Deregulating Banker Pay: Risk, Labor Market Competition, and Persistence of Bonus Culture

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Abstract

We exploit the 2023 removal of the UK's banker bonus cap to identify the causal effect of incentive pay on bank risk and shareholder value. Contrary to regulatory concerns, the removal did not increase tail risk, though systematic risk and leverage rose significantly. Surprisingly, equity values did not improve, which we attribute to intensified labor market competition driving up total compensation. Senior management remuneration increased sharply, driven entirely by variable pay, particularly at banks that relied heavily on it before the cap's introduction. Our findings highlight the persistence of bonus culture and the unintended labor market consequences of pay regulation.

Keywords: Bonus cap, bank risk, equity value, labor market competition, bonus culture

JEL Codes: G21, G28, G32, J30, J33

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1 Introduction

> "*Decisions about pay are a matter for shareholders and not politicians.*"- British Bankers Association. (Vander Weyer, 2014)

> "*Let's not have a short memory! We all saw during the crisis that the risks of financial instability were ultimately borne by taxpayers – not only in the UK. We saw for instance that remuneration of bankers set the wrong incentives and allowed excessive risk-taking.*"- Michel Barnier, European Union's Chief Brexit Negotiator. (Barnier, 2018)

> "*These changes are good for banks, but not for bankers" said one senior dealmaker at a European bank. "Our people don't want compensation to change — fixed allowances have been good to us."* (Clark, 2024)

There is a robust debate among policymakers on whether to impose restrictions on the incentive pay of bankers. Proponents of such restrictions point to the Great Financial Crisis, arguing that high-powered compensation packages incentivize executives and traders to take on tail risks that may enhance performance in the short run but can cause significant damage to the bank when such risks materialize (Rajan, 2005; Kashyap et al., 2008; Bebchuk and Spamann, 2010). These concerns led to regulations on bankers' incentive pay, such as the EU's 2013 Capital Requirements Directive (CRD) IV "bonus cap," which required that the maximum variable-to-fixed compensation ratio at EU banks should not exceed 100% (or 200%, subject to shareholder approval), and less draconian regulations in the US.[1] Conversely, opponents argue that such restrictions hinder banks' ability to attract top talent, thus hurting bank value.

Empirical evidence is lacking on whether pay restrictions are necessary or sufficient to curtail bank risk, or if repealing them improves bank value. Identifying the causal effect of incentive pay on bank risk and value is challenging due to omitted variable bias. Indeed, the existing literature (reviewed in Section 2) finds no conclusive evidence that an increase in banker pay convexity *leads to* greater risk. Furthermore, tighter post-crisis regulations

[1] See Section 956 of the Dodd-Frank Act, which addresses "*incentive-based compensation arrangements offered by 'covered financial institutions'*" and would "*prohibit incentive-based compensation arrangements for 'covered persons' that would encourage inappropriate risks by providing 'excessive' compensation.*" See https://www.fdic.gov/news/board-matters/2011/2011memo2.pdf.

under the Basel III accords independently limit risk-taking by bank executives and traders. Theories of labor market competition for banker talent (e.g., Thanassoulis, 2012; Acharya et al., 2016) and recent theoretical work on compensation regulation (Hoffmann et al., 2022) also highlight potential unintended consequences of regulating incentive-based compensation, casting doubt on whether such regulation necessarily lowers bank risk. We address the following questions in this paper to address the gaps in the existing literature. Does allowing banks to offer higher incentive compensation lead to higher risk? What is the effect on labor market competition and banker pay structure? What is the overall effect on shareholder value?

We use a recent deregulation of banker compensation in the UK to identify the causal effect of bankers' incentive pay on bank's risk and shareholder value; and to evaluate the efficacy of government pay regulations in curtailing bank risk. On October 24, 2023, UK financial regulators announced that UK banks would no longer be subject to the EU's bonus cap regulation, effective October 31, 2023 (see Section 3 for details). Using unique, hand-collected data on banker remuneration, we first show that the implementation of the EU bonus cap in 2014 led to a sharp drop in the variable-to-fixed compensation ratio for not only C-suite executives (also see Colonnello et al., 2023; Kleymenova and Tuna, 2021) but also non-C-suite material risk takers at UK banks. Therefore, the recent bonus cap removal significantly expands the compensation contracting space of UK banks. UK banks were widely excepted to respond to this deregulation by substantially increasing their reliance on variable compensation.[2] Hence, we employ a quasi-natural experiment framework, using UK's bonus cap removal as an exogenous positive shock to variable compensation of UK bankers, to study the effect of increase in variable compensation on bank risk and value.

We employ a difference-in-differences (DiD) framework, estimated on a bank-quarter panel, to examine changes in bank risk and value of UK banks (the treated group) relative to EU banks (the control group) surrounding the announcements of UK's bonus cap repeal. We analyze two key announcement events (detailed in Section 3 for details): the initial policy signal in 2022Q3, when the UK Chancellor announced the intent to repeal the cap, and the formal regulatory announcement in 2023Q4. We consider both these event dates because we

[2] For example, an August 2024 Reuters report noted an internal Barclays memo stating: "*The lender's senior bankers will now be able to earn payouts of up to 10 times their base salary, up from a two-to-one ratio previously imposed by the European Union back in 2014 when the UK was a member.*" (White, 2024)

expect the market to price the risk and return implications of change in banker compensation structure when the government first announces its intention to repeal the bonus cap, as well when the policy formally comes into effect. We use the EU banks as the control group because they remain subject to EU's bonus cap.

Contrary to policymakers' fears, we find little evidence of an immediate increase in the credit risk or tail risk of UK banks relative to EU banks following UK's bonus cap removal. We establish this using different measures of risk: credit default swap (CDS) spreads across various maturities; and measures of left-tail risk such as expected shortfall and value-at-risk. One potential explanation for this (non-)result is that banking regulation has been tightened significantly in response to the Great Financial Crisis, which limits risk-taking by bank executives and traders. For example, Basel III accords increased bank capital requirements, introduced new liquidity standards, and strengthened risk supervision. Another possibility is that tail risk takes some time to materialize. Consistent with this explanation, we find weak evidence of an upward trajectory in CDS spreads beginning in early 2025.

In contrast with the tail risk results, we find a significant increase in the systematic risk (i.e., *Beta*) of UK banks relative to EU banks following UK bonus cap removal announcements. The economic magnitude is large: the *Beta* of UK banks increases by about 0.3 and 0.2 after each event, representing a 15%-22% increase relative to the sample mean. Brexit is unlikely to confound this finding: our sample begins a full year after it took effect, pre-trends between UK and EU banks are flat during our control period, and we show that Brexit-related beta effects had fully reversed before our sample starts. This increase in systematic risk is consistent with the notion of differential risk-taking incentives associated with variable pay, particularly the use of stock options (Armstrong and Vashishtha, 2012). Specifically, greater pay convexity incentivizes risk-averse managers to increase systematic rather than idiosyncratic risk (Armstrong and Vashishtha, 2012), because they can hedge systematic risk exposure by trading the market portfolio (Tian, 2004; Duan and Wei, 2005) but cannot hedge idiosyncratic risk (Carpenter, 1998, 2000). Our evidence is consistent with these arguments. We find a quick and sharp increase in the systematic risk of UK banks following the deregulation, but no evidence of an increase in idiosyncratic risk. We also find that the *systemic risk exposure* of UK banks – measured by exposure ΔCoVaR – increases significantly following the announcements, although the magnitude of the effect is modest. We also find that UK banks significantly increase their leverage relative to EU banks after

the deregulation is announced, which is consistent with the increases in systematic risk and systemic risk exposure.

Critics of the EU bonus cap in UK argued that restrictions on incentive pay hinder UK banks' ability to attract top talent, thus hurting bank values and making London less attractive to global banks. Based on these arguments, which were crucial to UK's bonus cap removal policy, we would expect an increase in the equity values of UK banks following the repeal of the bonus cap, because UK banks now have more flexibility in designing compensation contracts to incentivize and attract high-quality bankers. Surprisingly, however, we find that the announcements of UK's bonus cap removal have no significant effect on the equity value of UK banks relative to EU banks. If anything, we find weak evidence of a short-lived decrease in UK banks' equity values and Sharpe ratio relative to EU controls following the first announcement about the repeal, which may partly be due to the financial market turmoil in UK during that time.

The absence of a positive effect on equity value suggests that the bonus cap repeal has some countervailing negative effect on UK banks that negates the benefits of greater contracting flexibility. One possibility, based on the theoretical framework of Thanassoulis (2012), is that the bonus cap removal intensifies the competition for banker talent in the UK, thus imposing a negative externality on all UK banks. Specifically, competition for banker talent drives up banker remuneration and generates a negative externality that drives up rival banks' default risk (also see Bijlsma et al., 2018). This externality can be economically significant because total remuneration costs accounts for a significant share of banks' shareholder equity. For instance, Thanassoulis notes that in about 10% of cases, the remuneration bill exceeded 80% of the bank's equity capital. Similarly, Acharya et al. (2016) argue that intense competition for banker talent escalates incentive pay (also see Bénabou and Tirole, 2016) and makes it easy for bankers to leave their current banks before the long-term risks associated with their strategies materialize, which in turn, makes it harder for banks to observe the true quality or "alpha" of their employees. Therefore, bonus caps may actually benefit banks by softening labor market competition; and conversely, removal of bonus caps can hurt banks by re-intensifying the competition for banker talent. Recent theoretical work by Hoffmann et al. (2022) also emphasizes that compensation regulation can reshape, rather than eliminate, distorted incentives by altering the cost of implementing different compensa-

tion schemes under shareholder bailout distortions. Thus, relaxing compensation constraints does not necessarily improve efficiency or shareholder value.

To test these theoretical arguments about the negative externalities imposed by labor market competition, we examine how the level and composition of banker pay in UK changes after the bonus cap removal. A novel aspect of our analysis is that we hand-collect information on the compensation structure of material risk takers (MRTs) of UK and EU banks for both senior and non-senior management positions. This granularity allows us to separately evaluate the policy's impact on the compensation packages of top managers, other senior managers, and non-senior managers. Because the deregulation took effect in late 2023, our post-treatment window currently spans two years (2024 and 2025). (For a subset of banks, primarily within the control group, 2025 data were unavailable at the time of writing due to disclosure lags.) Despite this brief post-treatment period, we document strong shifts in UK banker compensation.

We find that the total compensation per person at the top management level increases by about 18.7% at UK banks relative to EU peers following the bonus cap repeal, supporting the key prediction in Thanassoulis (2012). This effect is driven by a large increase in variable pay (32.1%) whereas fixed pay decreases by about 15.4%, thus leading to a sharp increase in the variable-to-fixed pay ratio (95.2%) for top managers at UK banks. We also find similar effects – increases in variable compensation, total compensation, and the variable-to-fixed pay ratio – for other senior managers at UK banks relative to EU peers although the economic magnitudes are smaller compared to those of top managers. The increases in the variable-to-fixed pay ratio for top managers and other senior managers of UK banks relative to EU peers after the bonus cap repeal is consistent with the prediction of Acharya et al. (2016) that intense competition for banker talent drives up the incentive compensation for bankers. For non-senior managers at UK banks, we only find modest increase in total compensation per person, but no significant change in the variable-to-fixed pay ratio relative to EU peers.

An alternative interpretation for the increase in banker compensation at UK banks is that it is driven by entrenchment of top executives, who use the bonus cap removal to increase their variable pay without lowering their fixed pay, rather than by increase in competition for banker talent. Some recent media articles allude to this concern (e.g., see Martin, 2024). However, while opportunistic behavior by entrenched executives may partially explain the

increase in compensation of C-suite executives, it cannot account for the decrease in fixed pay for top managers or the significant increases in banker compensation that we find at all levels at UK banks. For instance, there are about 47 senior managers per UK bank, on average, which suggests that even this category extends well beyond the C-suite. The broad-based increase in compensation costs may explain why the equity values of UK banks did not increase following the bonus cap repeal. Consistent with a significant increase in compensation costs, we find that UK banks' return on equity declined relative to EU banks following the bonus cap repeal.

Finally, we explore how the impact of the repeal varies based on banks' 2013 compensation structures, that is, prior to the implementation of EU bonus cap in 2014 and nearly a decade before its UK removal. Accordingly, we sort UK banks into two groups– high and low– based on their 2013 variable-to-fixed ratio (i.e. initial treatment sorting). Following the deregulation, the increase in the variable-to-fixed ratio for top managers is nearly twice as large for UK banks in the high group compared to those in the low group. This is a striking result given that the restriction was in place for nearly a decade. The fact that UK banks which used to rely heavily on high-powered compensation prior to 2014 revert back more strongly to such compensation schemes after UK's bonus cap removal points to the existence of a persistent "bonus culture" at some banks. This result is reminiscent of the finding of a persistent risk culture at banks (Fahlenbrach et al., 2012; Song and Thakor, 2019). It also relates to the findings of persistence in residual pay at banks (Cheng et al., 2015) and in corporate capital structures (Lemmon et al., 2008).

In summary, our analysis yields three main insights. First, in the presence of stringent banking regulations, increases in bankers' pay convexity may not significantly impact bank left-tail risk, but can still incentivize managers to increase bank systematic risk, highlighting the importance of considering differential risk-taking incentive effects. Second, regulatory interventions in bankers' pay can have unintended effects on the labor market competition for banker talent and bank equity value, as predicted by Thanassoulis (2012). Restrictions on incentive pay benefit banks by limiting labor market competition among banks, which may counteract the adverse effects arising from a constrained compensation contracting space. Therefore, repealing these restrictions does not automatically enhance bank equity value. To our knowledge, we are the first to empirically examine these labor market effects of regulatory interventions in bankers' pay. Third, compensation culture at banks tends to be persistent.

2 Related Literature

Our paper is closely related to Colonnello et al. (2023), who examine the 2014 EU bonus cap implementation (when the UK was an EU member). They analyze how this policy affected the risk of EU banks (treated group) compared to US banks (control group). A key difference is that while Colonnello et al. (2023) focus on changes in executive compensation following the EU bonus cap introduction, we use unique, hand-collected data to examine the changes in compensation across *all* material risk takers following the UK's bonus cap removal.[3]

This is important for two reasons. First, as we show below in Figure 1, the 2014 EU bonus cap was not binding for most EU banks outside the UK; hence, its introduction was unlikely to significantly alter risk-taking incentives of EU bankers outside of the UK. Second, given the intense competition for talent and high labor costs, it is possible that banks use more high-powered compensation contracts for traders compared to C-suite executives. Thus, as Colonnello et al. (2023) acknowledge, pay convexity metrics based on the CEO's compensation may not reflect the risk-taking incentives of key risk takers within the bank.

We believe that the 2023 UK bonus cap removal is a relatively cleaner empirical setting for isolating the effects of banker compensation on risk than the 2014 EU bonus cap implementation. First, unlike for non-UK banks, EU's bonus cap policy was a highly binding constraint for UK banks in 2014. Hence, its repeal functions as a direct, positive shock to UK bankers' variable compensation. Second, both US and EU banks were subject to other confounding shocks around 2014, which make it hard to isolate the effects of the EU bonus cap policy on bank risk. US banks faced major regulatory changes between 2011 and 2015 aimed at curbing risk,[4] whereas EU banks were still feeling the after-effects of the Eurozone debt crisis during this period. Possibly due to these confounding shocks, Colonnello et al.

[3] See also Sakalauskaite and Harris (2022) who study how compensation within UK banks changes after the 2014 bonus cap implementation.

[4] Buchak et al. (2018) discuss these regulatory shock in detail: tightening of risk-weighted capital requirements under Basel III; mortgage-related lawsuits pertaining to banks' conduct during the financial crisis; and closure of the Office of Thrift Supervision (OTS) which had the reputation of being a lax regulator. Next, the 2013 Supervisory Guidance on Leveraged Lending (GLL) and the subsequent 2014 FAQ notice, which clarified expectations on the GLL, had a negative effect on speculative-grade term-loan origination by banks (Calem et al., 2020). The Comprehensive Capital Analysis and Review (CCAR) stress tests of 2011 and 2012 also had a significant negative effect on the provision of mortgage credit by US banks in subsequent years (see Calem et al., 2020; Gete and Zecchetto, 2024).

(2023) find that EU banks actually experience an *increase* in CDS spread, systemic risk, and systematic risk compared to US banks after the cap's imposition.

Our findings also relate to Kleymenova and Tuna (2021), who study the UK Remuneration Code implemented in 2010, shortly after the financial crisis. The Remuneration Code is UK's domestic legislation of the remuneration provisions in Capital Requirement Directives (CRD) III, which regulated aspects of the compensation contract, such as requiring that a portion of bonuses be deferred for at least 3 years. Kleymenova and Tuna (2021) find mixed evidence. While UK banks' contribution to systemic risk decreases after the code relative to other UK firms, the effect does not hold when compared to EU or US banks. The mixed results could be due to world-wide banking regulations occurring simultaneously, such as the EU adoption of CRD III in 2010, which complicates the identification of a UK-specific effect.

Our paper also connects to the broader literature examining the relation between banker compensation structures and bank risk, which has yielded mixed evidence. On the one hand, Fahlenbrach and Stulz (2011) fail to find evidence that better aligned CEO incentives improved bank performance during the financial crisis. Similarly, Erel et al. (2014) conclude that CEO incentives were unrelated to bank holdings of highly rated mortgage-backed securities. On the other hand, DeYoung et al. (2013) find a positive link between the risk-taking incentives of large US bank CEOs (as measured by their vega and delta) and ex-post risks of these institutions. Similarly, Kolasinski and Yang (2018) find that US financial institutions whose CEOs had more short-term incentives (i.e., those who could cash out their stock and option grants sooner) exhibited higher subprime exposure, an elevated probability of financial distress, and lower risk-adjusted stock returns during the crisis. Bennett et al. (2021) also find that bank tail risk is higher when compensation depends more on short-term measures of performance.

While the extant literature generally highlights the adverse implications of variable pay for bank risk, some studies emphasize its role in optimal risk sharing between bank shareholders and employees, which enhances resilience because variable pay partially absorbs negative shocks (see Thanassoulis, 2012; Bijlsma et al., 2018, for theoretical arguments). The implication of this theory is that the effect of variable pay on bank risk is not clear cut. Efing et al. (2023) provide empirical support for this view of variable pay as a risk sharing contract.

Finally, our paper also relates to the wider (i.e., outside of the financial sector) literature on the effects of CEO compensation design on firm risk. Theory offers ambiguous predic-

tions regarding the effect of option compensation on firm risk (e.g., see Carpenter, 2000). Moreover, omitted variable bias is a serious concern in this setting because executive compensation design is endogenous, and the literature show that a firm's risk profile itself affects compensation design (e.g., see Gormley et al., 2013; De Angelis et al., 2017).

To overcome these challenges, researchers have designed various ways to capture exogenous variations in compensation design. For example, Coles et al. (2006) estimate simultaneous equation models and find that pay-for-performance convexity (vega) is associated with riskier corporate policies. Armstrong and Vashishtha (2012) use an instrumental variable approach with cash reserves, tax-loss carry-forward, ROA and stock returns as instruments for CEO equity incentives, and find that vega incentivizes managers to increase firm's systematic risk (but not idiosyncratic risk). Our results, using a shock to the contracting space that captures exogenous variations in pay convexity, are consistent with their findings.

Recent studies use stock option expense regulations as a negative shock to option pay, yielding mixed results. While some evidence indicates that reduced option pay leads managers to curb risk, such as by decreasing leverage (Chava and Purnanandam, 2010), increasing hedging intensity (Bakke et al., 2016), and shifting activities to safer segments (Carline et al., 2023), Hayes et al. (2012) fail to find less risky corporate policies. Shue and Townsend (2017) use the timing of multiyear compensation plans to capture large variations in new at-the-money options grants. They find that an increase in option grant is associated with increased equity volatility, primarily driven by increased leverage. Given stringent modern banking regulations, it is unclear whether bank executives could activate that lever nowadays.

3 Institutional Background

3.1 Banker Compensation Regulation in the EU

Given the widely prevalent view that high-powered bankers' compensation packages encouraged excessive risk-taking and contributed to the 2008-09 financial crisis, the EU introduced a series of rules on the bankers' compensation package under Capital Requirement Directives (CRD) III in order to prevent excessive risk-taking. CRD III was published in December

2010 and became effective as of January 2011.[5] CRD III introduced minimum levels of deferral and equity grants for identified staff at significant institutions, to better align bankers' incentives with long-term bank performance. In particular, at least 50% of any variable remuneration must be in shares, share-linked instruments, or equivalent non-cash instruments and at least 40% of variable compensation must be deferred for not less than 3 to 5 years.

CRD III was further updated to CRD IV, introduced in 2013 and effective in January 2014.[6] CRD IV complements the provisions in CRD III with the so-called bankers' bonus cap, limiting the ratio of variable-to-fixed compensation at 100%, or 200% with shareholder approval. These regulations apply to material risk takers (MRTs), including senior managers, internal supervisors, but also those lower-rank employees that can substantially alter the bank's risk profile with their choices (e.g., selected traders). Detailed qualitative and quantitative criteria of MRTs are further set out in Regulation (EU) No. 604/2014.[7]

3.2 Banker Compensation Regulation in the UK

The UK was subject to CRD III and IV as an EU member. It enacted its Remuneration Code in late 2010 and revised it in January 2014 to incorporate the bonus cap and other changes introduced by CRD IV. The bonus cap remained controversial, however, with critics arguing that it constrained UK banks' ability to compete for talent against other global financial centers such as New York, Singapore, and Zurich.

Brexit in January 2020 significantly reduced the legal barrier to removing the bonus cap, though the decision proved politically contentious amid the UK cost-of-living crisis. In June 2022, Prime Minister Boris Johnson explicitly ruled out lifting the bonus cap.[8] However, this stance was reversed under his successor, Liz Truss, whose government formally announced its intention to abolish the bonus cap as part of the "Growth Plan 2022" (also known as "Mini-Budget") on September 23, 2022. Following a consultation process, the two UK financial regulators– the Prudential Regulation Authority (PRA) and the Financial Conduct

[5] The text of CRD III (Directive 2010/76/EU) is available at https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32010L0076.

[6] Text of CRD IV (Directive 2013/36/EU) is available at https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013L0036.

[7] Text of Regulation (EU) No 604/2014: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32014R0604.

[8] See https://www.reuters.com/world/uk/uks-boris-johnson-rules-out-lifting-curbs-banker-bonuses-2022-06-23/.

Authority (FCA)– formally announced the removal of the bonus cap on October 24, 2023, with the policy taking effect a week later on October 31, 2023.[9]

Importantly, both announcement dates coincided with significant short-term market turbulence and potentially confounding events. The September 2022 "Growth Plan" triggered broad UK market instability and contributed to the ouster of Prime Minister Truss within a month. The October 2023 formal announcement coincided with Barclays releasing weak Q3 earnings, sending its share price down roughly 6% that day. These concurrent disruptions make clean short-term event studies around either announcement date infeasible, and instead motivate our approach of examining the effects of the bonus cap removal over several quarters.

3.3 Banker Compensation Disclosure Requirements

CRD III introduced compensation disclosure requirements under which EU banks must annually report detailed remuneration information for material risk takers (MRTs), including headcount, total remuneration, and the breakdown between fixed and variable pay, as well as deferred remuneration, new sign-on, and severance payments.

Because CRD III required transposition into national law, disclosure compliance varied across EU countries until the Capital Requirements Regulation (CRR) of 2013 made MRT compensation disclosure directly applicable to all EU banks starting in 2014.[10] However, CRR left the disclosure format to banks' discretion, resulting in poor cross-bank comparability. In particular, banks did not use a standard classification of the categories of MRTs.

Standardization came with Regulation (EU) 2021/637, which introduced uniform disclosure templates for MRT compensation (EU REM1–REM5).[11] Although the UK had left the EU by this point, UK regulators required domestic banks to continue adhering to these standards, so UK and EU banks have used the same disclosure templates since 2021. The standardized templates also increased granularity: both fixed and variable remuneration are

[9] PRA PS 9/23 FCA PS 23/15: https://www.bankofengland.co.uk/prudential-regulation/publication/2023/october/remuneration-ratio-between-fixed-and-variable-components-of-total-remuneration

[10] The text of CRR (Regulation (EU) No 575/2013) is available at https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R0575. CRR was published along with CRD IV.

[11] The text of Regulation (EU) 2021/637 is available at https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32021R0637. The disclosure templates are EU REM1 - REM5 that are documented in Annex XXXIII.

further broken down by payment form (cash, share-based, and other), and variable remuneration is additionally split between deferred and non-deferred components.

4 Data and Empirical Methodology

4.1 Data Sources

Identifying UK and EU banks: Our sample of UK banks consists of institutions regulated by UK's banking regulator, PRA, and includes building societies which are a special form of credit institutions. To identify EU banks, we apply a two-step screening process: we first select all firms with NAICS codes beginning with 522 ("Credit Intermediation and Related Activities") or code 551111 ("Bank Holding Companies"), and then manually review each institution's primary business segments to exclude non-banking entities. The final sample consists exclusively of banks, with the full list provided in the internet appendix. We note that this sampling methodology is consistent with recent studies of UK and EU banks (e.g., Kleymenova and Tuna, 2021).

CDS spreads and stock returns: We obtain data on daily CDS spreads from Markit. We use the 5-year CDS spread as the main measure of credit risk but also examine CDS spreads for other maturities: 1 year, 3 years, 7 years and 10 years. Henceforth, we refer to the sample of UK and EU banks for which we are able to find CDS spread data on Markit as the "CDS sample."

