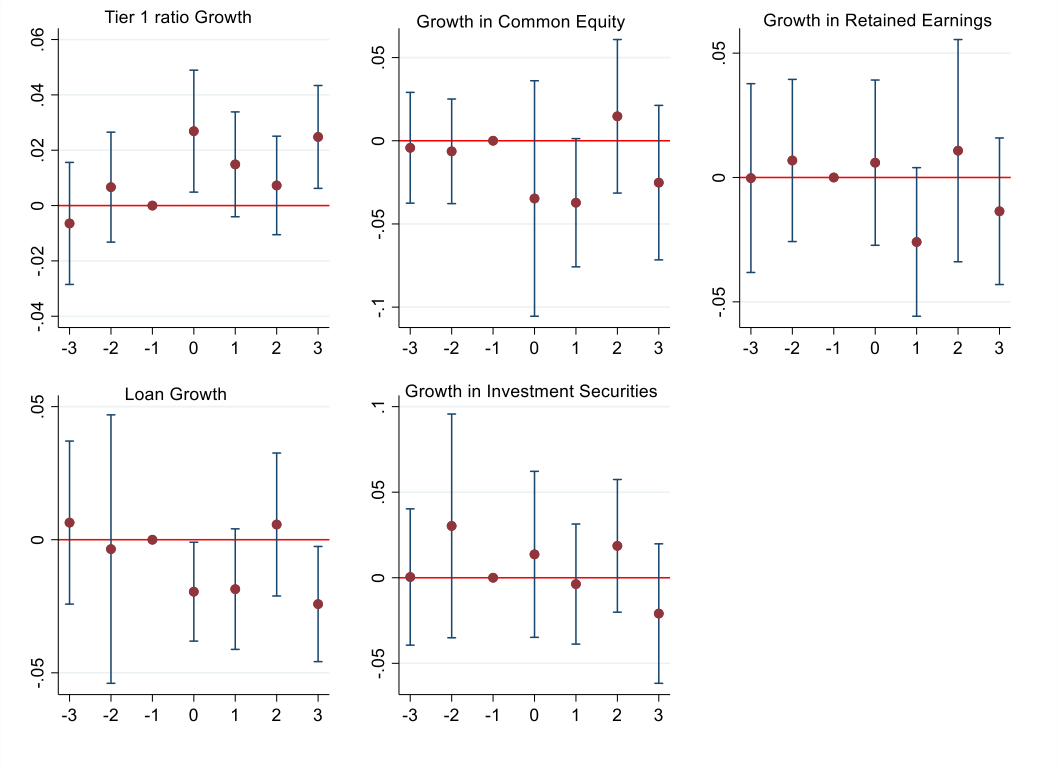

Figure 1. Dynamic Difference-in-Differences: ASC 842 and Regulatory Capital Management

Notes: This figure graphically presents the point estimates of the dynamic DiD specification in Eq. (7); The observation window runs from 2015q1 to 2019q4, and the event window is restricted to the interval [-3; +3]; Treatment effects to the left extreme of the event window are accumulated at β_{-3} accordingly; The x-axis denotes the relative quarters from the effective date of ASC 842, with 0 depicting the actual quarter of the shock (2019q1); The year prior to the shock (-1(2018q4)) is the omitted category, and the y-axis presents the estimated treatment effect within a 95 percent confidence interval.