We obtain daily stock returns from Bloomberg. Henceforth, we refer to the sample of UK and EU banks for which we are able to find stock return information as the "stock return sample." The stock return sample is significantly smaller than the CDS sample because the latter also includes many private banks which do not trade on the stock market.

Banker compensation data: Since 2011, CRD III has required UK and EU banks to disclose the remuneration information for MRTs annually. Banks disclose this information in one of the following documents: the annual report, the Pillar 3 report[12], or an individual

[12] Basel III consists of three main pillars: minimum capital requirements (Pillar 1), supervisory review (Pillar 2) and market discipline (Pillar 3). Pillar 3 promotes market discipline through prescribed public disclosures for banks. Pillar 3 report is the disclosure of key information on capital structure, risk-weighted

remuneration report. We hand-collect this information for all banks in our CDS sample, gathering data on the number of MRTs, fixed remuneration, and variable remuneration. For post-2021 disclosures, which follow the standardized REM1–REM5 templates, we additionally collect the breakdown of compensation by payment form (cash, share-based, and other), as well as the split between deferred and non-deferred variable pay.

For pre-2021 disclosures, which lack a standardized format, we reclassify MRT categories to align with the REM1 template, which classifies MRTs into four categories: Management Body (MB) Supervisory Function, MB Management Function, Other Senior Management, and Other Identified Staff.[13] Based on the definitions provided in Regulation (EU) 2021/637, we classify executive directors as MB Management function; non-executive directors as MB Supervisory function; senior managers who are not in the board as other senior management; and all other MRTs as other identified staff. We then map these to two broader groups used throughout our analysis: Senior Management (comprising the first three REM1 categories) and Non-senior Management (the remainder). Some banks reported only aggregate MRT data in certain pre-2021 years, in which case we retain the original classification without further adjustment.[14]

Where a banking group has multiple entities in our CDS sample — for example, both a parent and a subsidiary — we use the consolidated compensation data of the parent to avoid double-counting. The compensation sample therefore includes only unique parent banks from the CDS sample.

Bank fundamental data: We obtain the key fundamental data of banks from Capital IQ, including total assets, total liabilities, Tier 1 capital ratio, ROA, and ROE. The fundamental data is quarterly based and the data period is 2021Q1 - 2025Q4. Same with the banker compensation data, the bank fundamental data is also based on parent bank level.

assets (RWAs), credit risk, market risk, operational risk, leverage ratio, liquidity metrics, and remuneration policies.

[13] See Annex XXXIV of Regulation (EU) 2021/637 for the definitions of the four categories.

[14] Note that at the moment of the writing of this draft, the disclosure of 2025 MRT compensation data is available for seven UK banks (Barclays, HSBC, Lloyds, NatWest, Standard Chartered, Nationwide Building Society, and Yorkshire Building Society) and six EU banks (Banco BPM SPA, Banco Santander SA, Skandinaviska Enskilda Banken AB, Svenska Handelsbanken AB, Swedbank AB, and Unicredit SPA).

4.2 Empirical Methodology

Our empirical strategy is based on the idea that UK's bonus cap removal is an exogenous and positive shock to the variable compensation of UK banks (the treated group), but has no direct effect on the compensation of EU banks (the control group) which are still subject to the EU's bonus cap policy. As noted in Section 3, all the announcements by the UK government pertaining to the banker bonus cap removal occurred during a period of political and financial turmoil in the UK and other confounding events in the EU. Because of these confounding effects, we cannot undertake short-term event studies around these announcement dates. Instead, we will examine the longer-term effects of these policy changes on the risk metrics and equity value of UK banks relative to EU banks.

We recall the following important dates from Section 3. The UK government's desire to repeal the banker bonus cap was first announced on September 23, 2022, that is, in *2022Q3* (henceforth "first announcement"). The repeal of the UK bonus cap removal was formally announced on October 24, 2023, that is, *2023Q4* (henceforth, "second announcement"), and became effective shortly thereafter. Market prices should reflect the effects of the bonus cap removal when this policy can be clearly anticipated or formally announced, i.e., starting in 2022Q3. Because we have two significant announcements relating to the bonus cap removal policy, we estimate variants of the following difference-in-differences (DiD) regression to understand the differential effects of these policy announcements on bank risk and equity value of UK banks relative to EU banks:

$$y_{i,c,t} = \alpha + \beta_1 \times Treat_i \times Post_1 + \beta_2 \times Treat_i \times Post_2 + \delta_i + \gamma_t + \psi \cdot X_{c,t} + \epsilon_{i,c,t} \qquad (1)$$

We estimate this regression on a panel dataset in which each observation corresponds to a bank-quarter combination and includes all UK banks and EU banks. In order to avoid the confounding effects caused by the Brexit, which formally took effect on January 31, 2020 with a transition period lasting until December 31, 2020, the data period spans from 2021Q1 to 2025Q4. The subscripts 'i', 'c', and 't' denote the bank, the country in which the bank is located, and the quarter, respectively. $Treat_i$ is an indicator variable to identify UK banks (the treated sample); hence, $Treat_i = 0$ identifies EU banks (the control sample). $Post_1$ is an indicator variable to identify the period between the first and second announcements; i.e., it takes the value of 1 between 2022Q3 and 2023Q3 (inclusive), and the value of 0 otherwise.

$Post_2$ is an indicator variable to identify the period after the second announcement; i.e., it takes the value of 1 for 2023Q4 and beyond, and the value of 0 in other time periods. Hence, the omitted time period in regression (1) is the time period before 2022Q3 when both $Post_1$ and $Post_2$ equal 0. The regression includes bank fixed effects (δ_i), quarter fixed effects (γ_t), and control for market characteristics in the country in which the bank is located ($X_{c,t}$). Hence, the coefficient β_1 captures the change in the outcome variable, y, of UK banks relative to EU banks after the first announcement but before the second announcement. On the other hand, the coefficient β_2 capture the change in y of UK banks relative to EU banks after the second announcement compared to the period before the first announcement.

To evaluate the timing of the effects and evaluate the parallel trends assumption, we estimate the following dynamic version of the DiD regression (1) via this specification:

$$y_{i,c,t} = \alpha + \sum_{\tau=-6,\tau\neq-1}^{\tau=13} \beta_\tau \times t_\tau \times Treat_i + \psi \cdot X_{c,t} + \delta_i + \gamma_t + \epsilon_{i,c,t} \tag{2}$$

where t_τ for $\tau \in -6, +13$ are identifiers for quarters, where t_τ with positive (negative) values of τ identifies the quarter which comes τ quarters after (before) 2022Q3. The omitted quarter in the regression is t_{-1}, that is, 2022Q2. Hence, the coefficient β_τ captures the change in $y_{i,t}$ for UK banks between 2022Q2 and quarter t_τ relative to EU banks. If the parallel trends assumption is met, then β_τ should equal zero for negative values of τ.

The dependent variable $y_{i,c,t}$ measures bank risk or stock return performance for bank i in quarter t. We examine various measures of credit risk, systematic risk, systemic risk, idiosyncratic risk, and tail risk, including $Log(CDS\ spread)$, defined as the logarithm of the quarterly average CDS spread across maturities; $Beta$, estimated from a market model using the MSCI UK index for UK banks and the MSCI Europe index for EU banks; $Idiosyncratic\ Risk$, measured as the standard deviation of residuals from the market model; $Total\ Volatility$, measured as the standard deviation of stock returns; $Expected\ Shortfall$ (ES), defined as the negative average stock return during the worst 5% return days;[15] VaR or value-at-risk, defined as the negative of the 5% worst daily stock return; and $\Delta CoVaR$, which captures the contribution (or sensitivity, see Internet Appendix for details) of a bank to the systemic risk (Adrian and Brunnermeier, 2016). We also examine stock return per-

[15] ES is widely used within financial firms to capture expected loss conditional on returns being less than some $\alpha-$quintile (Acharya et al., 2017)

formance, including *Cumulative Return*, *Average Return*, and *Sharpe Ratio* (the ratio of *Average Return* to $Total\ Volatility$). All stock-market-related measures are estimated using daily returns over a rolling 12-month window.

Unlike market prices, the effects of the deregulation on bank compensation structure and financial performance are expected to materialize only after the policy became effective in 2023Q4. We obtain quarterly bank financial data from Capital IQ and estimate equation (1) without controls to examine the effects of the UK bonus cap removal on bank financial performance. Because compensation data are only available annually, we estimate annual variants of equations (1) and (2) to examine the effects on banker compensation structure. The analysis uses a bank-year panel of UK and EU banks and focuses on 2022, 2024, and 2025. Although MRT compensation data are available from 2011 onward, we exclude pre-2021 observations because disclosure templates became standardized only in 2021. We further exclude 2021 and 2023 to avoid confounding effects from changes in MRT identification criteria and potential immediate post-policy compensation adjustments, respectively. We will discuss the details in a later section. As before, $Treat_i$ is an indicator variable of UK banks, while *Post* equals one for post-removal years (2024 and 2025) and zero for the pre-period (2022). In the dynamic specification, t_τ identifies years relative to 2023.

4.3 Descriptive Statistics

Table 1 provides a breakdown of the number of UK banks (treated banks) and EU banks (control banks) in our sample for the various analyses we conduct. The CDS sample contains 16 UK banks and 44 EU banks. The stock return sample is a subset of the CDS sample, consisting of 6 UK banks and 27 EU banks, because some CDS entities are not publicly traded and some belong to the same listed parent group. The MRT remuneration sample contains 8 UK banks and 34 EU banks. It is smaller than the CDS sample because remuneration disclosures are consolidated at the parent-bank level when both parents and subsidiaries issue CDS contracts, and because remuneration reports are unavailable for a small number of banks. Overall, the sampling methodology and the sample sizes are broadly consistent with those in recent studies of UK and EU banks (Kleymenova and Tuna, 2021; Colonnello et al., 2023).

Table 2 reports descriptive statistics for the remuneration of senior managers (Panels A and B) and non-senior managers (Panels C and D) at UK and EU banks. As discussed in Section 4.1, senior managers include MRTs in MB Management Function, MB Supervisory Function, and Other Senior Management, while the remaining MRTs are classified as non-senior managers.

UK banks employ fewer MRTs than EU banks in both senior (47.40 vs. 111.42) and non-senior management positions (582.69 vs. 622.43), but provide substantially higher remuneration per person and higher variable-to-fixed pay ratios. For senior managers, remuneration per person averages $2.19 million in UK banks versus $1.05 million in EU banks, with a variable-to-fixed ratio of 1.12 versus 0.49. For non-senior managers, remuneration per person averages $0.86 million versus $0.43 million, with a variable-to-fixed ratio of 1.05 versus 0.48. Despite the lower headcount, UK banks also exhibit a larger total remuneration bill than EU banks for both senior MRTs ($80.75 million vs. $55.15 million) and non-senior MRTs ($547.39 million vs. $285.34 million).

In Figure 1, we plot the time-series variation in the average ratio of variable pay to fixed pay for UK and EU banks over the 2011-2025 period, separately for MRTs in senior management and non-senior management positions. As discussed in Section 3, because the disclosure format for MRT remuneration data was not standardized until 2021, we had to reclassify the pre-2021 data to make it comparable across banks and over time.

In 2011, the average variable-to-fixed compensation ratio at UK banks was approximately 260% for non-senior MRTs and 200% for senior MRTs, indicating a greater reliance on variable compensation for MRTs in non-senior management roles. Following the imposition of the bonus cap in 2014, the variable-to-fixed ratio for both groups dropped sharply below 100%, suggesting that the bonus cap was binding for UK banks.[16] During the years when the bonus cap was in effect, the ratio remained well below 100% for non-senior MRTs and generally at or below 100% for senior MRTs (the ratio was slightly over 100% in 2017 because some banks may have used a higher ratio with their shareholder approval).

In contrast, we observe that the average ratio of variable-to-fixed compensation at EU banks was well below 100% for MRTs in both senior-management roles and non-senior man-

[16] Along with the bonus cap regulation, CRD IV introduced a discount rate policy in calculating variable-to-fixed pay ratio: A firm may apply a discount rate to a maximum of 25% of an employee's total variable remuneration provided it is paid in instruments that are deferred for a period of not less than five years (Article 94(1)(g)(iii) of CRD IV). We do not apply any discount in the calculation of variable-to-fixed ratio.

agement roles even before the bonus cap came into effect in 2014. Therefore, it appears that the bonus cap was not binding, on average, for EU banks outside of UK.

Following the removal of the bonus cap, the variable-to-fixed compensation ratio for senior MRTs at UK banks rises sharply above 100%, reaching around 125% in 2024 and exceeding 140% in 2025, while remaining largely unchanged at EU banks. This again indicates that the bonus cap was binding at UK banks. In contrast, the ratio for non-senior MRTs remains broadly stable in both UK and EU banks. It is plausible that compensation contracts of senior employees adjust more rapidly to regulatory changes.

We report the descriptive statistics of key bank characteristics in Table 3. UK banks are larger than EU banks on average, but are broadly similar in leverage, Tier 1 ratio, ROA, and ROE. For shorter-maturity CDS contracts (below five years), EU banks exhibit higher average spreads than UK banks, while the pattern reverses for longer maturities. UK banks also exhibit higher systematic risk, measured by *Beta*. By contrast, UK and EU banks appear broadly similar in quarterly returns, Sharpe ratios, and other stock-based risk measures.

We include US banks as additional control sample for later analysis of the effect of bonus cap *imposition* on bankers' compensation because both UK banks and EU banks were all affected when the bonus cap was imposed. We report the descriptive statistics of the remuneration and employment size of the US banks in Panel C of Table 3. The full list of US banks is in Internet Appendix.

5 Effect of UK's Bonus Cap Removal on Bank Risk and Equity Value

5.1 Effect on Bank Risk

We begin by examining the effect of UK's bonus cap removal on bank CDS spreads, which are a proxy for credit risk. We estimate the DiD regression (1) with $Log\ (CDS\ spread)$ as dependent variable to examine the effects of the two major announcements regarding bonus cap removal on CDS spreads. If high-powered compensation packages incentivize bank executives and traders to take on excessive risks to enhance short-run stock performance, then we should expect an increase in CDS spreads for UK banks relative to EU banks

following the announcements of the bonus cap removal policy. We present these regression results in Table 4. The five columns correspond to five different maturities of CDS contracts: 1, 3, 5, 7, and 10 years.

We find that the coefficients on $Treat \times Post_1$ and $Treat \times Post_2$ are insignificant in all the columns, which indicates that neither of the two major announcements regarding the UK's bonus cap removal policy had any significant lasting effect on the quarterly average CDS spreads of UK banks relative to EU banks. That is, there is no measurable worsening of the market's perception of the credit risk of UK banks relative to EU banks following the announcement of UK's bonus cap removal. As noted above, a potential explanation for this (non-)result is that banking regulation has been tightened significantly in response to the Great Financial Crisis, which limits risk-taking by bank executives and traders.

We present the results of the dynamic DiD regression (2) with $Log(CDS\ spread)$ as the dependent variable in Figure 2 where we plot the β_τ coefficients for CDS spreads of various maturities. Recall that the coefficient β_τ captures the change in $Log\ (CDS\ spread)$ for UK banks between 2022Q2 and the quarter t_τ relative to EU banks. We note that the 1-year, 3-year, and 5-year CDS spreads of UK banks experience a modest increase after the first announcement which is quickly reversed; but these CDS spreads show an upward trend starting in 2025Q1. One interpretation of these patterns is that increases in credit risk take time to materialize. In contrast, we fail to detect any effect of the bonus cap removal announcements on the 7-year and 10-year CDS spreads of UK banks relative to EU banks, either in the short term or the long term.

Next, in Table 5, we present the results of DiD regressions examining the effects of the UK bonus cap removal announcements on the following stock-based measures of risk: *Beta* as a proxy for systematic risk; *Idiosyncratic Volatility*; *Total Volatility*; $\Delta CoVaR$ measures of contribution to and exposure to systemic risk (Adrian and Brunnermeier, 2016); *Expected Shortfall (ES)* and *VaR* as measures of downside risk. Detailed definitions of these variables are in the Appendix. We control these regressions for country-level market volatility, measured as the standard deviation of daily MSCI market returns over the quarter, except in the $\Delta CoVaR$ regressions because these risk measures are already conditional on market conditions.

The positive and significant coefficients on $Treat \times Post_1$ and $Treat \times Post_2$ in column (1) indicate that UK banks experience an economically significant increase in systematic

risk ($Beta$) relative to EU banks following both bonus cap removal announcements. In contrast, there is no evidence of a corresponding increase in either idiosyncratic volatility (column (2)) or total volatility (column (3)) of UK banks relative to EU banks following these announcements. If at all, we find a modest negative effect on idiosyncratic volatility following the first announcement.

The $\Delta CoVaR$ measures in columns (4) and (5) capture banks' contributions to systemic risk ($system|i$) and sensitivity to systemic risk ($i|system$), respectively. We find that UK banks experience an increase in their sensitivity to systemic risk relative to EU banks following both announcements of the bonus cap removal (column (5)), but there is no significant change in their contribution to systemic risk (column (4)).

The insignificant coefficients on $Treat \times Post_1$ and $Treat \times Post_2$ in column (6) and (7) indicate that the bonus cap removal announcements have no significant effect on the downside risk of UK banks relative to EU banks.

We plot the corresponding β_τ coefficients from the dynamic DiD regression (2) for these risk measures in Figure 3. Note that unlike with CDS spreads, we find pre-trends in some of the stock-based risk measures prior to the first bonus cap removal announcement in 2022Q3. We attribute these pre-trends to the fact that stock-based measures are not directly observed but are noisy estimates derived from the distribution of daily stock and market returns. The larger pre-trends are in variables like idiosyncratic volatility, total volatility, ES, and VaR, for which we do not find significant regression results in Table 5. On the other hand, the plots for $Beta$ and $\Delta CoVaR^{i|system}$ are consistent with the corresponding regression results, and the pre-trends, if any, are economically insignificant. Nonetheless, we conduct additional robustness tests for these risk measures which we describe in Section 5.4 below.

Overall, the results in Table 5 are consistent with the notion of differential risk-taking incentives associated with variable pay, particularly the use of stock options (Armstrong and Vashishtha, 2012) that can incentivize managers to increase firm's systematic risk because managers can trade the market portfolio (Tian, 2004; Duan and Wei, 2005). Consistent with these arguments, we find a quick and sharp increase in the systematic risk of UK banks following the announcement of bonus cap removal, but no increase in idiosyncratic risk.

5.2 Effect on Bank Equity Value

In Table 6, we report the results of DiD regressions examining the effect of UK's bonus cap removal announcements on the stock return performance of UK banks relative to EU banks. The dependent variables we examine are *Cumulative Return*, *Average Return*, and *Sharpe Ratio*. We control these regressions for the cumulative market return in the respective country (using that country's MSCI index) over the quarter. The insignificant coefficients on $Treat \times Post_1$ and $Treat \times Post_2$ in all three columns indicate that the announcements of UK's bonus cap removal had no significant effect on the stock return performance of UK banks relative to EU banks. We note that all these coefficients are negative albeit statistically insignificant.

The corresponding dynamic DiD plots for the stock return measures are in Figure 4. The plots point to a drop in the cumulative return, average return and Sharpe ratio of UK banks relative to EU banks following the first announcement of the bonus removal policy, but this effect is reversed within a few quarters.

UK's banker pay deregulation was widely expected to benefit UK banks by providing them more flexibility in the design of compensation contracts and making it easier for them to attract bank executives and traders with high talent. Therefore, our findings in this section – that UK's bonus cap removal had no positive effect on the equity values of UK banks and that the first announcement actually had a short-lived negative effect – are noteworthy and surprising. One likely explanation, which we explore in detail in Section 6 below, is that the bonus cap removal intensified the competition for banker talent in the UK, thus imposing a negative externality on all UK banks.

5.3 Effect on Bank Fundamentals

We showed above that UK banks experienced significant increase in systematic risk relative to EU banks following the bonus cap removal announcement, but there was no significant improvement in equity value. To complement these findings, we examine whether corresponding shifts are visible in banks' fundamental accounting-based measures of financial condition and performance. Accordingly, we estimate the DiD regression (1) to examine effects on the following five variables: *Log Assets* as a measure of bank size; *Leverage* and

Tier 1 Ratio as measures of capital structure; and *ROA* and *ROE* as measures of bank profitability.

The results in Table 7 show that size of UK banks remained broadly unchanged following both announcements (column (1)), while their leverage increased significantly after each event compared to EU banks (column (2)), consistent with the increase in systematic risk documented above. Along similar line, the Tier 1 ratio of UK banks declined significantly following the formal cap removal announcement compared to EU banks (column (3)), pointing to a reduction in capital buffers relative to risk-weighted assets. We note that the increase in leverage happened prior to the formal removal of the bonus cap, which suggests that bank managers may have started adjusting systematic risk following the announcement of the bonus cap removal.

Turning to profitability, both ROA and ROE declined significantly following the formal cap removal, with ROE falling by approximately 2.6 percentage points relative to EU peers. This deterioration in profitability is consistent with the absence of an equity value gain documented in Section 5.2, and together these results suggest that the cap removal did not translate into improved financial performance for UK banks. The dynamic DiD results in Figure 5 confirm that these patterns emerged gradually following the announcements and are not driven by pre-existing trends.

5.4 Robustness Analysis

Brexit and Other Potential Confounding Events

A natural concern is that our findings reflect the lingering effects of Brexit rather than the bonus cap removal. This is unlikely for several reasons. First, our sample period begins in 2021Q1, a full year after Brexit formally took effect and more than four years after the referendum, making it unlikely that Brexit anticipation effects contaminate our control period. Second, the parallel trends plots for our main outcomes show no differential pre-trends between UK and EU banks during the 2021Q1–2022Q2 control period. Third, and most directly, we examine market betas around both the Brexit referendum (2016Q2) and Brexit implementation (2020Q1) in Section C.3 of the Internet Appendix. We find that UK banks' betas increased following the referendum but reversed within three quarters, and show no significant response around the implementation date. This pattern suggests that

any Brexit-related risk effects were fully absorbed well before our sample period begins, and that the sustained increase in betas we document is more plausibly attributed to the bonus cap removal.

A second potential confound is that the initial cap removal announcement in September 2022 was part of the broader "Growth Plan 2022 (or Mini-Budget)," which introduced other policy changes including tax cuts for individuals and businesses, and triggered significant UK financial market turbulence. While we cannot fully rule out the influence of these concurrent developments, the overall pattern of our results offers limited support for these alternative explanations. A purely fiscal stimulus interpretation would predict favorable market reactions and improvements in bank performance, neither of which we observe. At the same time, we acknowledge that the mini-budget is related to broader market turmoil that could affect market-based risk measures in the short run. Consistent with this possibility, CDS spreads increased and equity returns decreased after the initial announcement, although the response was temporary. However, this short-lived response does not fully account for the more persistent increases in market beta and systemic risk exposure, nor does it explain the significant increase in MRT compensation. We therefore interpret the joint pattern of evidence as more consistent with the incentive effects of removing the bonus cap than with the broader macroeconomic backdrop of the mini-budget.

Parallel Trend Assessment

The causal interpretation of our results relies on the parallel trends assumption, that UK and EU banks would have followed similar trajectories in the absence of the bonus cap removal. The dynamic DiD plots presented alongside our main results provide initial support for this assumption, showing no significant pre-trends in our key outcome variables particularly all of those for which we find a significant effect associated with the bonus cap removal, during the 2021Q1–2022Q2 control period. We conduct two additional tests to further assess the robustness of our findings to potential violations of this assumption.

First, we employ the Synthetic DiD estimator of Arkhangelsky et al. (2021), which constructs a synthetic control group by selecting unit weights that closely match the pre-treatment outcome path of the treated group, while using time weights to form a more informative pre-treatment benchmark. This approach is particularly useful for outcome variables that exhibit differential pre-trends in the standard DiD specification — namely, idiosyn-

cratic volatility, total volatility, ES, and VaR — as it weakens reliance on the parallel trends assumption by better aligning pre-treatment trajectories. The results, reported in Section C.1 of the Internet Appendix, show no differential pre-trends under this methodology, and the estimated treatment effects are consistent with those from our main specifications. We also confirm the results for outcome variables that did not exhibit pre-trends in the baseline analysis.

Second, we assess the sensitivity of our significant results, specifically $Beta$ and $\Delta CoVaR$, to post-treatment violations of the parallel trends assumption using the Honest DiD methodology of Rambachan and Roth (2023). This approach tests whether the estimated treatment effects remain statistically significant after allowing for plausible deviations from parallel trends in the post-treatment period. We find, through tests reported in Section C.2 of the Internet Appendix, that the effects remain significant even when allowing for post-treatment violations amounting to 10% of the maximum violation observed during the pre-treatment period, providing further confidence in the causal interpretation of our results.

Placebo Tests

To assess whether our findings could be attributed to chance, we conduct a placebo (permutation) test by randomly assigning the same number of banks as in the true treatment group to a placebo treatment group and re-estimating the DiD regression (1), and repeating this procedure 1,000 times. Under the null hypothesis of no treatment effect, the distribution of placebo coefficients should be centered around zero. As shown in Panel A of Figure 6, the placebo effects for $Beta$ are approximately centered around zero, while the true treatment effect lies in the extreme right tail of the distribution. The corresponding $t-$statistic is among the largest across all 1,000 permutations, confirming that the increase in systematic risk we document is unlikely to be a chance finding.[17]

[17] We also conduct a similar test for our finding relating to $\Delta CoVaR$, but report it in Section C.4 of the internet appendix to conserve space.