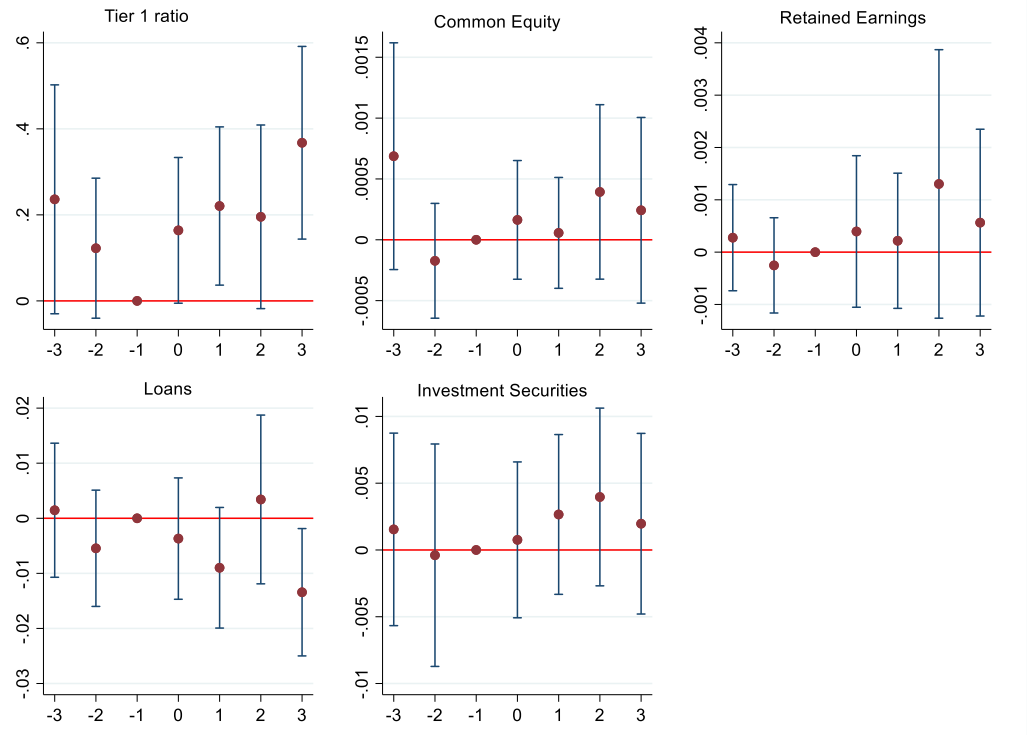

Figure 2. Dynamic Difference-in-Differences: ASC 842 and Regulatory Capital Management (levels)

Notes: This figure graphically presents the point estimates of the dynamic DiD specification in Eq. (7) with the dependent variables being the levels rather than the growth rates of Tier 1 ratio, ordinary equity, retained earnings, loans, and investment securities; the observation window runs from 2015q1 to 2019q4, and the event window is restricted to the interval [-3; +3]; treatment effects to the left extreme of the event window are accumulated at β_{-3} accordingly; the x-axis denotes the relative quarters from the effective date of ASC 842, with 0 depicting the actual quarter of the shock (2019q1); the year prior to the shock (-1(2018q4)) is the omitted category, and the y-axis presents the estimated treatment effect within a 95 percent confidence interval.

Appendix:

Table A1

Variable Definitions

	Definitions
Outcome Variables	
Tier 1 ratio	Tier 1 regulatory capital ratio.
CE	Ordinary share capital scaled by beginning of quarter total assets.
RE	Retained Earnings scaled by beginning of quarter total assets.
Loans	Total outstanding loans scaled by beginning of quarter total assets.
IS	Total investment securities scaled by beginning of quarter total assets.
RE loans	Real estate loans scaled by beginning of quarter total assets.
IDV loans	Loans to individuals scaled by beginning of quarter total assets.
C&I loans	Commercial and Industrial loans scaled by beginning of quarter total assets.
Agric loans	Loan to finance agricultural production scaled by beginning of quarter total assets.
Control Variables	
Size	Natural logarithm of total assets.
ROA	Return on assets.
Liquid	Liquid assets scaled by beginning of quarter total assets.
Loans_Deposits	Loans divided by total deposits.
LLR growth	Growth in loan loss reserves.
Other Variables	
Op_Lease	Present value of future operating lease obligations scaled by beginning of quarter total assets.
RWA_TA	Risk-weighted assets divided by total assets.
Z_score	Natural logarithm of Z-score. Z-score is the sum of return on assets and equity-to-asset ratio divided by a three-quarter rolling standard deviation of return on assets.
Non-Performing Loans	Non-performing loans divided by total assets.
Sigma_Int Income	Standard deviation of interest income calculated over a two-quarter rolling window.
Dividends	Ordinary share dividends scaled by the book value of common equity.

Table A2

Regulatory Capital Management, Risk-Taking Behavior, and Operating Lease Commitments

Dependent Variable	Δ *Ln(Tier 1 ratio)*		Δ *Ln(Loan)*	
	(1)	(2)	(3)	(4)
Sd_Income & Op_Lease	High	Others	High	Others
*Treat*ASC_842*	0.010**	0.010	-0.010**	-0.010
	(2.404)	(1.510)	(-2.329)	(-1.188)
p-value of diff. in coefficients	**0.016**		**0.019**	

Size	-0.035***	-0.027	0.049***	0.059***
	(-3.235)	(-1.500)	(3.976)	(2.908)
Liquid	0.066	-0.023	0.169**	0.273*
	(1.133)	(-0.208)	(2.339)	(1.926)
ROA	2.316***	-0.077	1.607**	3.512***
	(3.325)	(-0.075)	(2.553)	(2.832)
Loans_Deposits	0.000	-0.042	0.147***	0.095
	(0.002)	(-0.839)	(5.115)	(1.150)
LLR_growth	-0.019	-0.055***	0.372***	0.522***
	(-0.745)	(-3.831)	(4.067)	(7.005)
Constant	0.516***	0.476	-0.915***	-1.072***
	(3.092)	(1.624)	(-4.650)	(-3.173)
Observations	3,137	1,186	3,137	1,186
Adj. R^2	0.022	0.018	0.214	0.348
Bank FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes

Notes: This table presents cross-sectional results of our baseline based on banks' ex-ante risk-taking and operating lease obligations. Risk taking is measured as the standard deviation of banks' interest income (*Sd_Income*) and operating lease obligation (*Op_Lease*) is measured based on Eq. (6). Banks with both above median levels of *Sd_Income* and *Op_Lease* are categorized in the *High* group, otherwise they are categorized under the *Others* group. The growth rate for $quarter\ t$ denotes the (approximate) percentage change from $quarter\ t-1$ to $quarter\ t$. *t*-statistics, based on robust standard errors clustered by bank, are in parentheses. *. **, and *** represent statistical significance at the 10%, 5%, and 1% levels respectively.