6 Effect of UK's Bonus Cap Removal on Banker Compensation

As noted above, one potential explanation for the absence of a positive effect of the bonus cap removal on the equity value of UK banks is that pay deregulation is expected to intensify labor market competition among UK banks, and lead to increase in total compensation (Thanassoulis, 2012) and variable compensation (Acharya et al., 2016), thus offsetting the benefits of greater contracting flexibility. In this section, we test this mechanism directly using our hand-collected MRT compensation data. We first examine changes in the level and composition of pay across MRT groups following the cap removal, then explore whether the response varies systematically with banks' pre-existing bonus cultures. Finally, we present additional confirmatory evidence on payment forms and examine the symmetric effects of the 2014 cap imposition, which together reinforce the interpretation that bonus cap regulation meaningfully shapes banker compensation in both directions.

6.1 Effect on the Level and Composition of Pay

We examine changes in the level and composition of MRT compensation at UK banks relative to EU banks following the bonus cap removal using a variant of the DiD regression (1) estimated on a bank-year panel. The analysis focuses on 2022, 2024, and 2025 (for some banks, primarily within the control group, 2025 data were unavailable at the time of writing due to disclosure lags). We exclude 2021 due to changes in MRT identification criteria, and 2023 to avoid conflating pre- and post-removal compensation adjustments.[18]

We examine the following dependent variables ($y_{i,t}$): $Log\ Fixed(pp)$ which is log of the fixed remuneration per risk taker; $Log\ Var(pp)$ which is log of the variable remuneration per risk taker; $Log\ Total(pp)$ which is log of the total remuneration per risk taker; $Total(pp)$ which is the total remuneration per risk taker in $million; and $Var\text{-}Fixed\ Ratio$ which is the ratio of variable remuneration to fixed remuneration. $Treat_i$ is an indicator for UK banks. $Post_t$ is an indicator which takes the value of 1 for 2024 and 2025, and equals 0 for year 2022. We estimate these regressions separately for three different groups of MRTs: Top Managers

[18] Some banks adjusted compensation immediately following the October 2023 removal of the bonus cap, which could bias treatment estimates if treated as part of the pre-period.

(MB Management Function), Other Senior Managers, and Non-senior Managers. We do not examine the compensation of MRTs in Supervisory Function because they only receive fixed remuneration without any forms of variable remuneration, which is not our focus. The results are presented in Table 8.

The results in Table 8 reveal strong and broad-based increases in compensation at UK banks relative to EU peers following the bonus cap removal. The results in Panel A show that, for top managers at UK banks relative to their EU peers, total compensation per person rose by approximately 19% (column (3), or $2.49 million on average (column (4)). This was driven by a 32% increase in variable pay per person (column (2)) even as fixed pay person decreased by 15% (column (1)). The variable-to-fixed pay ratio for top managers nearly doubled relative to EU peers, indicating a sharp structural shift in how UK banks compensate their most senior employees after the bonus cap removal.

The results in Panel B indicate that other senior managers at UK banks experienced similar but comparatively modest changes, with variable pay per person increasing by 24.2% (column (2)), total compensation per person increasing by 16.6% (column (3)), and the variable-to-fixed pay ratio increasing by 23.6% (column (5)) relative to EU peers. On the other hand, for non-senior managers (Panel C), there is only modest increase in total compensation per person on average ($0.065 million), suggesting that the restructuring of compensation toward variable pay was concentrated among senior employees.[19]

We present the results of the corresponding dynamic DiD regression (2) in Figure 7, where we plot the β_τ coefficients separately for top managers, other senior managers, and non-senior managers in panels A, B, and C, respectively. These plots confirm that the increases in variable pay, total pay, and variable-to-fixed pay ratio for top managers and other senior managers emerged gradually after the bonus cap removal took effect in late 2023, and strengthened through 2024 and 2025, with no evidence of pre-existing trends. Taken together, the results in this section are consistent with the predictions of Thanassoulis (2012) and Acharya et al. (2016): the removal of the bonus cap intensified labor market competition for banker talent, pushing up both total and variable compensation broadly across UK banks

[19] The baseline specification uses the log transformation of compensation variables and excludes observations with zero values. In unreported tests, we re-estimate Poisson regression specifications using original compensation variables without log transformation, and find that the results remain robust.

relative to EU banks. The resulting increase in remuneration costs provides a plausible explanation for the absence of an equity value gain documented in Section 5.2.

Finally, we assess whether the increase in the variable-to-fixed ratio for top managers could be attributed to chance using a placebo permutation test analogous to that described in Section 5.4. We randomly assign the same number of banks as in the true treatment group to a placebo treatment group, re-estimate the DiD regression, and repeat this procedure 1,000 times. As shown in Panel B of Figure 6, the distribution of placebo effects for the variable-to-fixed ratio of top managers is approximately centered around zero, while the true treatment effect lies in the extreme right tail. The corresponding $t-$statistic is among the largest across all 1,000 permutations, confirming that the sharp increase in variable compensation among top managers at UK banks is unlikely to reflect a chance finding. For completeness, Section C.4 of the internet appendix reports the analogous placebo distributions for other senior managers and non-senior managers.

6.2 Bank "Bonus Culture" and Heterogeneous Treatment Effects

It is possible that banks have persistent differences in their reliance on high-powered compensation packages ("bonus culture"), and these differences may shape their reaction to UK's bonus cap removal. To test this hypothesis, we examine whether the treatment effect varies with UK banks' compensation structures prior to the EU bonus cap implementation in 2014, that is, almost a decade prior to UK's bonus cap removal.

We capture the bonus culture of UK banks using the variable-to-fixed pay ratio of all MRTs in 2013 ("pre-treatment ratio"), because it reflects banks' compensation practices in the absence of any restrictions on incentive pay. We use the ratio of all MRTs instead of the ratio of the specific type of MRTs because some banks only disclose the compensation data of all MRTs at the aggregate level without detailed classification of MRTs before 2014 (see examples in the Internet Appendix). We define the indicator variables, *High* and *Low*, to identify UK banks whose pre-treatment ratio is higher than and lower than, respectively, the sample median. We then estimate the following variant of the DiD regression (1):

$$y_{i,t} = \alpha + \beta_1 \times Treat_i \times Post_t \times High_i + \beta_2 \times Treat_i \times Post_t \times Low_i + \delta_i + \gamma_t + \epsilon_{i,t} \quad (3)$$

We present these regression results in Table 9, separately for top managers (Panel A), other senior managers (Panel B), and non-senior managers (Panel C). The coefficients, β_1 and β_2, capture the responses of UK banks in the *High* and *Low* pre-treatment groups, respectively, to UK's bonus cap removal. We report the statistical significance of the difference, $\beta_1 - \beta_2$, in the row titled "High−Low".

The results in Panel A reveal striking heterogeneity. For top managers at UK banks, the increase in the variable-to-fixed ratio following the bonus cap removal is nearly twice as large for banks in the high pre-treatment group relative to those in the low group (141% vs. 69%), and this difference is statistically significant. This pattern holds broadly across other dependent variables: banks in the high group implement larger reductions in fixed pay per person, and larger increases in variable pay and total compensation per person compared to the banks in the low group, though the differences are statistically significant primarily for fixed pay and total compensation.

The results in panels B and C indicate that similar directional patterns emerge with respect to the variable-to-fixed pay ratio for other senior managers and non-senior managers, respectively, but the differences between the two groups are generally smaller and less likely to be statistically significant.

The results in Table 9, especially Panel A, are striking because restrictions on variable pay were in place for almost a decade. Therefore, the finding that banks with stronger pre-cap bonus cultures revert more aggressively to high-powered compensation after deregulation points to the existence of a persistent bonus culture at some UK banks. It suggests that regulatory constraints may suppress but do not permanently alter deeply embedded compensation norms, which reassert themselves once the constraints are lifted.

6.3 Additional Evidence

Effect of the 2014 Bonus Cap Imposition: An important caveat with the analysis in Section 6.1 is that we only have compensation data for two years after UK's bonus cap removal went into effect. Hence, to complement the deregulation analysis, we examine the symmetric effects of the EU bonus cap imposition in 2014 on banker compensation. Because both UK and EU banks were subject to the cap when it was introduced ($Treat_i = 1$), we use a set of major publicly listed US banks as the control group ($Treat_i = 0$). Because

US banks do not disclose MRT-level compensation, we focus on total remuneration per employee rather than per MRT. We estimate variants of the DiD regression (1) and the dynamic DiD regression (2) on a bank-year panel covering 2011–2023, with *Post* identifying years after 2014. We examine three dependent variables: *Log Remuneration*(*pp*), defined as log remuneration per employee; *Log Remuneration*, defined as log total remuneration; and *Log Assets*(*pp*), defined as the log ratio of total assets to employees.

We present the results in Table 10, separately for UK versus US banks (Panel A) and EU versus US banks (Panel B). The results in both panels are qualitatively similar. Following the EU bonus cap imposition in 2014, both UK and EU banks experienced significant declines in remuneration per employee relative to US banks (column (1)). The economic magnitudes are substantial, with remuneration per employee declining by approximately 10% for UK banks and 19% for EU banks in the post-2014 period. Total remuneration also declined significantly (column (2)), but this was partly due to the reduction in bank size (column (3)). The decline in remuneration per employee suggests that the EU bonus cap improved the bargaining power of EU banks (including UK banks) in the labor market for banker talent. Logically, therefore, we should expect the UK bonus cap removal to weaken the bargaining power of UK banks in the labor market for banker talent and lead to increases in remuneration costs, which can explain the fact that equity values of UK banks did not increase after the bonus cap removal.

The results of the dynamic DiD regression in Figure 8 indicate that remuneration per employee declines more gradually for UK banks but more immediately for EU banks relative to US banks (Panels (a) and (b)). By contrast, total remuneration falls sharply for both UK and EU banks following the imposition of the EU bonus cap (Panels (c) and (d)). Panels (e) and (f) show a pronounced decline in assets per employee, suggesting that reductions in bank size partly explain the decline in total remuneration, although the effect largely reverses for UK banks after 2020.

These findings complement the deregulation results in two important ways. First, they confirm that the bonus cap was a binding constraint that meaningfully reduced compensation costs at affected banks. Second, the decline in remuneration following the cap imposition is consistent with the prediction of Thanassoulis (2012) that pay regulation softens labor market competition among banks, improving their bargaining power in the market for banker

talent. These dynamics are reversed following the bonus cap removal, as we showed in Section 6.1.

Effect on Payment Forms: We further examine how the composition of MRT compensation by payment form evolves following the bonus cap removal. As described in Section 4.1, both fixed and variable remuneration are classified into three payment forms– cash, share-based, and other– with variable remuneration additionally split between deferred and non-deferred components. We estimate variants of the DiD regression (1) to examine the effects of the bonus cap removal on cash and share-based pay, separately for each MRT group.

To conserve space, we report these results in Table B.3 in the Internet Appendix. The results are broadly consistent with the compensation level and composition changes documented in Section 6.1. Following the bonus cap removal, UK banks shifted the compensation structure of senior MRTs toward greater reliance on variable compensation and a higher share of share-based pay, while the compensation structure of non-senior managers remained relatively stable. The greater reliance on deferred and performance-sensitive pay among senior managers is consistent with our earlier evidence of stronger risk-taking incentives following deregulation, and reinforces the interpretation that the cap removal meaningfully altered the incentive structure of senior UK bankers.

7 Conclusion

We use a recent regulatory change in the UK, which removed restrictions on banker variable pay that were earlier imposed by the EU, to identify the effect of bankers' incentive pay on bank risk and shareholder value. Hand-collecting remuneration data on all material risk takers for each UK and EU banks in our sample, we show that the bonus cap implementation and its removal were highly binding and had significant effects on banker pay.

The announcement of UK's bonus cap removal does not have a significant effect on the CDS spreads and other measures of left-tail risk. That is, there is no measurable worsening of the market's perception of the credit risk of UK banks, which goes against the fears expressed by policymakers that increase in the pay convexity of bankers will lead to an increase in tail risk. On the other hand, the removal of the cap is associated with a significant increase in bank's market beta, suggesting that the systematic risk of UK banks increased. We also

observe that UK banks significantly increased their leverage. These results are consistent with the notion of differential risk-taking incentives associated with variable pay, which can incentivize managers to increase firm's systematic risk (rather than idiosyncratic risk).

The announcement of the deregulation is not associated with a positive effect on UK banks' equity value. It is surprising that such a strong and binding constraint on the contracting space has no significant impact on firm value. We show that a potential explanation for this muted effect on the equity value of UK banks is that the removal of the bonus cap is expected to intensify labor market competition among UK banks for banker talent. By unrestricting variable compensation, the positive effect arising from the expanded contracting space can be offset by the negative effect from more intense labor market competition.

Our analysis also shows strong heterogeneity in the treatment effect. The effect is almost three times larger for UK banks that relied more heavily on variable pay before the bonus cap introduction, consistent with the argument that bank's bonus culture is persistent.

Overall, our analysis offers three main takeaways. First, in the presence of stringent banking regulations, increase in pay convexity of bankers may not have a significant effect on bank left-tail risk, but can still incentivize managers to increase bank systematic risk, highlighting the importance of considering differential risk-taking incentive effects. Second, regulatory interventions in bankers' pay can have unintended effects on the labor market competition for banker talent. Third, bank-specific bonus culture tends to be persistent.

Appendix: Definition of Variables

Variable	Definition
CDS Spreads	
1-year CDS Spread	Quarterly average of 1-year daily credit default spread for senior secured debt(in bps, 1bp = 0.01%)
3-year CDS Spread	Quarterly average of 3-year daily credit default spread for senior secured debt(in bps, 1bp = 0.01%)
5-year CDS Spread	Quarterly average of 5-year daily credit default spread for senior secured debt(in bps, 1bp = 0.01%)
7-year CDS Spread	Quarterly average of 7-year daily credit default spread for senior secured debt(in bps, 1bp = 0.01%)
10-year CDS Spread	Quarterly average of 10-year daily credit default spread for senior secured debt(in bps, 1bp = 0.01%)
Stock Market Measures	
Beta	Market Beta of the bank based on MSCI UK index (UK banks) and MSCI Europe index (EU banks)
$\Delta CoVaR^{system\|i}_{95\%,t}$	Value at risk of the entire system conditional upon institution i's level of distress based on Adrian and Brunnermeier (2016)
$\Delta CoVaR^{i\|system}_{95\%,t}$	Value at risk of an individual bank conditional on the value at risk of the system based on Adrian and Brunnermeier (2016)
Idiosyncratic Volatility	Standard deviation of residuals from the market model estimated within a quarter, scaled by the square root of the number of trading days
Total Volatility	Standard deviation of daily log returns within a quarter, scaled by the square root of the number of trading days
VaR	5% Value at Risk, computed as the negative of the 5% worst daily return of the bank's stock over a quarter
ES	Expected Shortfall, the negative of the average return on the bank's stock over the 5% worst return days for the bank's stock over a quarter
Cumulative Return	Quarterly compounded return from daily stock returns
Average Return	Arithmetic average of daily stock returns over a quarter multiplies number of trading days in a quarter

Continued

Variable	Definition
Sharpe-Ratio	Ratio of Average Return over Total Volatility
Remuneration of Material Risk Taker (MRT)	
Log Fixed(pp)	Log (fixed remuneration per person for MRT)
Log Var(pp)	Log (variable remuneration per person for MRT)
Log Total(pp)	Log (total remuneration per person for MRT)
Total(pp)	Total remuneration per person for MRT
Var-Fixed Ratio	The ratio of variable remuneration to fixed remuneration of MRT
Bank Fundamentals	
Log Assets	Log (total assets (CIQ Data Item 1007))
Leverage	The ratio of total liabilities (CIQ Data Item 1276) to total assets (CIQ Data Item 1007)
Tier 1 Ratio	The ratio of Tier 1 regulatory capital to risk weighted assets (CIQ Data Item 4292)
ROA	Return on assets (CIQ Data Item 4178), computed as (EBIT $\times$ 0.625)/((total assets(t) + total assets(t-1))/2)
ROE	Return on Equity (CIQ Data Item 4128), computed as continuing operations/((total equity(t) + total equity(t-1))/2)
Total Remuneration	
Log Remuneration	Log (total remuneration of all employees)
Log Remuneration(pp)	Log (total remuneration of all employees/employee number)
Log Assets(pp)	Log (total assets/total number of employees)

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Table 1: Sample Summary

The table provides an overview of the samples used in our analysis. Panel A reports the multiple samples that we use for the analysis of the removal of bonus cap. The observations in CDS sample are bank entities that have issued CDS contracts. The observations in stock return sample are listed entities of banks. For banks where both the parent and subsidiaries have issued CDS contracts, both entities are included in the CDS sample, but only the parent is kept in the stock return sample. We construct our MRT (material risk taker) remuneration sample based on the CDS sample. We collect the MRT remuneration data for all banks in CDS sample with a few unavailable. For banks where both the parent and subsidiaries have issued CDS contracts, we only keep the parent in the MRT remuneration sample because the remuneration data for the parent is consolidated which already incorporates the data of its subsidiaries. Panel B reports the sample banks at parent level. The parent bank sample is used for the analysis of bank fundamentals and the analysis of the imposition of bonus cap. In the analysis of bank fundamentals, the treated banks are UK banks and the control banks are EU banks. In the analysis of bonus cap imposition, the treated banks are UK banks and EU banks, while the control banks are US banks. The detailed list of banks is provided in the Internet Appendix.

Panel A: Bank Sample Composition

	CDS Sample	Stock Return Sample	MRT Remuneration Sample
UK Banks (Treated)	16	6	8
EU Banks (Control)	44	27	34
Total	60	33	42

Panel B: Sample of Unique Parent Banks

UK Banks	9
EU Banks	37
US Banks	13
Total	59

Table 2: Summary of Remuneration of MRTs

This table reports descriptive statistics for MRT remuneration over 2011–2025. Panels A and B report statistics for senior managers; Panels C and D report statistics for non-senior managers. The figures are in US dollar millions, except for the number of MRTs and the variable-fixed ratio; per-person values are indicated separately. Original local-currency amounts are converted to US dollars using annual spot exchange rates from FRED St. Louis.

	Mean	Std.Dev.	p25	p50	p75	Obs.
Panel A: Senior Managers (UK Banks)						
Number of MRTs	47.40	39.76	25.00	29.00	48.50	88
Fixed Remuneration	38.83	26.31	17.42	34.52	49.80	103
Variable Remuneration	41.91	32.54	18.82	33.62	57.19	103
Total Remuneration	80.75	54.26	34.51	69.77	110.00	103
Fixed Remuneration (per-person)	1.06	0.51	0.55	1.13	1.43	88
Variable Remuneration (per-person)	1.13	0.78	0.47	1.04	1.66	88
Total Remuneration (per-person)	2.19	1.16	1.10	2.15	3.00	88
Var-Fixed Ratio	1.12	0.67	0.65	1.00	1.39	103
Panel B: Senior Managers (EU Banks)						
Number of MRTs	111.42	183.66	22.00	31.00	110.00	278
Fixed Remuneration	35.79	42.75	11.43	19.27	44.60	267
Variable Remuneration	19.34	34.16	2.28	7.05	20.36	267
Total Remuneration	55.15	72.93	14.59	27.11	64.09	267
Fixed Remuneration (per-person)	0.65	0.59	0.32	0.48	0.77	267
Variable Remuneration (per-person)	0.41	0.63	0.03	0.15	0.53	267
Total Remuneration (per-person)	1.05	1.14	0.40	0.66	1.20	267
Var-Fixed Ratio	0.49	0.45	0.15	0.36	0.76	267
Panel C: Non-senior Managers (UK Banks)						
Number of MRTs	582.69	549.19	80.50	556.00	1100.00	88
Fixed Remuneration	279.35	320.91	20.66	121.98	372.00	103
Variable Remuneration	268.03	322.29	17.17	111.49	470.10	103
Total Remuneration	547.39	631.10	34.51	337.30	810.00	103
Fixed Remuneration (per-person)	0.44	0.14	0.35	0.46	0.55	88
Variable Remuneration (per-person)	0.41	0.27	0.21	0.36	0.56	88
Total Remuneration (per-person)	0.86	0.37	0.59	0.85	1.14	88
Var-Fixed Ratio	1.05	0.90	0.55	0.82	1.09	103
Panel D: Non-senior Managers (EU Banks)						
Number of MRTs	622.43	741.12	130.00	377.50	873.00	278
Fixed Remuneration	171.94	216.74	31.80	105.39	214.54	267
Variable Remuneration	112.59	205.04	6.69	29.29	92.24	267
Total Remuneration	285.34	406.69	42.08	136.64	315.92	267
Fixed Remuneration (per-person)	0.27	0.12	0.18	0.26	0.33	267
Variable Remuneration (per-person)	0.16	0.18	0.03	0.09	0.21	267
Total Remuneration (per-person)	0.43	0.28	0.22	0.35	0.56	267
Var-Fixed Ratio	0.48	0.42	0.19	0.36	0.70	267

Table 3: Descriptive Statistics

The table reports descriptive statistics for variables used in the analysis. The sample period is 2021Q1–2025Q4 (quarterly) for CDS spreads, stock market measures, and bank fundamentals, and 2011–2023 (annual) for remuneration and employment variables. Panels A, B, and C correspond to UK, EU, and US banks, respectively. Variable definitions are provided in the Appendix. CDS spreads are quarterly averages of daily spreads and are reported in basis points (1 bp = 0.01%).

Panel A: UK Banks						
	Mean	Std.Dev.	p25	p50	p75	Obs.
CDS spreads (Quarterly, 2021Q1 - 2025Q4)						
1-year CDS Spread	37.52	31.56	18.91	25.47	37.27	316
3-year CDS Spread	54.86	35.40	32.17	39.95	67.96	316
5-year CDS Spread	74.44	39.52	46.66	59.80	96.64	316
7-year CDS Spread	89.85	42.58	59.65	77.63	112.22	316
10-year CDS Spread	103.12	45.52	70.20	92.44	122.21	316
Stock Market Measures (Quarterly, 2021Q1 - 2025Q4)						
Beta	1.42	0.19	1.28	1.38	1.56	120
Idiosyncratic Volatility	0.24	0.05	0.22	0.23	0.26	120
Total Volatility	0.31	0.06	0.27	0.30	0.34	120
$\Delta CoVaR^{system\|i}_{95\%,t}$	0.04	0.01	0.03	0.04	0.04	120
$\Delta CoVaR^{i\|system}_{95\%,t}$	0.05	0.01	0.04	0.05	0.06	120
Value at Risk	0.03	0.01	0.02	0.03	0.03	120
Expected Shortfall	0.04	0.01	0.04	0.04	0.05	120
Cumulative Return	0.40	0.37	0.12	0.34	0.61	120
Average Return	0.35	0.26	0.15	0.33	0.53	120
Sharpe Ratio	1.16	0.80	0.52	1.14	1.81	120
Bank fundamentals (Quarterly, 2021Q1 - 2025Q4)						
Total Assets ($B)	1064.04	945.74	311.93	875.14	1823.84	155
ROA (%)	0.59	0.31	0.42	0.53	0.71	149
ROE (%)	9.57	4.00	7.41	9.66	11.90	153
Tier1 Ratio (%)	18.65	4.39	16.40	17.00	18.25	128
Leverage (%)	93.82	1.45	93.64	94.10	94.75	155
Employment and Remuneration (Annual, 2011 - 2023)						
Total Remuneration ($B)	6.22	6.41	0.74	5.22	9.62	117
Remuneration per person ($M)	0.09	0.03	0.07	0.08	0.11	104
Total Remuneration/Equity(%)	11.57	6.25	7.37	9.81	13.94	117
Assets per person ($M)	14.46	3.99	11.90	14.26	17.11	104

Panel B: EU Banks

	Mean	Std.Dev.	p25	p50	p75	Obs.
CDS spreads (Quarterly, 2021Q1 - 2025Q4)						
1-year CDS Spread	40.55	61.96	17.49	28.20	43.18	851
3-year CDS Spread	58.40	55.83	30.50	45.84	63.99	851
5-year CDS Spread	77.08	55.79	43.99	63.40	88.78	851
7-year CDS Spread	90.42	56.23	57.36	75.37	105.69	851
10-year CDS Spread	101.67	56.30	68.40	87.11	120.94	851
Stock Market Measures (Quarterly, 2021Q1 - 2025Q4)						
Beta	0.96	0.27	0.77	0.94	1.12	540
Idiosyncratic Volatility	0.27	0.09	0.22	0.25	0.32	540
Total Volatility	0.32	0.10	0.25	0.31	0.37	540
$\Delta CoVaR^{system\|i}_{95\%,t}$	0.04	0.02	0.03	0.04	0.05	540
$\Delta CoVaR^{i\|system}_{95\%,t}$	0.05	0.01	0.04	0.05	0.06	540
Value at Risk	0.03	0.01	0.02	0.03	0.03	540
Expected Shortfall	0.04	0.01	0.04	0.04	0.05	540
Cumulative Return	0.42	0.39	0.19	0.39	0.64	540
Average Return	0.37	0.31	0.22	0.38	0.54	540
Sharpe Ratio	1.24	0.85	0.73	1.30	1.83	540
Bank fundamentals (Quarterly, 2021Q1 - 2025Q4)						
Total Assets ($B)	673.67	681.01	216.10	400.84	864.92	718
ROA (%)	0.64	0.42	0.34	0.61	0.90	692
ROE (%)	9.79	5.43	6.25	9.77	13.50	700
Tier1 Ratio (%)	17.01	2.93	15.10	16.50	18.70	630
Leverage (%)	93.61	2.15	92.63	94.19	95.06	718
Employment and Remuneration (Annual, 2011 - 2023)						
Total Remuneration ($B)	4.20	4.51	1.06	2.29	6.21	461
Remuneration per person ($M)	0.10	0.04	0.07	0.10	0.12	451
Total Remuneration/Equity(%)	11.35	4.40	8.26	10.86	13.59	461
Assets per person ($M)	23.58	33.57	9.58	16.09	26.31	451

Panel C: US Banks

	Mean	Std.Dev.	p25	p50	p75	Obs.
Employment and Remuneration (Annual, 2011 - 2023)						
Total Remuneration ($B)	14.34	12.33	3.96	8.15	25.69	167
Remuneration per person ($M)	0.15	0.07	0.11	0.13	0.16	167
Total Remuneration/Equity(%)	15.24	5.29	11.85	14.29	16.98	167
Assets per person ($M)	11.24	6.64	6.90	9.48	14.32	167

Table 4: Change in CDS Spread

The table reports the results of OLS estimation of equation (1) to estimate the effect of bonus cap removal on the CDS Spread with maturity of 1-year, 3-year, 5-year, 7-year, and 10-year. The sample period is 2021Q1 - 2025Q4. Bank fixed effects and quarter fixed effects are included. The treated group consists of UK banks. The control group consists of EU banks. *Treat* is equal to 1 for the treated group. $Post_1$ is equal to 1 for quarters from 2022Q3 to 2023Q3, starting at the quarter when the UK regulator announced the intention to remove the bonus cap and ending at one quarter before the quarter when the UK regulator formally announced the removal of the bonus cap. $Post_2$ is equal to 1 for quarters starting from 2023Q4, when the UK regulator formally announced the removal of the bonus cap. The standard errors clustered by bank are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	(1) 1-year	(2) 3-year	(3) 5-year	(4) 7-year	(5) 10-year
Treat×Post$_1$	0.053	0.011	-0.006	-0.010	-0.006
	(0.120)	(0.092)	(0.075)	(0.063)	(0.059)
Treat×Post$_2$	0.160	0.062	0.036	0.023	0.019
	(0.097)	(0.069)	(0.056)	(0.048)	(0.046)
Log 5-year country-average Spread	-0.001	-0.014	-0.010	-0.013	-0.012
	(0.058)	(0.051)	(0.045)	(0.037)	(0.033)
Constant	-5.865***	-5.430***	-5.075***	-4.885***	-4.737***
	(0.246)	(0.215)	(0.189)	(0.156)	(0.138)
Bank FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.7787	0.8176	0.8333	0.8470	0.8493
Observations	1167	1167	1167	1167	1167

Table 5: Change in Stock Market Risk Measures

The table reports the results of OLS estimation of equation (1) to estimate the effect of bonus cap removal on different risk measures of stock market. The sample period is 2021Q1 - 2025Q4. Bank fixed effects and quarter fixed effects are included. *Beta* is the market beta. *Idiosyncratic Volatility* is the standard deviation of residuals from the market model estimated within a quarter, scaled by the square root of the number of trading days. *Total Volatility* is the standard deviation of daily log returns within a quarter, scaled by the square root of the number of trading days. $\Delta CoVaR$ corresponds to contributions to systemic risk $system|i$ or sensitivity to systemic risk $i|system$. *ES* is the expected shortfall, which is the negative of the average return on the bank's stock over the 5% worst return days for the bank's stock over a quarter. *VaR* is Value at Risk, computed as the negative of the 5% worst daily return of the bank's stock over a quarter. *Treat* is equal to 1 for the treated group. $Post_1$ is equal to 1 for quarters from 2022Q3 to 2023Q3, starting at the quarter when the UK regulator announced the intention to remove the bonus cap and ending at one quarter before the quarter when the UK regulator formally announced the removal of the bonus cap. $Post_2$ is equal to 1 for quarters starting from 2023Q4, when the UK regulator formally announced the removal of the bonus cap. The standard errors clustered by bank are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	Beta	Idiosyncratic Volatility	Total Volatility	$\Delta CoVaR^{system\|i}_{95\%,t}$	$\Delta CoVaR^{i\|system}_{95\%,t}$	ES	VaR
Treat×Post$_1$	0.318***	-0.029*	-0.031	0.001	0.011***	-0.004	-0.002
	(0.043)	(0.017)	(0.019)	(0.003)	(0.001)	(0.003)	(0.001)
Treat×Post$_2$	0.219**	0.012	0.006	0.003	0.012***	-0.000	-0.001
	(0.082)	(0.012)	(0.013)	(0.002)	(0.001)	(0.002)	(0.001)
Market Volatility	1.497*	0.509**	0.661***	-0.002	-0.014	0.078**	0.032*
	(0.797)	(0.194)	(0.236)	(0.028)	(0.011)	(0.035)	(0.018)
Constant	0.750***	0.179***	0.207***	0.038***	0.053***	0.030***	0.024***
	(0.139)	(0.034)	(0.041)	(0.005)	(0.002)	(0.006)	(0.003)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.7751	0.7437	0.7517	0.8547	0.9545	0.6782	0.7794
Observations	660	660	660	660	660	660	660

Table 6: Change in Stock Returns and Sharpe-Ratio

The table reports the results of OLS estimation of equation (1) to estimate the effect of bonus cap removal on stock returns and sharpe ratio. The sample period is 2021Q1 - 2025Q4. Bank fixed effects and quarter fixed effects are included. *Cumulative Return* is quarterly compounded return from daily stock returns. *Average Return* is the arithmetic average of daily stock returns over a quarter multiplying the number of trading days in a quarter. *Sharpe-Ratio* is the ratio of *Average Return* over $Total\ Volatility$. $Treat$ is equal to 1 for the treated group. $Post_1$ is equal to 1 for quarters from 2022Q3 to 2023Q3, starting at the quarter when the UK regulator announced the intention to remove the bonus cap and ending at one quarter before the quarter when the UK regulator formally announced the removal of the bonus cap. $Post_2$ is equal to 1 for quarters starting from 2023Q4, when the UK regulator formally announced the removal of the bonus cap. The standard errors clustered by bank are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	(1) Cumulative Return	(2) Average Return	(3) Sharpe Ratio
Treat×Post$_1$	-0.153	-0.063	-0.184
	(0.155)	(0.111)	(0.277)
Treat×Post$_2$	-0.136	-0.084	-0.177
	(0.186)	(0.125)	(0.358)
Market Return	0.527***	0.382***	1.261***
	(0.147)	(0.104)	(0.300)
Constant	0.367***	0.323***	1.081***
	(0.028)	(0.020)	(0.056)
Bank FE	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes
AdjR^2	0.4609	0.4548	0.5485
Observations	660	660	660

Table 7: Change in Bank Fundamentals around Bonus Cap Removal

This table reports the results of OLS estimation of equation (1) to estimate the effect of the removal of bonus cap in 2023 on bank key fundamentals. The fundamental data are quarterly. Bank fixed effects and quarterly fixed effects are included. The sample period is 2021Q1 - 2025Q4. The treated group consists of UK banks. The control group consists of EU banks. *Treat* is equal to 1 for the treated group. $Post_1$ is equal to 1 for quarters from 2022Q3 to 2023Q3, starting at the quarter when the UK regulator announced the intention to remove the bonus cap and ending at one quarter before the quarter when the UK regulator formally announced the removal of the bonus cap. $Post_2$ is equal to 1 for quarters starting from 2023Q4, when the UK regulator formally announced the removal of the bonus cap. *Log Assets* is log (total assets); *Leverage* is the ratio of total liabilities to total assets(in pct); *Tier 1 Ratio* is the ratio of Tier 1 Capital to risk-weighted assets(in pct); *ROA* is return on assets (in pct); *ROE* is return on equity (in pct). The standard errors clustered by bank are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	(1) Log Assets	(2) Leverage	(3) Tier1 Ratio	(4) ROA	(5) ROE
Treat×Post$_1$	0.036	0.572***	-0.816	-0.127*	-1.552
	(0.029)	(0.194)	(0.546)	(0.063)	(0.962)
Treat×Post$_2$	0.046	0.779***	-1.804**	-0.216**	-2.585**
	(0.035)	(0.239)	(0.710)	(0.082)	(1.130)
Constant	6.092***	93.559***	17.463***	0.654***	10.027***
	(0.004)	(0.026)	(0.073)	(0.009)	(0.122)
Bank FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.9967	0.9201	0.8208	0.5526	0.4794
Observations	873	873	758	841	853

Table 8: Change in MRT Remuneration around Bonus Cap Removal

This table reports OLS estimates of equation (1) on the effect of the 2023 bonus cap removal on MRT remuneration across positions. Panel A reports top managers, Panel B other senior managers, and Panel C non-senior managers. Bank and year fixed effects are included. The sample covers 2022, 2024, and 2025. Treated banks are UK banks, with EU banks as the control group. *Post* equals 1 for 2024 and 2025. *Log Fixed*(*pp*), *Log Var*(*pp*), and *Log Total*(*pp*) denote log(remuneration per risk taker) for fixed, variable, and total remuneration, respectively. *Total*(*pp*) is total remuneration per risk taker (in $ million), and *Var-Fixed Ratio* is the ratio of variable to fixed pay. Standard errors clustered at the bank level are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	(1) Log Fixed (pp)	(2) Log Var (pp)	(3) Log Total (pp)	(4) Total (pp)	(5) Var-Fixed Ratio
Panel A: Top Managers					
Treat×Post	-0.154**	0.321**	0.187*	2.487***	0.952***
	(0.076)	(0.156)	(0.103)	(0.889)	(0.211)
Constant	0.413***	0.329***	1.001***	4.049***	0.920***
	(0.013)	(0.030)	(0.017)	(0.147)	(0.035)
Bank FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.9022	0.9127	0.9211	0.9142	0.8446
Observations	91	77	91	91	91
Panel B: Other Senior Managers					
Treat×Post	0.059	0.242*	0.166**	0.745***	0.236*
	(0.056)	(0.129)	(0.080)	(0.254)	(0.123)
Constant	-0.498***	-1.051***	-0.035**	1.551***	0.656***
	(0.010)	(0.026)	(0.014)	(0.045)	(0.022)
Bank FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.9850	0.9868	0.9884	0.9712	0.9087
Observations	85	75	85	85	85
Panel C: Non-senior Managers					
Treat×Post	0.107	0.230	0.143	0.065***	0.059
	(0.089)	(0.185)	(0.094)	(0.018)	(0.037)
Constant	-1.371***	-2.351***	-0.972***	0.499***	0.535***
	(0.014)	(0.030)	(0.015)	(0.003)	(0.006)
Bank FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.9675	0.9475	0.9797	0.9910	0.9628
Observations	93	93	93	93	93

Table 9: Heterogeneous Effects of Bonus Cap Removal on MRT Remuneration

This table reports OLS estimates of equation (3) on the heterogeneous effects of the 2023 bonus cap removal on MRT remuneration by pre-treatment compensation structure. Panels A, B, and C report top managers, other senior managers, and non-senior managers, respectively. The sample covers 2022, 2024, and 2025. UK banks are the treated group and EU banks are the control group. $Treat$ equals 1 for UK banks, $Post$ equals 1 for 2024 and 2025, and $High$ (Low) equals 1 for banks with high (low) pre-treatment variable-fixed ratios. $High - Low$ reports the difference between the coefficients on $Treat \times Post \times High$ and $Treat \times Post \times Low$. $Log\ Fixed(pp)$, $Log\ Var(pp)$, and $Log\ Total(pp)$ denote log(remuneration per risk taker) for fixed, variable, and total remuneration, respectively; $Total(pp)$ is remuneration per risk taker (in $ million), and $Var\text{-}Fixed\ Ratio$ is the ratio of variable to fixed remuneration. Bank and year fixed effects are included. Standard errors clustered at the bank level are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	(1) Log Fixed(pp)	(2) Log Var(pp)	(3) Log Total(pp)	(4) Total(pp)	(5) Var-Fixed Ratio
Panel A: Top Managers					
Treat×Post×High	-0.272***	0.378**	0.256*	4.293***	1.410***
	(0.096)	(0.172)	(0.128)	(1.475)	(0.144)
Treat×Post×Low	-0.088	0.288	0.148	1.463**	0.692***
	(0.080)	(0.174)	(0.110)	(0.694)	(0.233)
Constant	0.412***	0.329***	1.002***	4.062***	0.924***
	(0.012)	(0.031)	(0.017)	(0.119)	(0.029)
High-Low	-0.184*	0.090	0.107	2.830*	0.718***
	(0.088)	(0.156)	(0.122)	(1.539)	(0.235)
Bank FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.9017	0.9107	0.9198	0.9232	0.8560
Observations	91	77	91	91	91

	(1) Log Fixed(pp)	(2) Log Var(pp)	(3) Log Total(pp)	(4) Total(pp)	(5) Var-Fixed Ratio
Panel B: Other Senior Managers					
Treat×Post×High	0.043	0.199*	0.140	0.211	0.241*
	(0.117)	(0.105)	(0.086)	(0.242)	(0.142)
Treat×Post×Low	0.067	0.267	0.181	-0.021	0.233
	(0.054)	(0.188)	(0.112)	(0.070)	(0.171)
Constant	-0.498***	-1.051***	-0.035**	3.365***	0.656***
	(0.010)	(0.027)	(0.014)	(0.016)	(0.022)
High-Low	-0.024	-0.069	-0.040	0.232	0.008
	(0.125)	(0.205)	(0.136)	(0.255)	(0.216)
Bank FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.9847	0.9865	0.9882	0.9751	0.9067
Observations	85	75	85	85	85
Panel C: Non-senior Managers					
Treat×Post×High	-0.024	0.042	0.032	-0.109	0.122**
	(0.039)	(0.092)	(0.026)	(0.078)	(0.049)
Treat×Post×Low	0.181	0.337	0.206	0.046	0.024
	(0.127)	(0.264)	(0.139)	(0.042)	(0.042)
Constant	-1.372***	-2.352***	-0.973***	4.879***	0.535***
	(0.014)	(0.030)	(0.015)	(0.007)	(0.006)
High-Low	-0.204	-0.295	-0.174	-0.155**	0.098
	(0.131)	(0.257)	(0.140)	(0.075)	(0.061)
Bank FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.9699	0.9474	0.9805	0.9964	0.9637
Observations	93	93	93	93	93

Table 10: Change in Total Remuneration around Bonus Cap Imposition

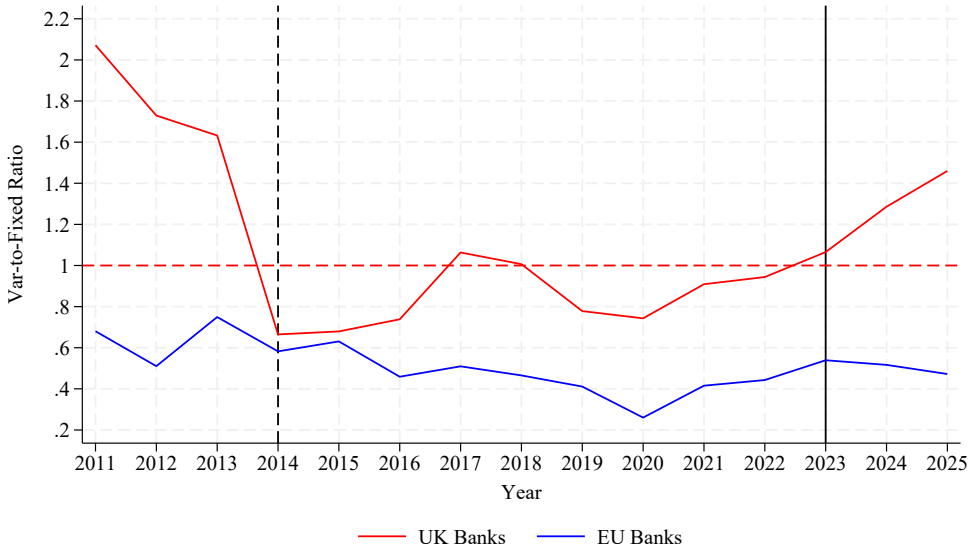
The table reports the results of OLS estimation of equation (1) to estimate the effect of the introduction of bonus cap in 2014 on total remuneration. Bank fixed effects and year fixed effects are included. The sample period is 2011 - 2023. The treated group consists of UK banks and EU banks. The control group consists of US banks. Panel A compares UK banks to US banks. Panel B compares EU banks to US banks. *Treat* is equal to 1 for treated group. *Post* is equal to 1 for years starting from 2014. *Log Remuneration*(*pp*) is log(remuneration per person). *Log Remuneration* is log(total remuneration). *Log Assets*(*pp*) is log(assets per person). The standard errors clustered by bank are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	(1) Log Remuneration(pp)	(2) Log Remuneration	(3) Log Assets(pp)
Panel A: UK vs US			
Treat×Post	-0.113***	-0.369***	-0.099
	(0.038)	(0.114)	(0.058)
Constant	11.689***	22.477***	16.249***
	(0.011)	(0.036)	(0.017)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
AdjR^2	0.9590	0.9828	0.9483
Observations	270	284	270
Panel B: EU vs US			
Treat×Post	-0.195***	-0.346***	-0.297***
	(0.038)	(0.075)	(0.056)
Constant	11.671***	22.129***	16.628***
	(0.022)	(0.043)	(0.032)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
AdjR^2	0.8756	0.9832	0.9357
Observations	618	628	618

Figure 1: Change in Variable-Fixed Ratio of MRTs

The figure plots the trend in the ratio of variable remuneration to fixed remuneration for two groups of material risk takers (MRTs): Senior Managers (Panel a) and Non-senior Managers (Panel b) from 2011 to 2025. The dash line denotes the imposition of the bonus cap in 2014. The solid line denotes the removal of the bonus cap in 2023.

(a) Senior Managers



(b) Non-senior Managers

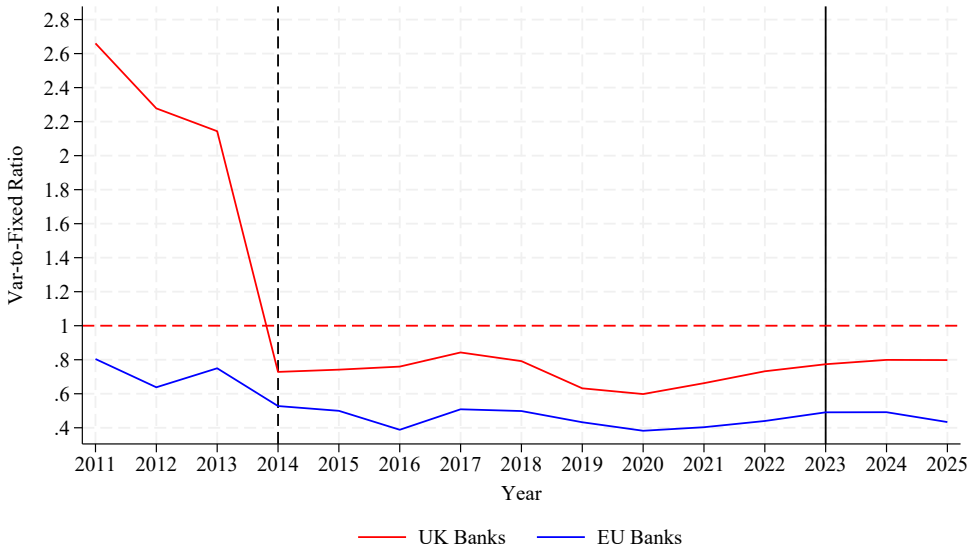
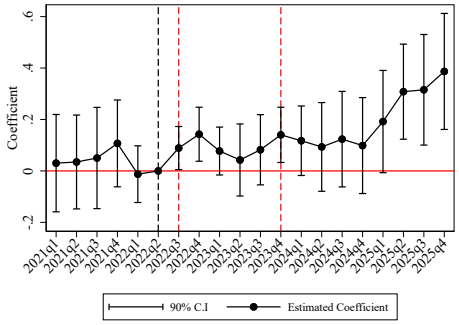


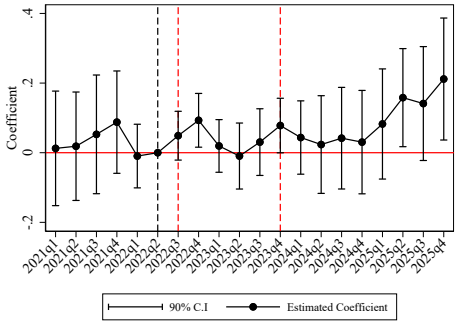
Figure 2: Dynamic Effects of Bonus Cap Removal on CDS Spreads

The figure plots dynamic effects of the 2023 bonus cap removal on CDS spreads across maturities (1-, 3-, 5-, 7-, and 10-year) over 2021Q1–2025Q4. We estimate equation (2) with UK banks as the treated group and EU banks as controls. Dots represent coefficient estimates with 90% confidence intervals based on bank-clustered standard errors. The black dashed line denotes the benchmark quarter; the first red dash line indicates 2022Q3, when the UK regulator announced the intention to remove the bonus cap; the second red dash line indicates 2023Q4, when the UK regulator formally announced the removal of the bonus cap.

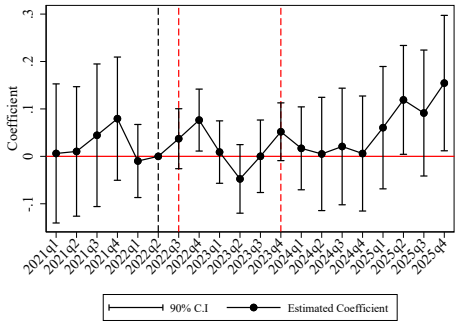
(a) 1-year CDS spread



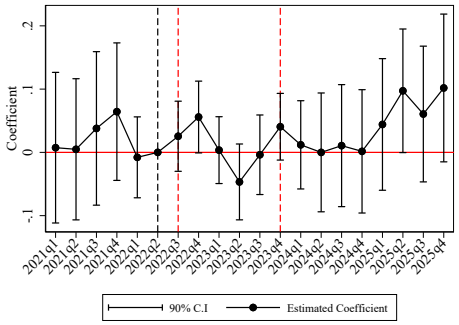
(b) 3-year CDS spread



(c) 5-year CDS spread



(d) 7-year CDS spread



(e) 10-year CDS spread

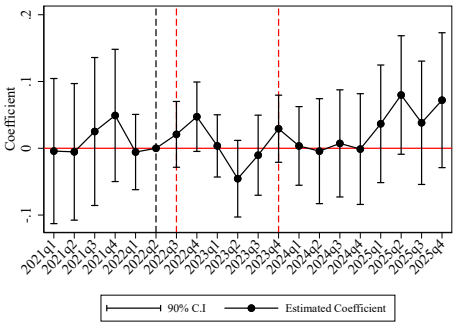
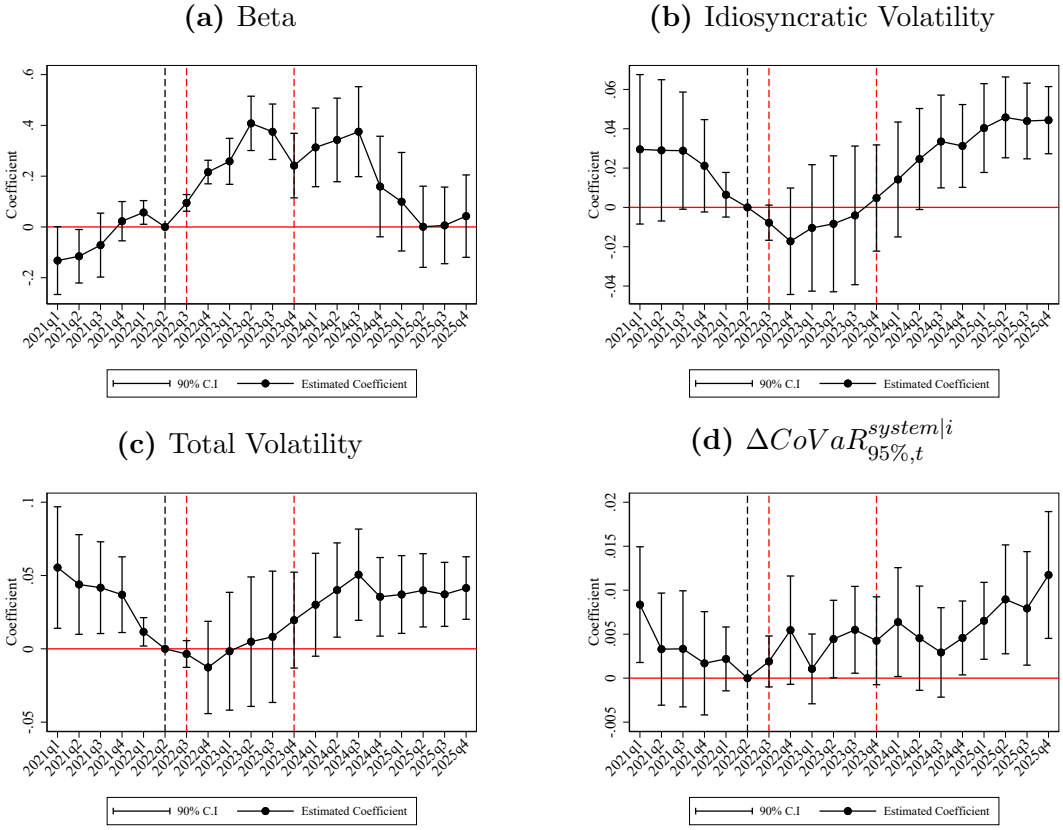
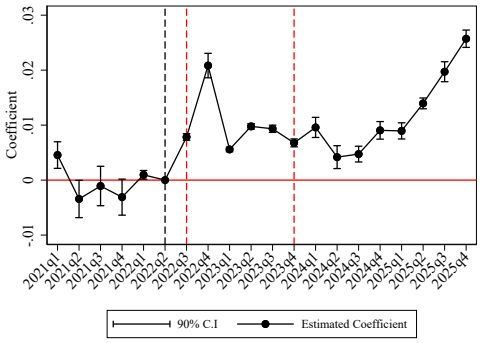


Figure 3: Dynamic Effects of Bonus Cap Removal on Stock Market Risk Measures

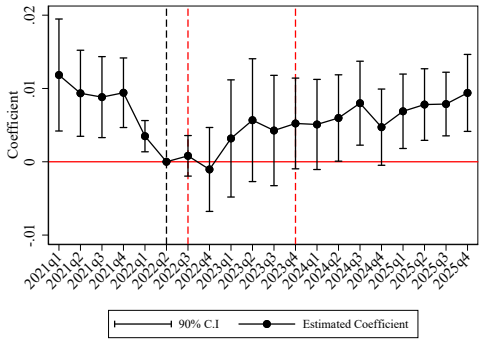
The figure plots dynamic effects of the 2023 bonus cap removal on stock market risk measures over 2021Q1–2025Q4. We estimate equation (2) with UK banks as the treated group and EU banks as controls. Dots represent coefficient estimates with 90% confidence intervals based on bank-clustered standard errors. The black dashed line denotes the benchmark quarter; the first red dash line indicates 2022Q3, when the UK regulator announced the intention to remove the bonus cap; the second red dash line indicates 2023Q4, when the UK regulator formally announced the removal of the bonus cap. *Beta* is market beta; *Idiosyncratic Volatility* is the standard deviation of residuals from the market model; *Total Volatility* is the standard deviation of daily log returns within a quarter, scaled by the square root of the number of trading days; $\Delta CoVaR$ captures contributions to systemic risk ($system|i$) or sensitivity to systemic risk ($i|system$); ES is expected shortfall, which is the negative of the average return on the bank's stock over the 5% worst return days for the bank's stock over a quarter; and VaR is value at risk, computed as the negative of the 5% worst daily return of the bank's stock over a quarter.