Table A3

Regulatory Capital Management, Capital Distribution Behavior, and Operating Lease Commitments

Dependent Variable	Δ *Ln(Tier 1 ratio)*		Δ *Ln(Loan)*	
	(1)	(2)	(3)	(4)
Dividends & Op_Lease	High	Others	High	Others
*Treat*ASC_842*	0.013***	0.000	-0.011**	-0.006
	(3.515)	(0.019)	(-2.447)	(-0.743)
p-value of diff. in coefficients	**0.000**		**0.014**	
Size	-0.029**	-0.031**	0.059***	0.045***
	(-2.473)	(-2.296)	(4.224)	(2.686)
Liquid	0.079	-0.027	0.179**	0.182
	(1.233)	(-0.317)	(2.275)	(1.571)
ROA	1.697***	3.127*	1.710**	1.973*
	(2.716)	(1.910)	(2.574)	(1.808)
Loans_Deposits	-0.004	-0.049	0.157***	0.108*
	(-0.125)	(-1.041)	(4.573)	(1.907)
LLR_growth	-0.011	-0.068***	0.376***	0.493***
	(-0.441)	(-2.805)	(3.788)	(8.140)
Constant	0.445**	0.514**	-1.081***	-0.814***
	(2.387)	(2.389)	(-4.843)	(-2.977)
Observations	3,089	1,234	3,089	1,234
Adj. R^2	0.016	0.032	0.219	0.321
Bank FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes

Notes: This table presents cross-sectional results of our baseline based on banks' ex-ante dividend payment behavior and operating lease obligations. Dividend is measured as ordinary share dividends scaled by the book value of total equity (*Dividends*) and operating lease obligation (*Op_Lease*) is measured based on Eq. (6). Banks with both above median levels of *Dividends* and *Op_Lease* are categorized in the *High* group, otherwise they are categorized under the

Others group. The growth rate for $quarter\ t$ denotes the (approximate) percentage change from $quarter\ t-1$ to $quarter\ t$. *t*-statistics, based on robust standard errors clustered by bank, are in parentheses. *. **, and *** represent statistical significance at the 10%, 5%, and 1% levels respectively.

Table A4

Regulatory Capital Management, Regulatory Structure, and Operating Lease Commitments

Dependent Variable	Δ *Ln (Tier 1 ratio)*		Δ *Ln(Loan)*	
	(1)	(2)	(3)	(4)
	Non-AA & High Op_Lease	Others	*Non-AA & High Op_Lease*	Others
*Treat*ASC_842*	0.010***	0.000	-0.010***	0.011
	(2.916)	(0.051)	(-2.610)	(0.797)
p-value of diff. in coefficients	**0.004**		**0.009**	
Size	-0.032***	0.015	0.042***	0.083
	(-3.683)	(0.452)	(4.425)	(1.060)
Liquid	0.052	-0.246	0.209***	0.098
	(0.956)	(-1.389)	(2.991)	(0.846)
ROA	1.972***	0.153	1.927***	1.029
	(3.155)	(0.132)	(3.187)	(0.950)
Loans_Deposits	-0.018	0.143	0.150***	-0.241**
	(-0.699)	(1.831)	(5.053)	(-3.014)
LLR_growth	-0.029	-0.102	0.415***	0.327***
	(-1.410)	(-1.417)	(5.494)	(3.781)
Constant	0.488***	-0.385	-0.810***	-1.506
	(3.662)	(-0.515)	(-5.335)	(-0.925)
Observations	4,176	147	4,176	147
Adj. R^2	0.020	0.179	0.247	0.200
Bank FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes

Notes: This table presents cross-sectional tests based on banks' regulatory structure (i.e., either they are advanced-approaches (AA) or non-advanced approaches (non-AA) banks) and operating lease obligations. AA banks (prior to December 31st, 2019) are defined as those with at least $250 billion in assets or $10 billion in on-balance sheet foreign exposures, or those that elect to employ such advanced approaches. Non-AA banks are those that do not meet the above thresholds. We identify AA and non-AA banks based on banks' FR Y-9C data item *"BCHAP83"* as of 2018q4. Operating lease obligation (*Op_Lease*) is measured based on Eq. (6). *Non-AA* banks with above median values of *Op_Lease* are categorized in the *Non-AA & High Op_Lease* group, otherwise they are categorized under the *Others* group. The growth rate for $quarter\ t$ denotes the (approximate) percentage change from $quarter\ t-1$ to $quarter\ t$.*t*-statistics, based on robust standard errors clustered by bank, are in parentheses. *. **, and *** represent statistical significance at the 10%, 5%, and 1% levels respectively.