(e) $\Delta CoVaR^{i|system}_{95\%,t}$



(f) ES



(g) VaR

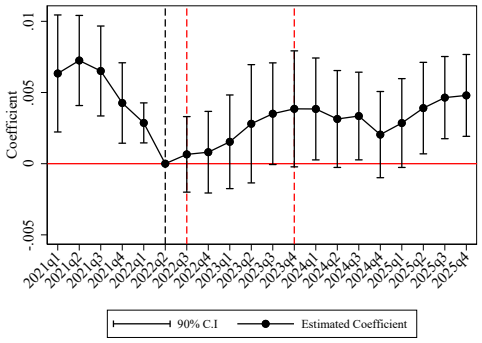
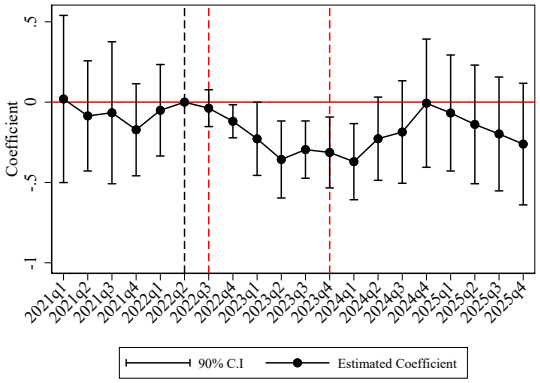


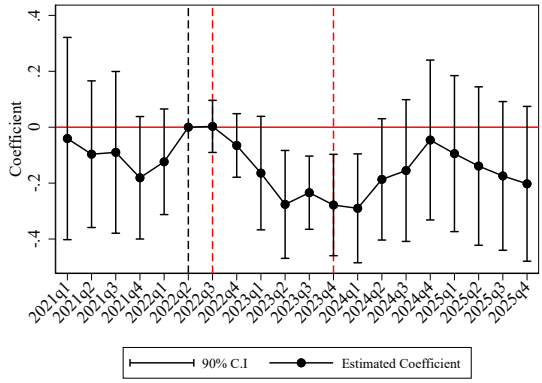
Figure 4: Dynamic Effects of Bonus Cap Removal on Stock Returns and Sharpe-Ratio

The figure plots the dynamic effects of Bonus Cap Removal in 2023 on stock returns and Sharpe Ratio. The sample period is 2021Q1 - 2025Q4. *Cumulative Return* is quarterly compounded return from daily stock returns. *Average Return* is arithmetic average of daily stock returns over a quarter multiplies number of trading days in a quarter. *Sharpe-Ratio* is the ratio of *Average Return* over *Total Volatility*. We estimate equation (2) with UK banks as the treated group and EU banks as controls. The dots represent the coefficient estimates on the quarter dummies. The black dash line indicates the benchmark quarter. The first red dash line indicates 2022Q3, when the UK regulator announced the intention to remove the bonus cap. The second red dash line indicates 2023Q4, when the UK regulator formally announced the removal of the bonus cap. All regressions include bank and quarter fixed effects. Standard errors are clustered by bank. The intervals around dots represent 90% confident intervals. The horizontal axis represents quarters.

(a) Cumulative Return



(b) Average Return



(c) Sharpe-Ratio

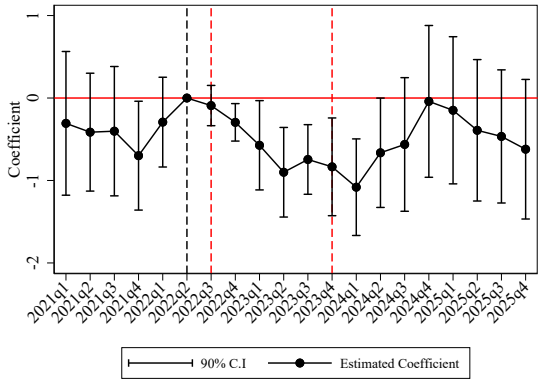
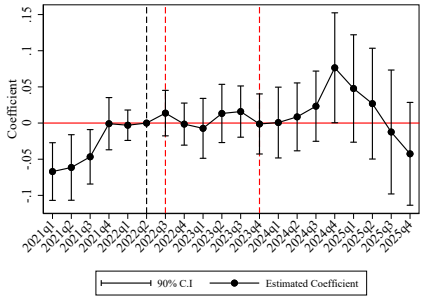


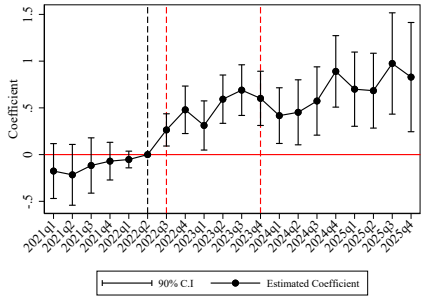
Figure 5: Dynamic Effects of Bonus Cap Removal of Bank Fundamentals

The figure plots dynamic effects of the 2023 bonus cap removal on bank fundamentals over 2021–2025. We estimate equation (2) with UK banks as the treated group and EU banks as controls. The dots represent the coefficient estimates on quarter dummies of 2021Q1 - 2025Q4. All regressions include bank and quarter fixed effects. Standard errors are clustered by bank. The first (second) red dashed line marks 2022Q3 (2023Q4), corresponding to the initial and formal announcements of the bonus cap removal, respectively; the black dashed line denotes the benchmark quarter. *Log Assets* is log(total assets); *Leverage* is total liabilities over total assets (in pct); *Tier 1 Ratio* is Tier 1 capital over risk-weighted assets (in pct); *ROA* is return on assets (in pct); and *ROE* is return on equity (in pct).

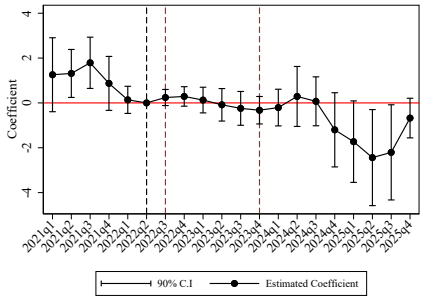
(a) Log Assets



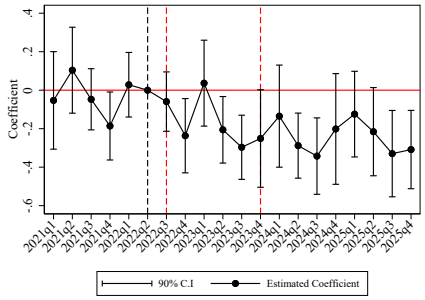
(b) Leverage



(c) Tier 1 Ratio



(d) ROA



(e) ROE

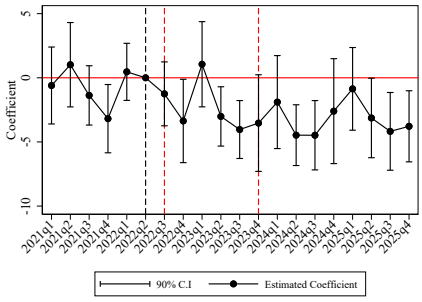
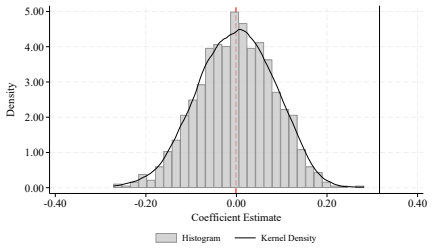


Figure 6: Distribution of Placebo Effects

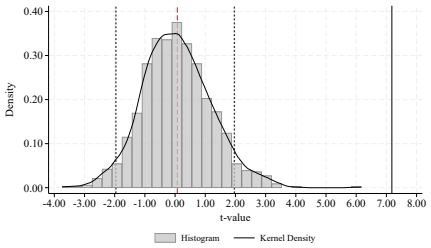
The figure plots the distribution of the placebo effects and the corresponding t-values of Beta and variable-fixed ratio. Panel A presents the distribution of placebo effects for beta on event date 1 (2022Q3) and event date 2 (2023 Q4). Panel B presents the distribution of placebo effect of variable-fixed ratio for top managers, other senior managers, and non-senior managers. The solid line denotes the estimated treatment effect based on the true treatment group and the corresponding t-value. The black dash line denotes the 5% and 95% quantile of the t-distribution (-1.96 and 1.96).

Panel A: Beta

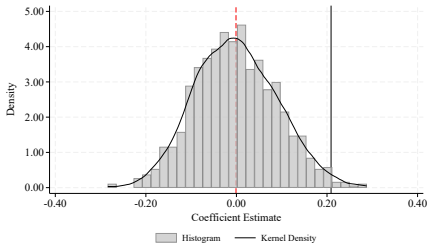
(a) Event Date 1 (2022Q3): Coefficient



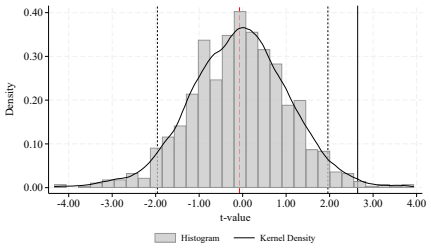
(b) Event Date 1 (2022Q3): t-value



(c) Event Date 2 (2023Q4): Coefficient



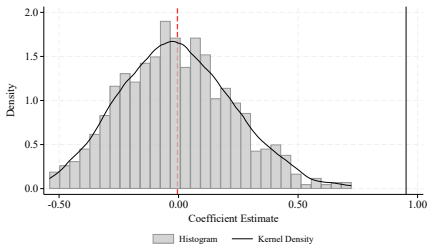
(d) Event Date 2 (2023Q4): t-value



Panel B: Variable-Fixed Ratio

Top Managers

(a) Coefficient



(b) t-value

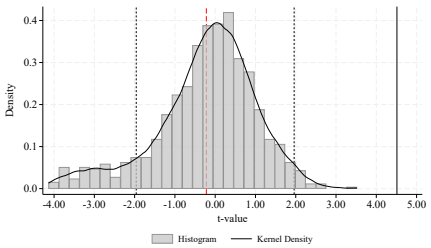
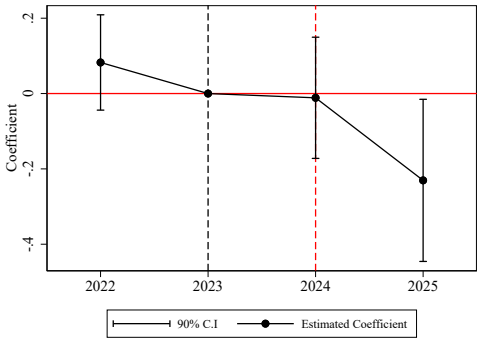


Figure 7: Dynamic Effects of Bonus Cap Removal on Remuneration of MRTs

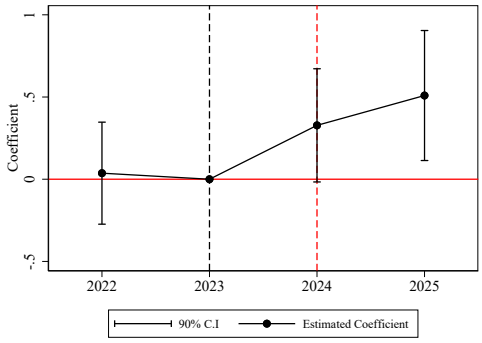
The figure plots the dynamic effects of the removal of bonus cap in 2023 on remuneration of material risk takers (MRTs) in different positions. Panel A plots the dynamic effects of the top managers (MRTs in Management Function); Panel B plots the dynamic effects of other senior managers; and Panel C plots the dynamic effects of non-senior managers. The sample period is 2022 - 2025. We estimated equation (1) except that we replace $Post_1$ and $Post_2$ with year dummies. The treatment group consists of UK banks. The control group consists of EU banks. The dots represent the coefficient estimates on year dummies of 2022 - 2025. All regressions include bank and year fixed effects. Standard errors are clustered by bank. The intervals around dots represent 90% confident intervals. The horizontal axis represents the years. We use year 2023 as the base year. We define year 2024 as the event year which is denoted by the red dash line. $Log\ Fixed(pp)$ is log (fixed remuneration per risk taker) ; $Log\ Var(pp)$ is log (variable remuneration per risk taker) ; $Log\ Total(pp)$ is log (total remuneration per risk taker); and $Var\text{-}Fixed\ Ratio$ is the ratio of variable compensation to fixed compensation.

Panel A: Top Managers

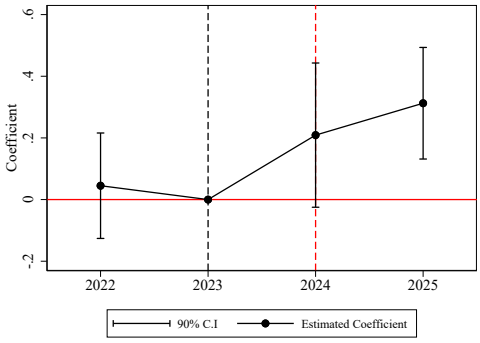
(a) Log Fixed(pp)



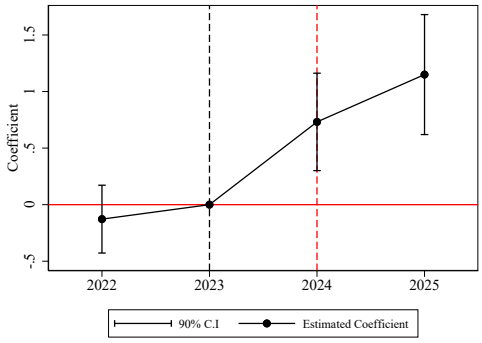
(b) Log Var(pp)



(c) Log Total(pp)

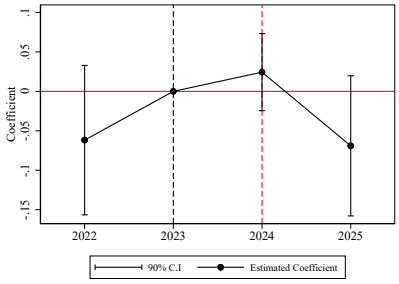


(d) Var-Fixed Ratio

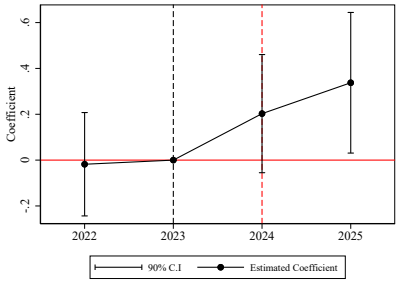


Panel B: Other Senior Managers

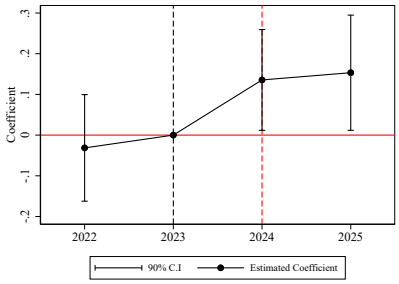
(a) Log Fixed(pp)



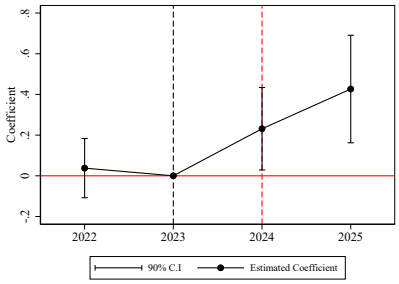
(b) Log Var(pp)



(c) Log Total(pp)

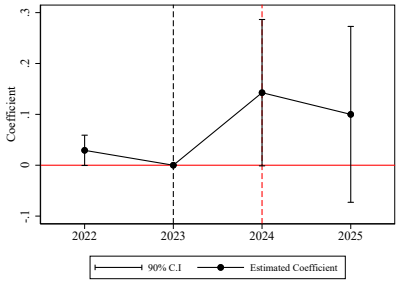


(d) Var-Fixed Ratio

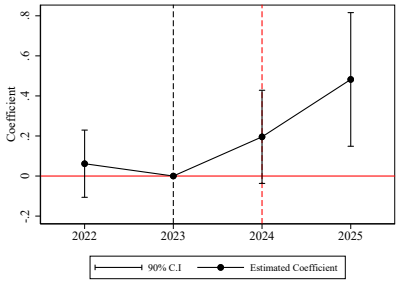


Panel C: Non-senior Managers

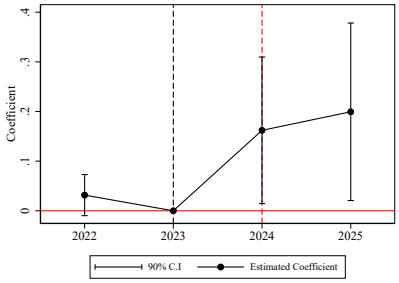
(a) Log Fixed(pp)



(b) Log Var(pp)



(c) Log Total(pp)



(d) Var-Fixed Ratio

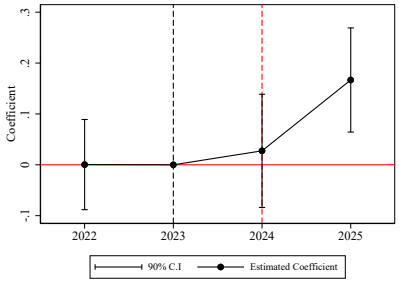
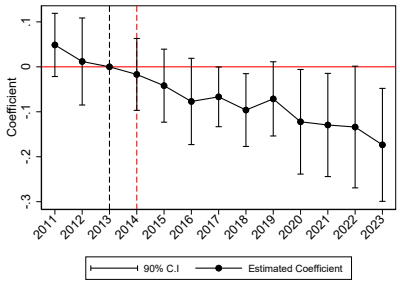


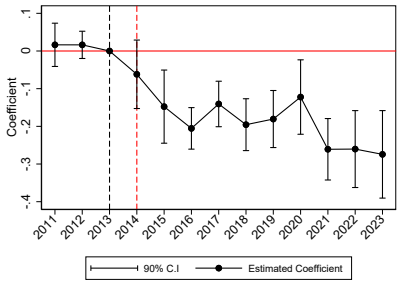
Figure 8: Dynamic Effects of 2014 Bonus Cap Imposition on Total Remuneration

The figure plots dynamic effects of the imposition of bonus cap in 2014 on total remuneration over 2011–2023. We estimate equation (1) replacing $Post_1$ and $Post_2$ with year dummies. Treated banks are UK and EU banks, with US banks as controls. Dots represent coefficients on year dummies. Standard errors are clustered by bank. The intervals around dots represent 90% confident intervals. The red dash line denotes the year in which the bonus cap was imposed, and the black dashed line denotes the base year. *Log Remuneration(pp)* is log(remuneration per person), *Log Remuneration* is log(total remuneration), and *Log Assets(pp)* is log(assets per person).

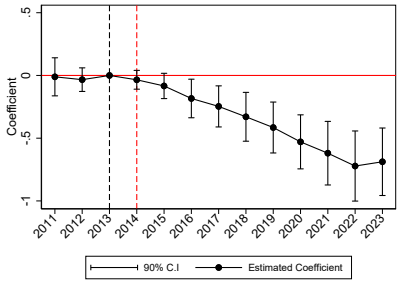
(a) Log Remuneration(pp) (UK vs US)



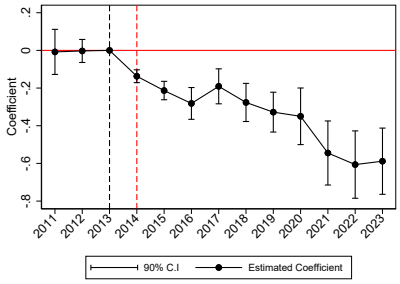
(b) Log Remuneration(pp) (EU vs US)



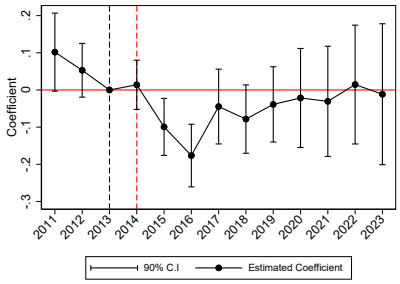
(c) Log Remuneration (UK vs US)



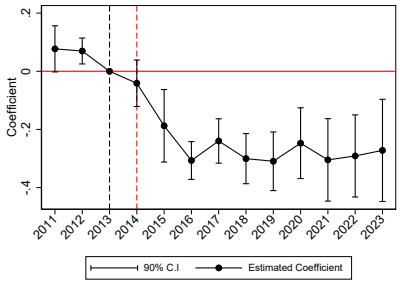
(d) Log Remuneration (EU vs US)



(e) Log Assets(pp) (UK vs US)



(f) Log Assets(pp) (EU vs US)



Internet Appendix

"Deregulating Banker Pay: Risk, Labor Market Competition, and Persistence of Bonus Culture"

Reader's Guide

This Internet Appendix provides supplementary materials supporting the empirical analyses in the main text. It contains additional institutional background, data construction details, supplementary empirical analyses, and robustness tests related to the UK bonus cap removal.

The appendix is organized as follows:

- **Appendix A. Institutional Background and Data Construction**

  This section provides detailed institutional background on banker remuneration regulations in the UK and the EU, including the introduction of remuneration policies under CRD III; the bonus cap under CRD IV; the identification of Material Risk Takers (MRTs); and the disclosure requirements for MRT compensation. It also documents the sample construction; the collection and harmonization of MRT compensation data; and the construction of $\Delta CoVaR$ measure.

- **Appendix B. Additional Empirical Analyses**

  This section presents supplementary empirical results that complement the main analysis. These include tests of the effect of bonus cap removal on additional risk measures: SRISK and LRMES and analyses of changes in the composition and payment forms of MRT compensation following the bonus cap removal.

- **Appendix C. Alternative Specification and Robustness Tests**

  This section reports alternative specification and robustness tests. These include the estimation of the treatment effect of bonus cap removal on stock-based risk measures based on Synthetic DiD, the corresponding outcome-path and weight diagnostics, and the event study exercise; the sensitivity analysis of parallel trend violations based on Honest DiD; tests examining the role of Brexit on systematic risk; and placebo tests on risk measures.

Contents

A Institutional Background and Data Construction

A.1 List of Sample Banks

UK and EU banks
(all included in the CDS analysis)

Bank Name	Remuneration Sample	Stock Return Sample	MRT Sample
UK			
Barclays Bank plc			
Barclays plc	Yes	Yes	Yes
HSBC Bank plc			
HSBC Holdings plc	Yes	Yes	Yes
Investec Bank plc	Yes	Yes	Yes
Bank of Scotland plc			
Lloyds Bank plc			
Lloyds Banking Group plc	Yes	Yes	Yes
National Westminster Bank plc			
NatWest Group plc	Yes	Yes	Yes
NatWest Markets plc			
Standard Chartered Bank plc			
Standard Chartered plc	Yes	Yes	Yes
FCE Bank plc	Yes		
Nationwide Building Society	Yes		Yes
Yorkshire Building Society	Yes		Yes
EU			
ABN AMRO Bank NV	Yes	Yes	Yes
Banca Monte dei Paschi di Siena SPA	Yes	Yes	Yes
Banca Nazionale del Lavoro SPA			
Banco Bilbao Vizcaya Argentaria SA (BBVA)	Yes	Yes	Yes
Banco BPI SA			
Banco BPM SPA	Yes	Yes	Yes
Banco Comercial Portugues SA	Yes	Yes	Yes
Banco de Sabadell SA	Yes	Yes	Yes
Banco Santander SA	Yes	Yes	Yes
Bank of Ireland	Yes	Yes	Yes
Bankinter SA	Yes	Yes	Yes
Bayerische Landesbank	Yes		
BNP Paribas	Yes	Yes	Yes
BNP Paribas Fortis SA/NV			
BPCE SA	Yes		Yes
Caixa Geral de Depositos	Yes		Yes

Continued

Bank Name	Remuneration Sample	Stock Return Sample	MRT Sample
CaixaBank, S.A.	Yes	Yes	Yes
Commerzbank AG	Yes	Yes	Yes
Cooperatieve Rabobank U.A.	Yes		Yes
Crédit Agricole	Yes	Yes	Yes
Criteria Caixa, S.A.			
Danske Bank A/S	Yes	Yes	Yes
Deutsche Bank AG	Yes	Yes	Yes
Dexia	Yes		Yes
DZ Bank AG	Yes		Yes
Erste Group Bank AG	Yes	Yes	Yes
Hamburg Commercial Bank	Yes		Yes
ING Bank NV			
ING Groep NV	Yes	Yes	Yes
Intesa Sanpaolo SPA	Yes	Yes	Yes
KBC Bank NV	Yes	Yes	Yes
Landesbank Baden-Württemberg	Yes		Yes
Helaba (Landesbank Hessen-Thüringen)	Yes		
Mediobanca Banca di Credito Finanziario SPA	Yes	Yes	Yes
Natixis SA			
Norddeutsche Landesbank	Yes		
Nordea Bank Abp	Yes	Yes	Yes
Raiffeisen Bank International AG	Yes	Yes	Yes
Skandinaviska Enskilda Banken AB	Yes	Yes	Yes
Societe Generale	Yes	Yes	Yes
Svenska Handelsbanken AB	Yes	Yes	Yes
Swedbank AB	Yes	Yes	Yes
Unicredit Bank GMBH			
Unicredit SPA	Yes	Yes	Yes

US banks
(for analysis of the imposition of bonus cap in 2014)

Bank Name	Country
Ally Financial	US
American Express Company	US
Bank of America Corporation	US
Capital One Financial Corporation	US
Citi Group Inc.	US
JPMorgan Chase & Co	US
KeyCorp	US
Morgan Stanley	US
Charles Schwab Corporation	US
Goldman Sachs Group, INC.	US
The PNC Financial Services Group, Inc.	US
Truist Financial Corporation	US
Wells Fargo & Company	US

A.2 Remuneration Policies and Bonus Cap

CRD III (Directive 2010/76/EU):
Capital Requirement Directive (CRD) III made several important amendments to CRD I (Directive 2006/48/EC), one of which is the introduction of remuneration policies of MRTs to promote sound and effective risk management. The remuneration policies introduced in CRD III consist of a series of principles and requirements. The following are the key points:

(a) the remuneration policy is consistent with and promotes sound and effective risk management and does not encourage risk-taking, and is in line with business strategy, objectives, values and long-term interests;

(b) fixed and variable components of total remuneration are appropriately balanced and the fixed component represents a sufficiently high proportion of the total remuneration to allow the operation of a fully flexible policy, on variable remuneration components, including the possibility to pay no variable remuneration component. Credit institutions shall set the appropriate ratios between the fixed and the variable component of the total remuneration;

(c) a substantial portion, and in any event at least 50%, of any variable remuneration shall consist of an appropriate balance of shares or equivalent ownership interests, subject to the legal structure of the credit institution concerned or share-linked instruments or equivalent non-cash instruments;

(d) a substantial portion, and in any event at least 40%, of the variable remuneration component is deferred over a period which is not less than 3 to 5 years;

(e) clawback and malus: Deferred remuneration is subject to performance adjustments, allowing the institution to reduce or reclaim variable pay if future performance or risks deteriorate.

CRD IV (Directive 2013/36/EU):
CRD IV tightened the requirement to set the appropriate ratios between the fixed and the variable component of the total remuneration in CRD III, which is known as the 'bonus cap':

(a) the variable component shall not exceed 100% of the fixed component of the total remuneration for each individual. Member States may set a lower maximum percentage;

(b) Member States may allow shareholders or owners or members of the institution to approve a higher maximum level of the ratio between the fixed and variable components of remuneration provided the overall level of the variable component shall not exceed 200% of the fixed component of the total

remuneration for each individual. Member States may set a lower maximum percentage.

Along with imposing the 'bonus cap' regulation, CRD IV allows credit institutions to apply the discount rate to a maximum of 25% of total variable remuneration provided it is paid in instruments that are deferred for a period of not less than five years in the calculation of the ratio between the fixed and the variable component of the total remuneration.

A.3 Identification of Material Risk Taker (MRT)

CRD III specifies the categories of staff subject to the remuneration policies:

> Categories of staff including senior management, risk takers, staff engaged in control functions and any employee receiving total remuneration that takes them into the same remuneration bracket as senior management and risk takers, whose professional activities have a material impact on their risk profile.

This is the first definition of what is referred to 'material risk taker' (MRT) in the later regulations. This definition is also documented in Article 92 of CRD IV. The European Banking Authority (EBA) published regulatory technical standards (RTS) in Delegated Regulation (EU) 604/2014 which include the qualitative and quantitative criteria of the identification of MRT. Staff shall be deemed to have a material impact on an institution's risk profile where any of the following qualitative criteria or quantitative criteria are met.

(EU) 604-2014 Article 3: Qualitative Criteria

(1) the staff member is a member of the management body in its management function;

(2) the staff member is a member of the management body in its supervisory function;

(3) the staff member is a member of the senior management;

(4) the staff member is responsible and accountable to the management body for the activities of the independent risk management function, compliance function or internal audit function;

(5) the staff member has overall responsibility for risk management within a business unit as defined in Article 142(1)(3) of Regulation (EU) No 575/2013 which has had internal capital distributed to it in accordance with Article 73 of Directive 2013/36/EU that represents at least 2% of the internal capital of the institution (a "material business unit");

(6) the staff member heads a material business unit;

(7) the staff member has managerial responsibility in one of the functions referred to in point (4) or in a material business unit and reports directly to a staff member identified pursuant to point (4) or (5);

(8) the staff member has managerial responsibility in a material business unit and reports directly to the staff member who heads that unit;

(9) the staff member heads a function responsible for legal affairs, finance including taxation and budgeting, human resources, remuneration policy, information technology, or economic analysis;

(10) the staff member is responsible for, or is a member of, a committee responsible for the management of a risk category provided for in Articles 79 to 87 of Directive 2013/36/EU other than credit risk and market risk;

(11) with regard to credit risk exposures of a nominal amount per transaction which represents 0.5% of the institution's Common Equity Tier 1 capital and is at least EUR 5 million, the staff member:

  (a) is responsible for initiating credit proposals, or structuring credit products, which can result in such credit risk exposures; or

  (b) has authority to take, approve or veto a decision on such credit risk exposures; or

  (c) is a member of a committee which has authority to take the decisions referred to in point (a) or (b);

(12) in relation to an institution to which the derogation for small trading book business provided for in Article 94 of Regulation (EU) No 575/2013 does not apply, the staff member:

  (a) has authority to take, approve or veto a decision on transactions on the trading book which in aggregate meet one of the following thresholds:

    (i) where the standardised approach is used, an own funds requirement for market risks which represents 0.5% or more of the institution's Common Equity Tier 1 capital; or

    (ii) where an internal model-based approach is approved for regulatory purposes, 5% or more of the institution's internal value-at-risk limit for trading book exposures at a 99th percentile (one-tailed confidence interval);

  (b) or is a member of a committee which has authority to take decisions set out in point (a);

(13) the staff member has managerial responsibility for a group of staff members who have individual authorities to commit the institution to transactions and either of the following conditions is met:

(a) the sum of those authorities equals or exceeds a threshold set out in point 11(a), point 11(b) or point 12(a)(i); or

(b) where an internal model-based approach is approved for regulatory purposes those authorities amount to 5% or more of the institution's internal value-at-risk limit for trading book exposures at a 99th percentile (one-tailed confidence interval). Where the institution does not calculate a value-at-risk at the level of that staff member the value-at-risk limits of staff under the management of this staff member shall be added up;

(14) with regard to decisions to approve or veto the introduction of new products, the staff member:

(a) has the authority to take such decisions; or

(b) is a member of a committee which has authority to take such decisions;

(15) the staff member has managerial responsibility for a staff member who meets one of the criteria set out in points (1) to (14).

(EU) 604-2014 Article 4: Quantitative Criteria

(1) Subject to paragraphs 2 to 5, staff shall be deemed to have a material impact on an institution's risk profile where any of the following quantitative criteria are met:

(a) the staff member has been awarded total remuneration of EUR 500 000 or more in the preceding financial year;

(b) the staff member is within the 0.3% of the number of staff, rounded up to the next integer, who have been awarded the highest total remuneration in the preceding financial year;

(c) the staff member was in the preceding financial year awarded total remuneration that is equal to or greater than the lowest total remuneration awarded in that financial year to a member of senior management or meets any of the criteria in points (1), (3), (5), (6), (8), (11), (12), (13) or (14) of Article 3.

(2) A criterion set out in paragraph 1 shall not be deemed to be met where the institution determines that the professional activities of the staff member do not have a material impact on the institution's risk profile because the staff member, or the category of staff to which the staff member belongs:

(a) only carries out professional activities and has authorities in a business unit which is not a material business unit; or

(b) has no material impact on the risk profile of a material business unit through the professional activities carried out.

(3) The condition set out in point (b) of paragraph 2 shall be assessed on the basis of objective criteria which take into account all relevant risk and performance indicators used by the institution to identify, manage and monitor risks in accordance with Article 74 of Directive 2013/36/EU and on the basis of the duties and authorities of the staff member or category of staff and their impact on the institution's risk profile when compared with the impact of the professional activities of staff members identified by the criteria set out in Article 3 of this Regulation.

(4) An institution shall notify the competent authority responsible for its prudential supervision of the application of paragraph 2 in relation to the criterion in point (a) of paragraph 1. The notification shall set out the basis on which the institution has determined that the staff member concerned, or the category of staff to which the staff member belongs, meets one of the conditions laid down in paragraph 2 and shall, if applicable, include the assessment carried out by the institution pursuant to paragraph 3.

(5) The application of paragraph 2 by an institution in respect of a staff member who was awarded total remuneration of EUR 750 000 or more in the preceding financial year, or in relation to the criterion in point (b) of paragraph 1, shall be subject to the prior approval of the competent authority responsible for prudential supervision of that institution. The competent authority shall only give its prior approval where the institution can demonstrate that one of the conditions set out in paragraph 2 is satisfied, having regard, in respect of the condition in point (b) of paragraph 2, to the assessment criteria set out in paragraph 3. Where the staff member was awarded total remuneration of EUR 1 000 000 or more in the preceding financial year the competent authority shall only give its prior approval in exceptional circumstances. In order to ensure the consistent application of this Article the competent authority shall inform the European Banking Authority before giving its approval in respect of such a staff member.

In 2021, the RTS was replaced by Delegated Regulation (EU) 923/2021. It provides detailed managerial responsibility for a staff to be identified as MRT in the qualitative criteria and makes a major amendment in the quantitative criteria that the threshold of the total remuneration awarded in one financial year for a staff to be identified as MRT is raised up from EUR 500,000 to EUR 750,000. The following are the detailed amendments:

(EU) 2021-923 Article 5: Qualitative Criteria

1. In addition to staff members identified under the criteria set out in Article 92(3), points (a), (b) and (c) of Directive 2013/36/EU, staff members shall be deemed to have a material impact on an institution's risk profile where one or more of the following qualitative criteria are met:
   (a) the staff member has managerial responsibility for:
      (i) legal affairs;
      (ii) the soundness of accounting policies and procedures;
      (iii) finance, including taxation and budgeting;
      (iv) performing economic analysis;
      (v) the prevention of money laundering and terrorist financing;
      (vi) human resources;
      (vii) the development or implementation of the remuneration policy;
      (viii) information technology;
      (ix) information security;
      (x) managing outsourcing arrangements of critical or important functions as referred to in Article 30(1) of Commission Delegated Regulation (EU) 2017/565(7);
   (b) the staff member has managerial responsibilities for any of the risk categories set out in Articles 79 to 87 of Directive 2013/36/EU, or is a voting member of a committee responsible for the management of any of the risk categories set out in those Articles;
   (c) with regard to credit risk exposures of a nominal amount per transaction, representing 0.5% of the institution's Common Equity Tier 1 capital and which is at least EUR 5 million, the staff member meets one of the following criteria:
      (i) the staff member has the authority to take, approve or veto decisions on such credit risk exposures;
      (ii) the staff member is a voting member of a committee which has the authority to take the decisions as referred to in point (i) of this point (c);
   (d) in relation to an institution for which the derogation for small trading book businesses set out in Article 94 of Regulation (EU) No 575/2013 does not apply, the staff member meets one of the following criteria:
      (i) the staff member has the authority to take, approve or veto decisions on transactions on the trading book that in aggregate represent one of the following thresholds:

- where the standardized approach is used, an own funds requirement for market risks that represents 0.5% or more of the institution's Common Equity Tier 1 capital;
- where an internal model-based approach is approved for regulatory purposes, 5% or more of the institution's internal value-at-risk limit for trading book exposures at a 99th percentile (one-tailed confidence interval level);

(ii) the staff member is a voting member of a committee that has the authority to take the decisions mentioned in point (i) of this point;

(e) the staff member heads a group of staff members who have individual authorities to commit the institution to transactions and either of the following conditions is met:

(i) the sum of those authorities equals or exceeds the threshold referred to in point (c)(i) or in point (d)(i), first indent;

(ii) where an internal model-based approach is approved for regulatory purposes, those authorities amount to 5% or more of the institution's internal value-at-risk limit for trading book exposures at a 99th percentile (one-tailed confidence interval level); where the institution does not calculate a value-at-risk at the level of that staff member, the value-at-risk limits of staff under the management of this staff member shall be added up;

(f) the staff member meets either of the following criteria with regard to decisions on approving or vetoing the introduction of new products:

(i) the staff member has authority to take such decisions;

(ii) the staff member is a voting member of a committee that has authority to take such decisions.

(EU) 2021-923 Article 6: Quantitative Criteria

1. In addition to staff members identified under the criteria set out in Article 92(3), points (a) and (b), of Directive 2013/36/EU, staff members shall be deemed to have a material impact on an institution's risk profile where any of the following quantitative criteria are met:

(a) the staff members, including staff members as referred to in Article 92(3), point (c), of Directive 2013/36/EU, have been awarded in or for the preceding financial year a total remuneration that is equal to or greater than EUR 750 000;

(b) where the institution has over 1 000 members of staff, the staff members are within the 0.3% of staff, rounded to the next higher integral

figure, which has, within the institution, been awarded the highest total remuneration in or for the preceding financial year on an individual basis.

2. The criteria laid down in paragraph 1 shall not apply where the institution determines that the professional activities of the staff member do not have a material impact on the institution's risk profile, because the staff member, or the category of staff to which the staff member belongs, meets any of the following conditions:

   (a) the staff member or categories of staff only carry out professional activities and have authorities in a business unit that is not a material business unit;

   (b) the professional activities of the staff member or category of staff have no significant impact on the risk profile of a material business unit having regard to the criteria set out in Article 3.

3. The application of paragraph 2 by an institution shall be subject to the prior approval of the competent authority responsible for prudential supervision of that institution. The competent authority shall only give its prior approval where the institution can demonstrate that one of the conditions set out in paragraph 2 is satisfied.

4. Where the staff member was awarded a total remuneration of EUR 1 000 000 or more in or for the preceding financial year, the competent authority shall only give its prior approval under paragraph 3 in exceptional circumstances. In order to ensure the consistent application of this paragraph, the competent authority shall inform the EBA before giving its approval in respect of such a staff member.

   The existence of exceptional circumstances shall be demonstrated by the institution and assessed by the competent authority. Exceptional circumstances shall be situations that are unusual and very infrequent or far beyond what is usual. The exceptional circumstances shall be related to the staff member.

A.4 Disclosure Requirements of MRT Compensation

CRD III (Directive 2010/76/EU):
The disclosure requirement of the compensation of MRTs was first documented in CRD III which was published in 2011. The disclosure requirement serves as the amendment of Annex XII of CRD I and specifies the frequency and the context of the disclosure of the compensation of MRTs. The following point is added:

> The following information, including regular, at least annual, updates, shall be disclosed to the public regarding the remuneration policy and practices of the credit institution for those categories of staff whose professional activities have a material impact on its risk profile:
>
> (a) information concerning the decision-making process used for determining the remuneration policy, including if applicable, information about the composition and the mandate of a remuneration committee, the external consultant whose services have been used for the determination of the remuneration policy and the role of the relevant stakeholders;
>
> (b) information on link between pay and performance;
>
> (c) the most important design characteristics of the remuneration system, including information on the criteria used for performance measurement and risk adjustment, deferral policy and vesting criteria;
>
> (d) information on the performance criteria on which the entitlement to shares, options or variable components of remuneration is based;
>
> (e) the main parameters and rationale for any variable component scheme and any other non-cash benefits;
>
> (f) aggregate quantitative information on remuneration, broken down by business area;
>
> (g) aggregate quantitative information on remuneration, broken down by senior management and members of staff whose actions have a material impact on the risk profile of the credit institution, indicating the following:
>
> (i) the amounts of remuneration for the financial year, split into fixed and variable remuneration, and the number of beneficiaries;
>
> (ii) the amounts and forms of variable remuneration, split into cash, shares, share-linked instruments and other types;
>
> (iii) the amounts of outstanding deferred remuneration, split into vested and unvested portions;
>
> (iv) the amounts of deferred remuneration awarded during the financial year, paid out and reduced through performance adjustments;

(v) new sign-on and severance payments made during the financial year, and the number of beneficiaries of such payments; and

(vi) the amounts of severance payments awarded during the financial year, number of beneficiaries and highest such award to a single person.

CRR (Regulation (EU) No 575/2013):
CRD III is a directive and will not be effective until it is converted into the domestic law of each EU country. Because of the different legal environment and of each EU country, the disclosure of the compensation of MRTs was not implemented immediately in some EU countries after the CRD III was published in 2011. In 2014, the council of the EU published Capital Requirements Regulations (CRR) which is directly applicable and does not require transposition into national law. CRR documents the disclosure requirements of the compensation of MRTs in CRD III in the Article 450. In addition to the information required to be disclosed under CRD III, Article 450 introduces the following new disclosure requirements:

(a) the ratios between fixed and variable remuneration (in accordance with the "bonus cap" regulation introduced in CRD IV);

(b) the number of individuals being remunerated EUR 1 million or more per financial year, for remuneration between EUR 1 million and EUR 5 million broken down into pay bands of EUR 500 000 and for remuneration of EUR 5 million and above broken down into pay bands of EUR 1 million;

(c) upon demand from the Member State or competent authority, the total remuneration for each member of the management body or senior management.

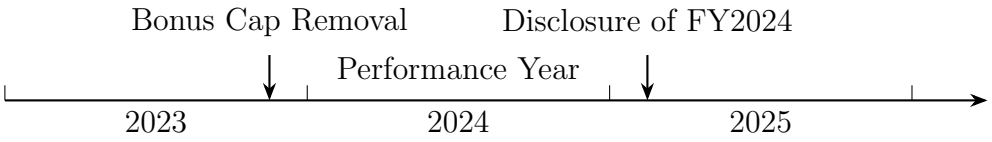
All the banks operated in the EU disclose the MRT compensation annually since 2014. Banks operating in the UK remain subject to these disclosure requirements after Brexit.

Timeline of UK and EU MRT Compensation Regulations

- 2011 – CRD III: Introduce Remuneration Policies for MRT;
  Introduce disclosure requirements of MRT Compensation
- 2014 – CRD IV: Introduce 'Bonus Cap'
  CRR: Formalize disclosure requirements of MRT Compensation in law
  EU 604/2014: Set up the regulatory technical standards of identification of MRT
- 2021 – EU 923/2021: Update the regulatory technical standards of identification of MRT
  EU 2021/637: Set up the templates of MRT Compensation Disclosure (EU REM 1-5)
- 2023 – PRA PS 9/23 & FCA PS 23/15: Remove 'Bonus Cap' in the UK

Timeline of MRT Compensation Disclosure

MRT compensation is disclosed in the year following the performance year, typically together with or shortly after the release of the annual report, and the disclosure is based on the same fiscal year as the performance year. The following is the example timeline of 2024 MRT compensation:



A.5 MRT Compensation Data

A.5.1 Data Collection

We collect the MRT compensation data of all the banks in our CDS sample. In case of banks where both the parent and subsidiaries have issued CDS contracts, we only collect the data of the parent bank (the data is after consolidation). To construct a comprehensive dataset, we collect the MRT compensation data of each bank since 2011 (if available). We review the annual report, Pillar 3 report, and compensation report of each sample bank for every year, and extract the relevant sections on MRT compensation to compile our dataset. We collect remuneration data for almost all banks in the sample, with only a few missing observations. Among these banks with missing data, some banks are not required to disclose the MRT compensation data because of the small size (for example, FCE Bank plc). We fail to find the disclosure reports for the remaining banks.

A.5.2 Template of Disclosure Report

Although CRD III and CRR prescribe the context of the disclosure of the compensation of MRTs, there is no requirement about the format of the disclosure. Banks have discretion to design the format of their disclosure reports in accordance with their business operations. To enhance comparability and standardization, the format of the disclosure of MRTs was standardized in the European Commission published Regulation (EU) 2021/637. The disclosure of the compensation of MRTs should apply the template EU REM1 to EU REM5. We collect the data of the fixed compensation, the variable compensation, and their compositions of MRTs awarded for the financial year, which is disclosed in the template EU REM1. The following is the sample table of the MRT compensation disclosure of HSBC Holdings plc in 2021 using the template EU REM1:

Example:

Additional regulatory remuneration disclosures

This section provides disclosures required under the Hong Kong Ordinances, Hong Kong Listing Rules and the Pillar 3 remuneration disclosures.

For the purpose of the Pillar 3 remuneration disclosures, executive Directors and non-executive Directors are considered to be members of the management body. Members of the Group Executive Committee other than the executive Directors are considered as senior management.

MRT remuneration disclosures

The following tables set out the remuneration disclosures for individuals identified as MRTs for HSBC Holdings.

Remuneration information for individuals who are only identified as MRTs at HSBC Bank plc, HSBC UK Bank plc or other solo-regulated entity levels is included, where relevant, in those entities' disclosures.

The 2021 variable pay information included in the following tables is based on the market value of awards. For share awards, the market value is based on HSBC Holdings' share price at the date of grant (unless indicated otherwise). For cash awards, it is the value of awards expected to be paid to the individual over the deferral period.

Remuneration awarded for the financial year (REM1)

		Supervisory function	Management function	Other senior management	Other identified staff
Fixed remuneration	Number of identified staff	**14.0**	**2.0**	**22.9**	**1,020.7**
	Total fixed pay ($m)	**7.2**	**6.9**	**48.9**	**619.6**
	Of which: cash-based ($m)[1]	***7.2***	***3.1***	***48.9***	***619.6***
	Of which: shares or equivalent ownership interests ($m)[2]	**–**	***3.8***	**–**	**–**
	Of which: share-linked instruments or equivalent non-cash instruments ($m)	**–**	**–**	**–**	**–**
	Of which: other instruments ($m)	**–**	**–**	**–**	**–**
	Of which: other forms ($m)	**–**	**–**	**–**	**–**
Variable remuneration[3]	Number of identified staff	**14.0**	**2.0**	**22.9**	**1,020.7**
	Total variable remuneration ($m)[4,5]	**–**	**15.1**	**76.3**	**637.5**
	Of which: cash-based ($m)	**–**	***1.8***	***27.1***	***307.2***
	Of which: deferred ($m)	**–**	**–**	***16.2***	***161.6***
	Of which: shares or equivalent ownership interests ($m)[2]	**–**	***13.3***	***49.2***	***318.1***
	Of which: deferred ($m)	**–**	***11.5***	***38.3***	***178.2***
	Of which: share-linked instruments or equivalent non-cash instruments ($m)	**–**	**–**	**–**	***8.8***
	Of which: deferred ($m)	**–**	**–**	**–**	***4.7***
	Of which: other instruments ($m)	**–**	**–**	**–**	**–**
	Of which: deferred ($m)	**–**	**–**	**–**	**–**
	Of which: other forms ($m)	**–**	**–**	**–**	***3.4***
	Of which: deferred ($m)	**–**	**–**	**–**	***2.1***
Total remuneration ($m)		**7.2**	**22.0**	**125.2**	**1,257.1**

1 Cash-based fixed remuneration is paid immediately.
2 Paid in HSBC shares. Vested shares are subject to a retention period of up to one year.
3 Variable pay awarded in respect of 2021. In accordance with shareholder approval received on 23 May 2014 (98% in favour), for each MRT the variable component of remuneration for any one year is limited to 200% of fixed component of the total remuneration.
4 The Group has used the discount rate under PRA remuneration rule 15.13 for 15 individuals for the purpose of calculating the ratio between fixed and variable components of 2021 total remuneration.
5 13 identified staff members were exempt from the application of the remuneration structure requirements for MRTs under the PRA and FCA remuneration rules. Their total remuneration is $4.2m, of which $3.6m is fixed pay and $0.6m is variable remuneration.

A.5.3 Reclassification of MRT categories

In template EU REM1, the MRTs are classified into four categories: MB (Management Body) Supervisory Function, MB Management Function, Other senior management, and Other identified staff. The following are the definitions of these four categories in Regulation (EU) 2021/637:

1. MB Supervisory Function: The members of the Management Body acting in its role of overseeing and monitoring management decision-making; this includes *non-executive directors* of any board in the scope of consolidation;
2. MB Management Function: The members of the Management Body in its management function, who have executive functions within the management body; this includes all *executive directors* of any board in the scope of consolidation;
3. Other Senior Management: Senior managers whose responsibilities are not classified as supervisory function or management function; this includes the staff of material business units who take responsibilities for senior management but are not in the board, for example *the heads of a material business unit*;
4. Other Identified Staff: Other staff than Management Body in its Supervisory function or in its Management function, and other than senior management, whose professional activities have a material impact on the institution's risk profile in accordance with the criteria set out in the Commission Delegated Regulation on identified staff implementing Article 94(2) CRD and where appropriate in addition based on institutions' criteria

Definitions of terms:

- Management Body (MB): an institution's body or bodies,which are appointed in accordance with national law, which are empowered to set the institution's strategy, objectives and overall direction, and which oversee and monitor management decision-making, and include the persons who effectively direct the business of the institution.
- Senior Management: those natural persons who exercise executive functions within an institution and who are responsible, and accountable to the management body, for the day-to-day management of the institution.

Before Regulation (EU) 2021/637 was published in 2021, banks have discretion to classify the MRTs in accordance with their business operations and governance environment. The classification of MRTs differs across banks and may also change from year to year within

the same bank. There are also some banks that only disclose the aggregate compensation of MRTs without classification or simply divide MRTs into senior MRTs and non-senior MRTs in certain years. The following are several examples:

Example 1: MRT Compensation Disclosure of HSBC Holdings plc in 2014

Remuneration – fixed and variable amounts – Group-wide

	2014			2013		
	Senior management[1]	MRTs (non-senior management)	Total	Senior management[1]	Code Staff (non-senior management)	Total
Number of 2014 MRTs/2013 Code Staff	98	1,080	1,178	66	264	330
	US$m	US$m	US$m	US$m	US$m	US$m
Fixed						
Cash-based	64.1	517.0	581.1	52.6	101.1	153.7
Shares-based	51.8	88.7	140.5	–	–	–
Total fixed	115.9	605.7	721.6	52.6	101.1	153.7
Variable[2]						
Cash	18.5	138.9	157.4	19.0	60.1	79.1
Non-deferred shares[3]	18.5	132.0	150.5	18.9	56.5	75.4
Deferred cash	24.9	119.5	144.4	26.6	79.3	105.9
Deferred shares	41.5	126.4	167.9	72.4	92.8	165.2
Total variable pay[4]	103.4	516.8	620.2	136.9	288.7	425.6

1 *Definition of senior management for 2014 includes members of the Group Management Board, Group General Managers and non-executive Directors. For 2013, this includes members of the Group Management Board and Group General Managers only.*
2 *Variable pay awarded in respect of performance in the years 2013 and 2014.*
3 *Vested shares, subject to a six-month retention period.*
4 *In accordance with shareholder approval received on 23 May 2014, for each MRT the variable component of remuneration for any one year is limited to 200% of fixed component of total remuneration of the MRT.*

Example 2: MRT Compensation Disclosure of HSBC Holdings plc in 2018

The 2018 variable pay information included in the following tables is based on the market value of awards granted to MRTs. For share awards, the market value is based on HSBC Holdings plc's share price at the date of grant (unless indicated otherwise). For cash awards, it is the value of awards expected to be paid to the individual over the deferral period.

Remuneration – fixed and variable amounts

	Executive Directors	Non-executive Directors	Senior management	Total
Number of MRTs	4	11	16	31
	$m	$m	$m	$m
Total fixed	13.8	6.3	36.4	56.5
Cash-based[1]	6.7	6.3	36.4	49.4
– of which: deferred cash	–	–	–	–
Share-based	7.1	–	–	7.1
– of which: deferred shares	–	–	–	–
Total variable[2]	16.8	–	44.7	61.5
Cash-based	2.5	–	21.1	23.6
– of which: deferred cash	–	–	*12.8*	*12.8*
Share-based[3]	14.3	–	23.6	37.9
– of which: deferred shares[3]	*11.8*	–	*15.3*	*27.1*
Other forms[3]	–	–	–	–
– of which: deferred[3]	–	–	–	–
Total remuneration	30.6	6.3	81.1	118.0

1 *Cash-based fixed remuneration is paid immediately.*
2 *Variable pay awarded in respect of 2018. In accordance with shareholder approval received on 23 May 2014 (98% in favour), for each MRT the variable component of remuneration for any one year is limited to 200% of fixed component of the total remuneration.*
3 *Share-based awards are made in HSBC shares. Vested shares are subject to a retention period of up to one year.*

Example 3: MRT Compensation Disclosure of BBVA in 2018

Table 90. Total remuneration of Identified Staff in 2018 (Thousand Euro or number of shares)

Remuneration for Identified Staff in 2018	Executive Directors (1)	Non-executive Directors	Senior Management (2)	Rest of Identified Staff	Total Identified Staff
Number of beneficiaries of fixed remuneration	**3**	**12**	**15**	**548**	**578**
Amount of total fixed remuneration for 2018 (3)	**5,530**	**3,867**	**17,005**	**200,884**	**227,285**
Number of beneficiaries of variable remuneration	**3**	**-**	**15**	**505**	**523**
Amount of total variable remuneration for 2018 (4)	**5,431**	**-**	**7,074**	**75,663**	**88,167**
In cash	2,389	-	3,112	37,831	43,333
Number of BBVA shares	638,098	-	833,880	8,028,391	9,500,369
Variable remuneration corresponding to 2018 payable in 2019	2,172	-	2,829	44,689	49,691
In cash	1,086	-	1,415	22,345	24,845
Number of BBVA shares	227,891	-	297,809	4,741,516	5,267,216
Outstanding deferred variable remuneration corresponding to 2018 (5)	3,258	-	4,244	30,974	38,476
In cash	1,303	-	1,698	15,487	18,488
Number of BBVA shares	410,207	-	536,071	3,286,875	4,233,153

(1) Includes the 2018 remuneration of Carlos Torres Vila, José Manuel González-Páramo Martínez-Murillo and Francisco González Rodríguez. The current CEO, Onur Genç, appointed by the Board of Directors on December 20th, 2018, has not received any remuneration for his tenure in 2018, being his remuneration included in "Other Identified Staff". Note 54 of the Annual Report of BBVA's Consolidated Financial Statements details individualized information for each one of them

(2) Includes information of the members of Senior Management, excluding executive directors, that had such condition until December 20th, 2018. Members of Senior Management appointed by the Board of Directors on December 20th, 2018, (5 members) have not received any remuneration for such condition and their remuneration is included under "Rest of Identified Staff". Note 54 of the Annual Report of BBVA's Consolidated Financial Statements details the aggregated information of each of these group's remuneration

(3) Fixed compensation received in 2018, including cash and in kind, except as regards benefit schemes.
In the case of executive directors and members of the Senior Management, contributions made by the Bank in 2018 in relation to agreed upon benefit schemes are detailed in Note 54 of the Annual Report of BBVA's Consolidated Financial Statements.
In the case of non-executive directors, their remuneration system includes, in addtion, a fixed remuneration with deferred delivery of shares after leave of directorship. Information regarding such system, including the number of "theoretical shares" allocated in 2018 (corresponding to 20% their fixed compensation received the previous year), is displayed in Note 54 of the Annual Report of BBVA's Consolidated Financial Statements

(4) According to applicable regulations, 15% of annual contributions agreed to cover retirement contingencies of executive directors and members of the Senior Management will be based on variable remuneration. Detailed information regarding the implementation of benefit-scheme entitlements in 2018 can be found in Note 54 of the Annual Report of BBVA's Consolidated Financial Statements

(5) The variable remuneration corresponding to 2018 that is deferred and outstanding is subject to multi-year performance indicators related to the Risk Appetite Framework and shareholder profitability that can reduce, even in its entirety (but never increase), the outstanding deferred amounts

Example 4: MRT Compensation Disclosure of ING Bank in 2018

Table 1 – Details of remuneration of Identified Staff in relation to performance year 2018

Fixed and variable remuneration awarded to Identified Staff in relation to performance year 2018, split by instrument

	Supervisory Board	Executive Board	Management Board	Other Identified Staff	Other IDS – Control functions
Amounts in thousands of euros	ING Group	ING Group	ING Bank	ING Bank	ING Bank
Number of employees	9	3	4	471	290
Fixed remuneration[1]	1,032	5,426	4,765	142,461	62,676
Variable remuneration[2]	-	-	-	29,062	7,908
Of which upfront cash	-	-	-	8,197	2,211
Of which upfront shares	-	-	-	8,409	2,270
Of which deferred cash	-	-	-	6,015	1,616
Of which deferred shares	-	-	-	5,169	1,234
Of which equity-linked instruments	-	-	-	946	383
Of which other instruments[3]	-	-	-	326	194
Sign-on, buy out and retention awards in 2018					
- Number of beneficiaries	-	-	-	1	2
- Sign-on, buy-out, retention awards	-	-	-	126	158
Severance payments awarded in 2018[4]					
- Number of beneficiaries	-	1	-	3	1
- Severance awards	-	602	-	2,947	1,138

1 Fixed remuneration of Supervisory Board members includes the standard fees per role and committee (VAT included). Fixed remuneration of Executive Board, Management Board Banking and Other Identified Staff includes employer pension contribution and collective fixed allowances (which for Dutch employees consist of two savings allowances applicable to all employees in the Netherlands; a savings allowance of 3.5% and a savings allowance to compensate for loss of pension benefits with respect to remuneration in excess of €105,075). Excluding severance awards.
2 Excluding sign-on, buy-out, retention and severance awards.
3 Paid in 2018, including profit sharing and CLA-based variable remuneration.
4 The highest severance award to an employee is EUR 1,700,000.

To make the compensation data comparable across years, for the compensation data before 2021, we reclassify the MRTs into the four categories determined in the template EU REM1 following the definitions in Regulation (EU) 2021/637. Specifically, we reclassify the Non-executive Directors and the Supervisory Board as MB Supervisory Function; Executive Directors and Management Board as MB Management Function; Senior Managers who are not directors/not in the board as Other Senior Management; and the rest of MRTs as Other identified staff. For disclosures only divide MRTs into senior MRTs and non-senior MRTs or only disclose the aggregate compensation of all MRTs, we directly extract these data without further detail classification.

A.6 Conditional Value at Risk Measure ($\Delta CoVaR$)

In this section, we describe and define in detail the measure of systemic risk: conditional value at risk measure ($\Delta CoVaR$). We follow the methodology of Adrian and Brunnermeier (2016) and Kleymenova and Tuna (2021).

The conditional value at risk measure ($\Delta CoVaR$) is computed one period ahead and captures a firm's contribution to overall systemic risk ($\Delta CoVaR^{system|i}_{95\%,t}$) or a firm's sensitivity to systemic risk ($\Delta CoVaR^{i|system}_{95\%,t}$) using quantile regressions. Value at risk (VaR) measures the worst expected loss over a specific time horizon at a given confidence interval and is defined as the quantile:

$$Pr(X^i \leq VaR^i_q) = q,$$

where X^i is the return loss of institution i for which the VaR^i_q is defined. In this paper, we focus on the 5% quintile and weekly asset returns or losses X_i and the VaR of institution i is the probability $Pr(X^i \leq VaR^i_{5\%}) = 5\%$. As VaR captures losses, it is a negative number by definition. Following Adrian and Brunnermeier (2016), we change the sign of the returns (in other words, the returns are now return loss, and the more positive VaR is, the larger the potential loss).

We define $\Delta CoVaR^{system|i}_{95\%,t}$, as the value at risk of the entire system (portfolio) conditional upon institution i's level of distress. By reversing the order of conditioning, we also estimate the VaR of an individual bank conditional on the VaR of the system ($\Delta CoVaR^{i|system}_{95\%,t}$). We use quantile regressions to estimate these time-varying measures based on weekly data as follows:

$$X_{i,t} = \alpha_i + \beta_i M_{t-1} + \epsilon_{it}$$

$$X^{\text{system}|i}_t = \alpha^{\text{system}|i}_q + \beta^{\text{system}|i}_q M_{t-1} + \gamma^{\text{system}|i}_q \bar{X}^i_t + \epsilon^{\text{system}|i}_{q,t}$$

where M_{t-1} is a vector of macro-state variables capturing time variation in the conditional moments of asset returns. Following Kleymenova and Tuna (2021), M_{t-1} consists of: (1) estimated market volatility for the corresponding UK, U.S. or EU equity market; (2) change in the three-month treasury bill rate for the relevant market to capture the tails of market-valued asset returns; (3) the change in the slope of the yield curve measured as the spread between the composite long-term bond yield in the corresponding market and the three-month Treasury bill rate; (4) a short-term liquidity spread measured as the difference between the three-month LIBOR or EURIBOR rate and the three-month secondary market treasury bill rate in the corresponding market; (5) the change in the credit spread as a difference between Moody's Baa-rated bonds and the 10-year treasury bond in the relevant market; and (6) the weekly market return computed in the relevant market. The data of macro-state variables is obtained from Bloomberg.

Using the predicted values from the regression model above, we can obtain the following unconditional (VaR) and conditional ($CoVaR$) measures of risk:

$$VaR^i_{q,t} = \hat{\alpha}^i_q + \hat{\beta}^i_q M_{t-1}$$

$$CoVaR^{system|i}_{q,t} = \hat{\alpha}^{system|i}_q + \hat{\beta}^{system|i}_q M_{t-1} + \hat{\gamma}^{system|i}_q VaR^i_{q,t}$$

This, in turn, allows us to compute $\Delta CoVaR^i_{q,t}$ for each institution i:

$$\Delta CoVaR^i_{q,t} = CoVaR^i_{q,t} - CoVaR^i_{50\%,t} = \gamma^{system|i}_q \left(VaR^i_{q,t} - VaR^i_{50\%,t}\right)$$

From these regressions, we obtain weekly $\Delta CoVaR$, which we convert to quarterly figures by averaging the weekly observations within each quarter and year.

B Additional Empirical Analyses

B.1 Test of SRISK and LRMES

In this section, we examine the dynamics of two additional tail risk measures: SRISK and LRMES, around the first announcement and the second announcement of the removal of bonus cap. The data we use in this section is from NYU V-Lab.

B.1.1 Definition of SRISK and LRMES

SRISK: The SRISK of firm i at time t answers a precise question: how much capital would this firm need to raise to meet regulatory capital requirements after a crisis-level market decline? A positive SRISK indicates vulnerability; negative SRISK indicates excess capital under stress. The formula is as follows:

$$SRISK_{i,t} = k \times Debt_{i,t} - (1-k) \times Equity_{i,t} \times (1 - LRMES_{i,t})$$

where LRMES is Long-Run Marginal Expected Shortfall.

The aggregate SRISK for a financial system containing N institutions is defined as the sum of positive individual shortfalls:

$$SRISK_{aggregate} = \sum_i \max(0, SRISK_i)$$

The max operator ensures that only capital deficits contribute to the aggregate. This truncation reflects a fundamental asymmetry in crisis dynamics: regulatory and market constraints prevent the reallocation of excess capital from healthy to distressed institutions when it would be most valuable. Each firm's systemic importance can be expressed as its share of total system SRISK:

$$SRISK(\%)_i = \frac{\max(0, SRISK_i)}{SRISK_{aggregate}}$$

MES and LRMES: Marginal Expected Shortfall (MES) measures a firm's expected return when the market experiences an extreme loss. Formally, MES is the conditional expectation of a firm's return given that the market return falls below a threshold. It answers a precise question: When the market is having its worst days, how badly does this firm perform? The definition is as follows:

$$MES = E[r_{firm} | r_{market} < \text{threshold}]$$

LRMES extends the daily MES concept to a crisis-length horizon, which measures a financial firm's expected equity loss during a prolonged market crisis. Formally, it is the expected percentage decline in a firm's equity value, conditional on the aggregate market experiencing a severe downturn over an extended horizon. The closed-form approximation is as follow:

$$LRMES \approx 1 - \exp(log(1-d) \times \beta_{i,t})$$

where β is the firm's market beta and d is crisis decline. NYU V-Lab calibrates a crisis as a 40% market decline ($d = 0.40$) over approximately six months (126 trading days).

B.1.2 Results

Table B.1: Change of SRISK(%) and LRMES

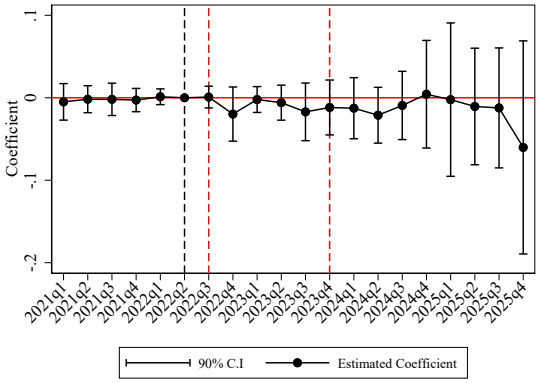
This table reports the results of OLS estimation of equation (1) to estimate the effect of bonus cap removal on SRISK(%) and LRMES. The sample period is 2021Q1 - 2025Q4. Following the methodology from NYU V-Lab, we collapse the daily SRISK(%) and LRMES to quarterly by keeping the last observation of each quarter. We include all the banks in the stock return sample except for the Deutsche Bank (the data is not available). Bank fixed effects and quarter fixed effects are included. $Treat$ is equal to 1 for the treated group. $Post_1$ is equal to 1 for quarters from 2022Q3 to 2023Q3, starting at the quarter when the UK regulator announced the intention to remove the bonus cap and ending at one quarter before the quarter when the UK regulator formally announced the removal of bonus cap. $Post_2$ is equal to 1 for quarters starting from 2023Q4, when the UK regulator formally announced the removal of bonus cap. The standard errors clustered by bank are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

	(1) SRISK(%)	(2) LRMES
Treat×Post$_1$	-0.007	-0.015
	(0.012)	(0.012)
Treat×Post$_2$	-0.013	0.013
	(0.034)	(0.013)
Constant	0.260***	0.439***
	(0.003)	(0.002)
Bank FE	Yes	Yes
Quarter FE	Yes	Yes
AdjR^2	0.8733	0.7255
Observations	640	640

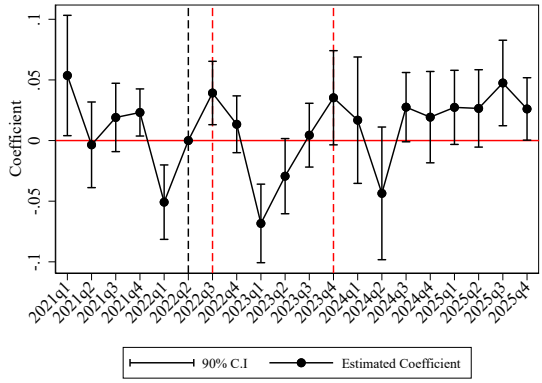
Figure B.1: Dynamic Effects of Bonus Cap Removal on SRISK(%) and LRMES

This figure plots dynamic effects of the 2023 bonus cap removal on SRISK(%) and LRMES over 2021Q1–2025Q4. We estimate equation (1) replacing *Post* with quarter indicators. UK banks are treated and EU banks serve as controls. Dots represent coefficient estimates with 90% confidence intervals based on bank-clustered standard errors. The black dashed line denotes the benchmark quarter; the first red dash line indicates 2022Q3, when the UK regulator announced the intention to remove the bonus cap; the second red dash line indicates 2023Q4, when the UK regulator formally announced the removal of bonus cap.

(a) SRISK(%)



(b) LRMES



B.2 Effect of Bonus Cap Removal on Compensation Payment Forms

In this section, we test the effect of bonus cap removal on payment forms of MRT compensation. Table B.2 reports the summary statistics of cash-based and share-based remuneration for Senior Managers and Non-senior Managers. Table B.3 reports the estimates of the annual variant of equation (1) separately for Top Managers, Other Senior Managers, and Non-senior Managers, with Senior Managers comprising the first two groups.

Table B.2: Summary of Payment Forms of MRT Compensation

This table reports descriptive statistics for different payment forms of MRT over 2021–2025. Panels A and B report statistics for Senior Managers; Panels C and D report statistics for Non-senior Managers. The numbers are in US dollar millions; per-person values are indicated separately. Original local-currency amounts are converted to US dollars using annual spot exchange rates from FRED St. Louis.

	Mean	Std.Dev.	p25	p50	p75	Obs.
Panel A: Senior Managers (UK Banks)						
Cash-based Remuneration	48.06	28.98	25.83	44.27	63.71	71
Share-based Remuneration	37.15	26.53	20.61	33.53	48.39	71
Cash-based Remuneration (per-person)	1.28	0.68	0.67	1.14	1.81	71
Share-based Remuneration (per-person)	0.94	0.57	0.48	1.05	1.31	71
Panel B: Senior Managers (EU Banks)						
Cash-based Remuneration	50.40	61.86	14.36	32.83	57.63	128
Share-based Remuneration	10.21	21.26	0.00	2.66	11.01	127
Cash-based Remuneration (per-person)	0.60	0.45	0.33	0.46	0.73	128
Share-based Remuneration (per-person)	0.14	0.21	0.00	0.05	0.24	127
Panel C: Non-senior Managers (UK Banks)						
Cash-based Remuneration	474.85	504.92	28.74	281.93	926.80	71
Share-based Remuneration	157.67	167.20	11.68	65.30	325.40	71
Cash-based Remuneration (per-person)	0.61	0.25	0.38	0.71	0.82	71
Share-based Remuneration (per-person)	0.23	0.14	0.13	0.24	0.30	71
Panel D: Non-senior Managers (EU Banks)						
Cash-based Remuneration	169.68	209.03	52.29	93.29	214.93	128
Share-based Remuneration	35.33	76.07	0.00	2.64	26.80	127
Cash-based Remuneration (per-person)	0.31	0.19	0.19	0.25	0.38	128
Share-based Remuneration (per-person)	0.05	0.08	0.00	0.02	0.09	127

Table B.3: Changes in MRT payment forms around the Bonus Cap Removal

This table reports OLS estimates of the annual variant of equation (1) examining the effect of the 2023 bonus cap removal on the payment forms of material risk takers (MRTs) across different positions. Panel A, B, and C reports results for Top Managers, Other Senior Managers, and Non-senior Managers, respectively. Bank and year fixed effects are included. The sample covers 2022, 2024, and 2025. The treated group consists of UK banks, and the control group consists of EU banks. *Post* equals 1 for 2024 and 2025. $Log\ Cash(pp)$ is log(total cash payment per MRT), and $Log\ Share(pp)$ is log(total share payment per MRT). Columns (2)–(6) report payment composition ratios. $Total\ Cash$ is total cash payment divided by total remuneration; $Fixed\ Cash$ is fixed cash payment divided by total cash payment; $Var\ Cash$ is variable cash payment divided by total cash payment; $Immediate\ Cash$ is immediately paid cash divided by variable cash payment; and $Defer\ Cash$ is deferred cash payment divided by variable cash payment. The definitions of share-based compensation ratios follow the same methodology.

Panel A: Top Managers

Panel A.1: Cash-based Remuneration

	(1) Log Cash(pp)	(2) Total Cash	(3) Fixed Cash	(4) Var Cash	(5) Immediate Cash	(6) Defer Cash
Treat×Post	0.181	-0.022	-0.100***	0.100***	0.134	-0.134
	(0.141)	(0.031)	(0.035)	(0.035)	(0.148)	(0.148)
Constant	0.475***	0.641***	0.775***	0.225***	0.572***	0.428***
	(0.025)	(0.005)	(0.006)	(0.006)	(0.033)	(0.033)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.7715	0.8911	0.7335	0.7335	0.3715	0.3715
Observations	85	85	85	85	67	67

Panel A.2: Share-based Remuneration

	(1) Log Share(pp)	(2) Total Share	(3) Fixed Share	(4) Var Share	(5) Immediate Share	(6) Defer Share
Treat×Post	0.188	0.064**	-0.035	0.035	-0.059	0.059
	(0.252)	(0.027)	(0.028)	(0.028)	(0.035)	(0.035)
Constant	0.254***	0.276***	0.053***	0.947***	0.287***	0.713***
	(0.062)	(0.005)	(0.007)	(0.007)	(0.009)	(0.009)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.8659	0.9489	0.8012	0.8012	0.8133	0.8133
Observations	61	85	61	61	61	61

Panel B: Other Senior Managers

Panel B.1: Cash-based Remuneration

	(1) Log Cash(pp)	(2) Total Cash	(3) Fixed Cash	(4) Var Cash	(5) Immediate Cash	(6) Defer Cash
Treat×Post	0.179**	0.008	-0.009	0.009	0.159**	-0.159**
	(0.087)	(0.030)	(0.025)	(0.025)	(0.076)	(0.076)
Constant	-0.351***	0.747***	0.775***	0.225***	0.564***	0.436***
	(0.016)	(0.005)	(0.005)	(0.005)	(0.016)	(0.016)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.9571	0.6610	0.8454	0.8454	0.5430	0.5430
Observations	83	83	83	83	73	73

Panel B.2: Share-based Remuneration

	(1) Log Share(pp)	(2) Total Share	(3) Fixed Share	(4) Var Share	(5) Immediate Share	(6) Defer Share
Treat×Post	0.204	0.018	-0.053*	0.053*	-0.032	0.032
	(0.131)	(0.016)	(0.026)	(0.026)	(0.023)	(0.023)
Constant	-1.204***	0.183***	0.043***	0.957***	0.357***	0.643***
	(0.032)	(0.003)	(0.006)	(0.006)	(0.005)	(0.005)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.9814	0.9376	0.8851	0.8851	0.8920	0.8920
Observations	58	83	58	58	58	58

Panel C: Non-senior Managers

Panel C.1: Cash-based Remuneration

	(1) Log Cash(pp)	(2) Total Cash	(3) Fixed Cash	(4) Var Cash	(5) Immediate Cash	(6) Defer Cash
Treat×Post	0.138	-0.007	-0.023	0.023	0.046	-0.046
	(0.102)	(0.017)	(0.016)	(0.016)	(0.032)	(0.032)
Constant	-1.187***	0.831***	0.784***	0.216***	0.699***	0.301***
	(0.018)	(0.003)	(0.003)	(0.003)	(0.006)	(0.006)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.9718	0.9526	0.9042	0.9042	0.7679	0.7679
Observations	85	85	85	85	85	85

Panel C.2: Share-based Remuneration

	(1) Log Share(pp)	(2) Total Share	(3) Fixed Share	(4) Var Share	(5) Immediate Share	(6) Defer Share
Treat×Post	0.078	0.006	0.013	-0.013	-0.029	0.029
	(0.132)	(0.016)	(0.023)	(0.023)	(0.045)	(0.045)
Constant	-2.750***	0.126***	0.024***	0.976***	0.442***	0.558***
	(0.027)	(0.003)	(0.005)	(0.005)	(0.010)	(0.010)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
AdjR^2	0.9692	0.9699	0.8256	0.8256	0.5105	0.5105
Observations	63	85	63	63	61	61

C Alternative Specification and Robustness Tests

C.1 Synthetic DiD

In this section, we report the results of running Synthetic DiD (Arkhangelsky et al., 2021) on the stock-based risk measures. The basic idea of Synthetic DiD is to construct a "synthetic" control group by reweighting control units to better match the pre-treatment outcome path of the treated group, while allowing for imperfect pre-treatment fit and unit-level heterogeneity. Compared to the conventional Synthetic Control Method (SCM), Synthetic DiD additionally incorporates time weights in the pre-treatment period, placing greater weights on periods that are more predictive of post-treatment outcomes and thereby making the parallel trends assumption more plausible.

Note that we use the first announcement date (2022Q3) as the sole treatment timing in the estimation (our main specification includes two event dates) because the method requires a clear cut-off between the pre-treatment and post-treatment periods. In Synthetic DiD, the outcome path of the "synthetic" control group is constructed solely based on pre-treatment outcomes. Incorporating both event dates would create an intermediate period between the announcement and implementation dates that is neither a clean pre-treatment period nor a post-treatment period. To better match the pre-treatment outcome path, we use the data from 2016Q1 to 2025Q4, with a longer pre-treatment period than our main specification. The pre-treatment period would be 2016Q1–2022Q2 and the post-treatment period would be 2022Q3–2025Q4. Table C.1 reports the estimated treatment effect. Figure C.1 plots the outcome paths and unit weights. Figure C.2 plots the results of the dynamic effects.

Table C.1: Treatment Effect of Bonus Cap Removal on Risk Measures

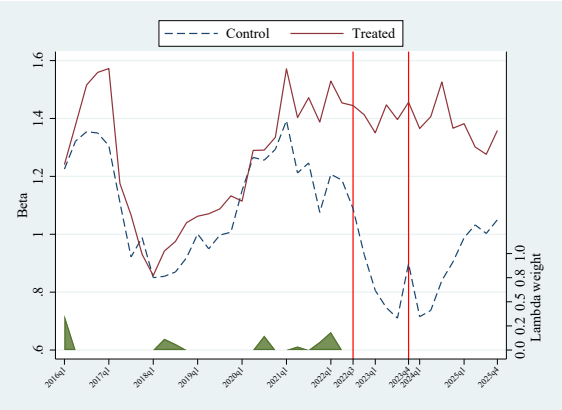
This table reports the estimates of average treatment effect of Bonus Cap Removal on stock-based risk measures based on Synthetic DiD (Arkhangelsky et al., 2021). The sample period spans 2016Q1–2025Q4 for all risk measures except $\Delta CoVaR$. Since these three measures contain missing observations in 2016, the entire year is excluded to satisfy the strong balanced panel requirement of the Synthetic DiD estimator (hence, the sample period of $\Delta CoVaR$ is 2017Q1-2025Q4). *Treat* is the dummy of UK Banks. *Post* equals 1 for quarters from 2022Q3 to 2025Q4. The standard error is based on placebo and the repetition time is 500.

	(1) Beta	(2) Idiosyncratic Volatility	(3) Total Volatility	(4) $\Delta CoVaR^{system\|i}_{95\%,t}$	(5) $\Delta CoVaR^{i\|system}_{95\%,t}$	(6) ES	(7) VaR
Treat × Post	0.382***	0.010	0.008	0.005	0.011***	-0.000	0.000
	(0.048)	(0.014)	(0.014)	(0.004)	(0.003)	(0.002)	(0.002)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1320	1320	1320	1152	1152	1320	1320

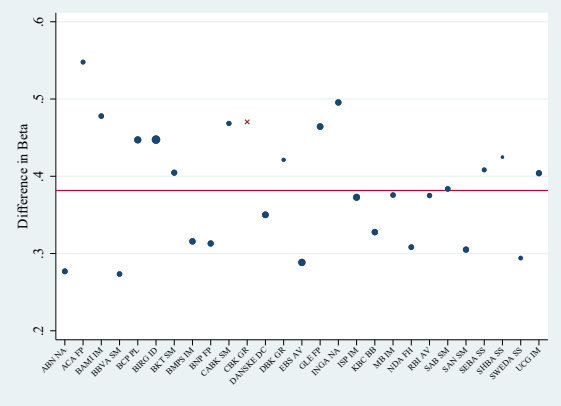
Figure C.1: Synthetic DiD: Outcome Paths and Weights

This figure plots the outcome paths of each risk measures from 2016Q1 to 2025Q4 (except $\Delta CoVaR$, which starts at 2017Q1 due to the strongly balanced panel requirement of the Synthetic DiD estimator) of the treated group and the synthetic control group, together with the unit and time weights used in the Synthetic DiD estimation for each stock-based risk measure. In the left panels, the red lines denote the two announcement dates. The time weights are denoted by the green area at the bottom. In the right panels, the dots denote adjusted outcome difference for each control bank, with the size is proportional to the corresponding unit weight. The horizontal line denotes the weighted average of these differences (the estimated treatment effect). Banks with zero weight are denoted by an $\times$ symbol.

(a) Beta

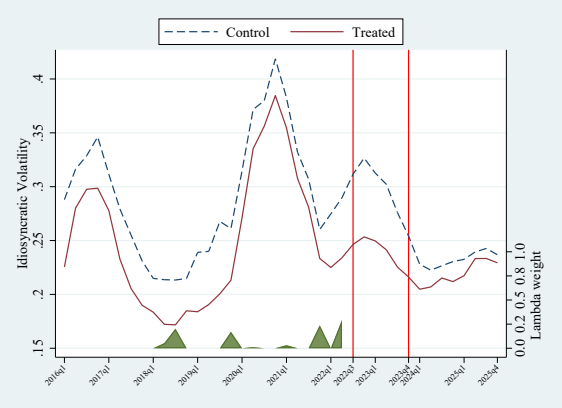


Outcome Path

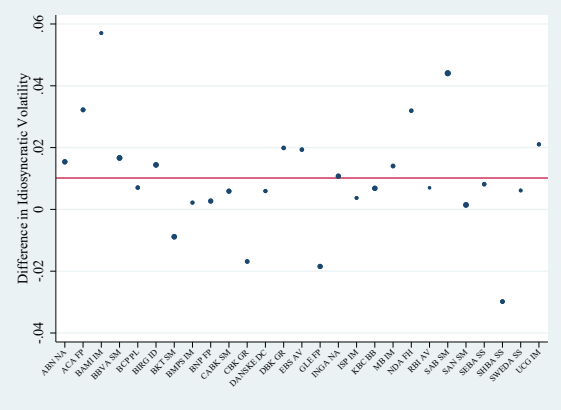


Weights

(b) Idiosyncratic Volatility

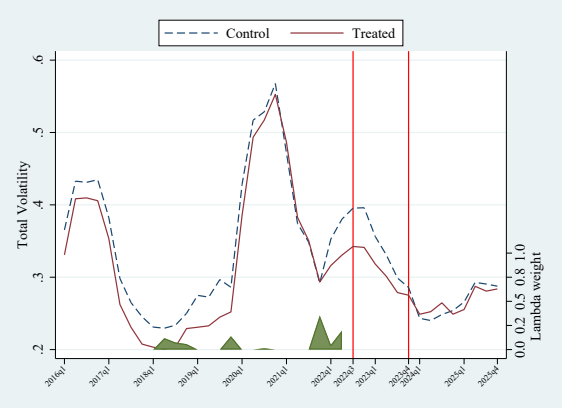


Outcome Path

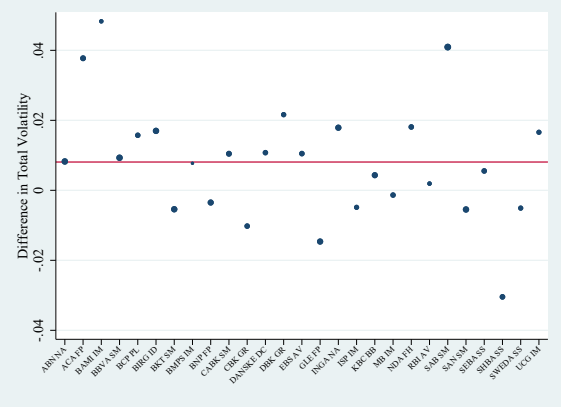


Weights

(c) Total Volatility

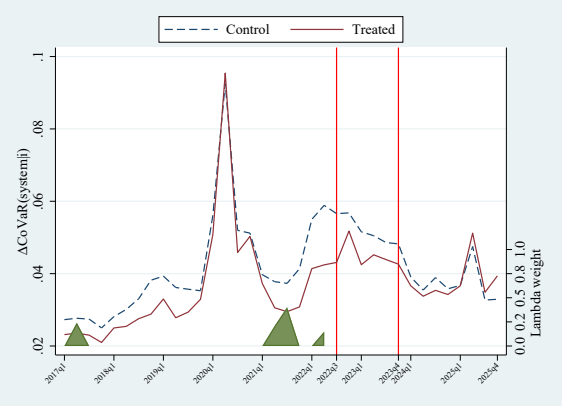


Outcome Path

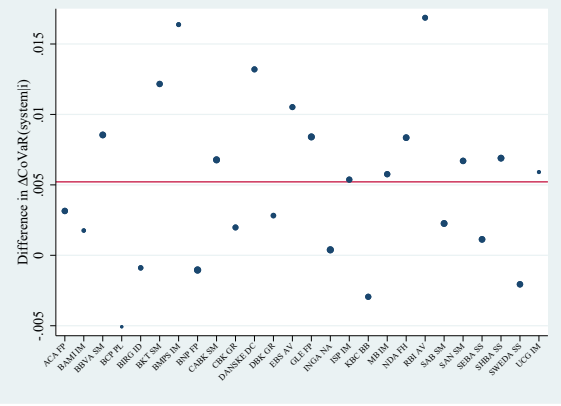


Weights

(d) $\Delta CoVaR^{system|i}$

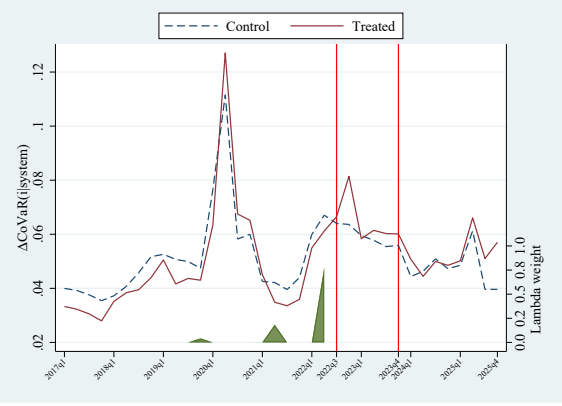


Outcome Path

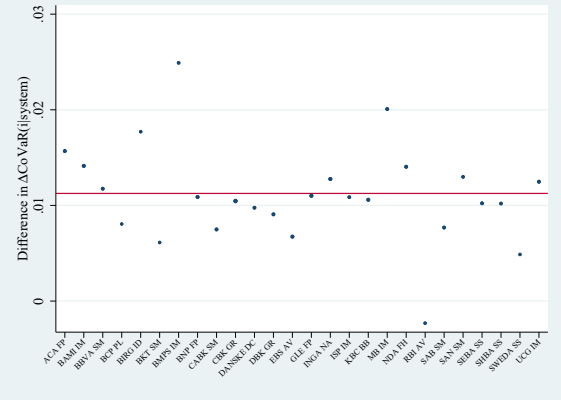


Weights

(e) $\Delta CoVaR^{i|system}$

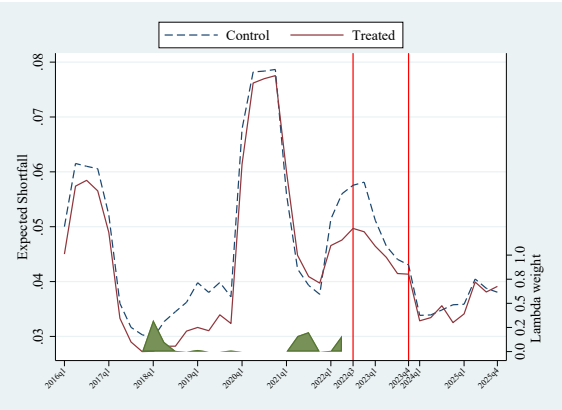


Outcome Path

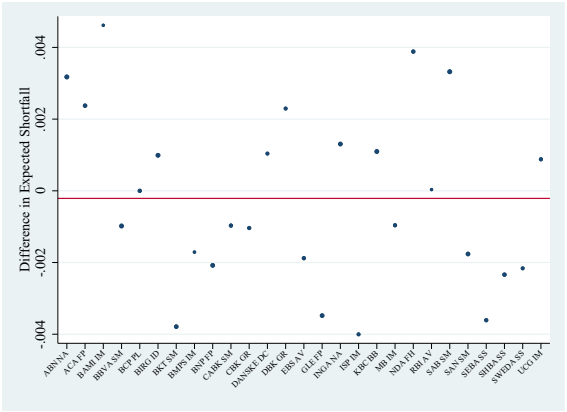


Weights

(f) ES

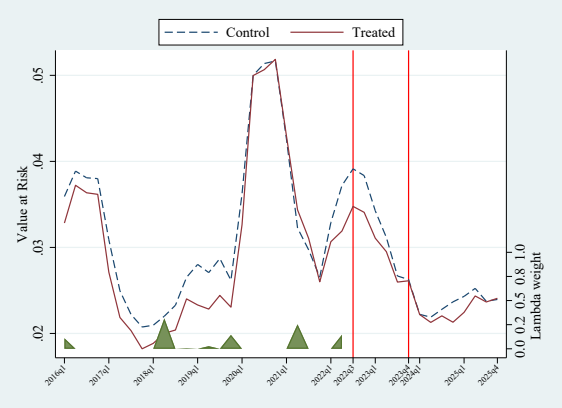


Outcome Path

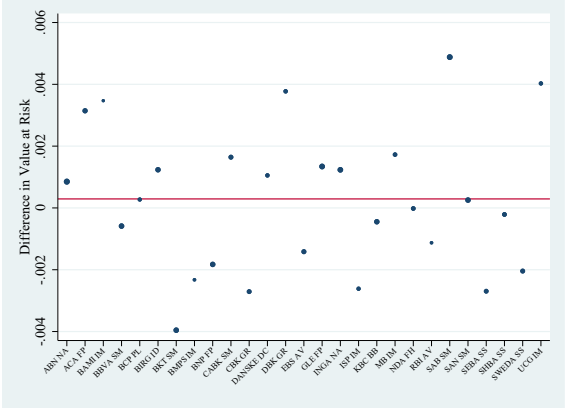


Weights

(g) VaR



Outcome Path

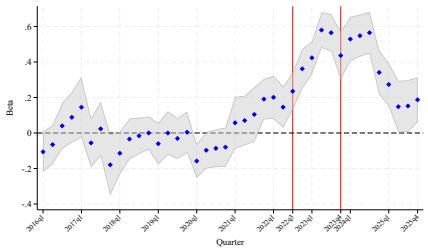


Weights

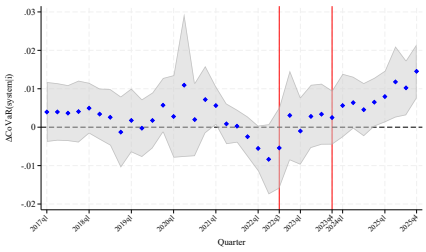
Figure C.2: Dynamic Effects from Synthetic DiD

This figure plots the dynamic effects for the stock-based risk measures from 2016Q1 to 2025Q4 (except $\Delta CoVaR$, which starts at 2017Q1 due to the strongly balanced panel requirement of the Synthetic DiD estimator) estimated using the Synthetic DiD estimator. The blue dots represent the point estimates and the shaded areas denote the 95% confidence intervals based on placebo standard errors. The red lines denote the two announcement dates. The sample period for $\Delta CoVaR$ and Tail Risk begins in 2017Q1.

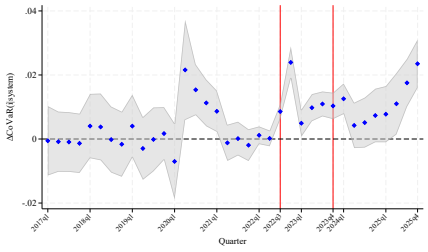
(a) Beta



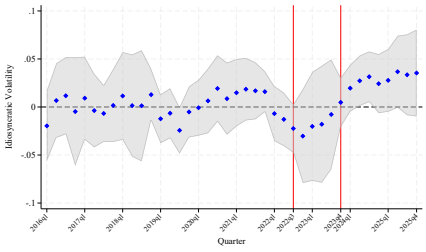
(b) $\Delta CoVaR^{system|i}$



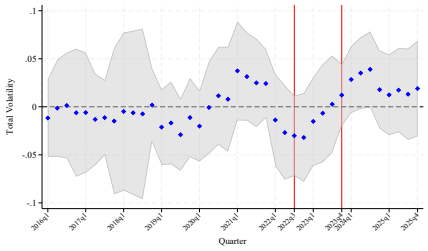
(c) $\Delta CoVaR^{i|system}$



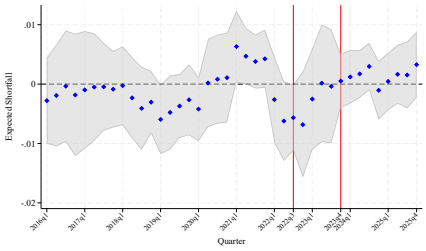
(d) Idiosyncratic Volatility



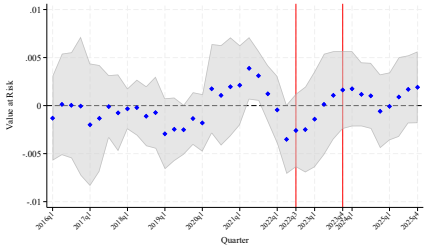
(e) Total Volatility



(f) ES



(g) VaR



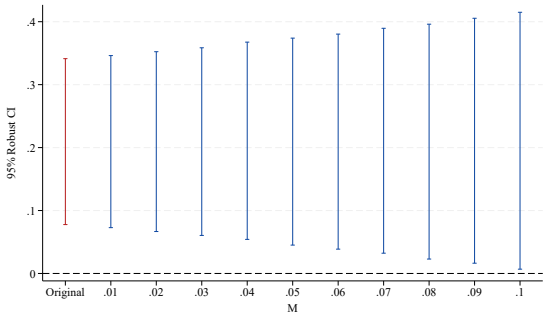
C.2 Sensitivity Analysis of Parallel Trend Violations (Honest DiD)

Figure C.3: Sensitivity Analysis of Parallel Trends Violations

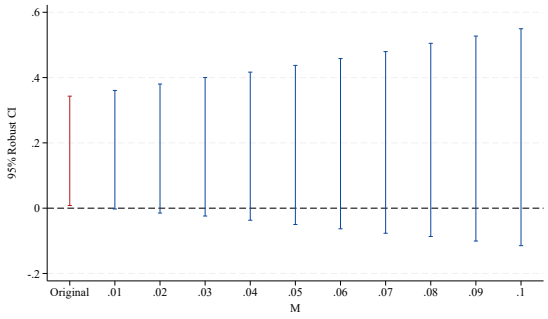
This figure plots the 95% confidence interval of the estimated treatment effect allowing the violations of parallel trend assumption under the relative magnitudes restrictions following Rambachan and Roth (2023). The parameter M measures the extent to which violations of the parallel trends assumption in the post-treatment period may exceed the maximum level of those observed in the pre-treatment period. Specifically, larger values of M allow for greater violation. The dashed line denotes zero.

Beta

(a) Event Date 1 (2022Q3)

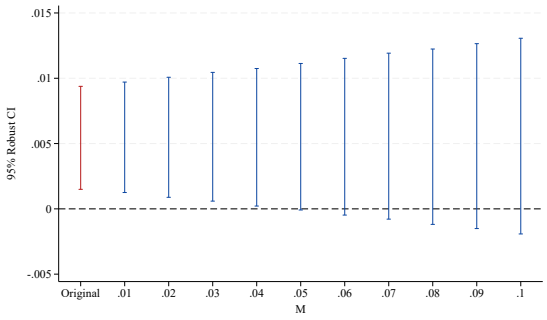


(b) Event Date 2 (2023Q4)

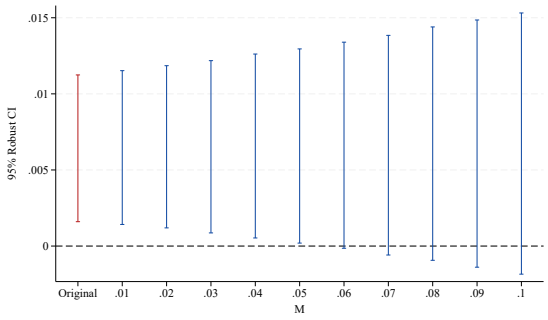


$$\Delta CoVaR^{system|i}_{95\%,t}$$

(c) Event Date 1 (2022Q3)

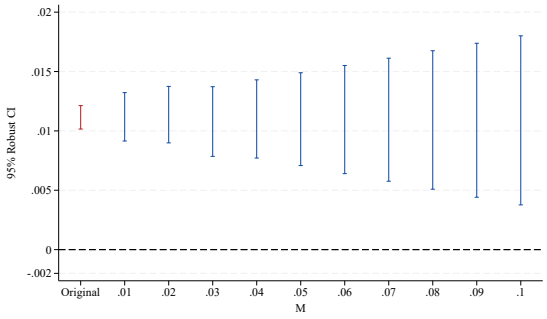


(d) Event Date 2 (2023Q4)

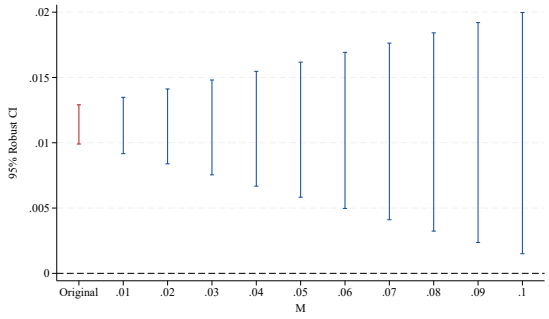


$$\Delta CoVaR^{i|system}_{95\%,t}$$

(e) Event Date 1 (2022Q3)



(f) Event Date 2 (2023Q4)

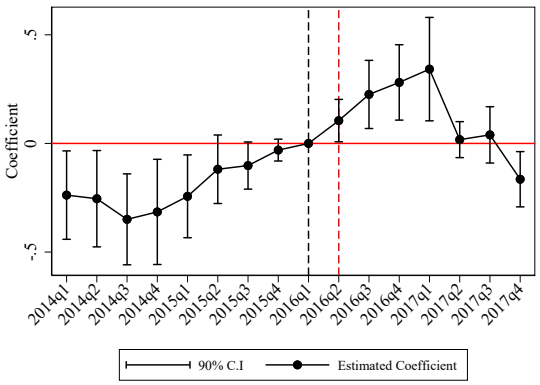


C.3 Test of the Effect of Brexit on Systematic Risk

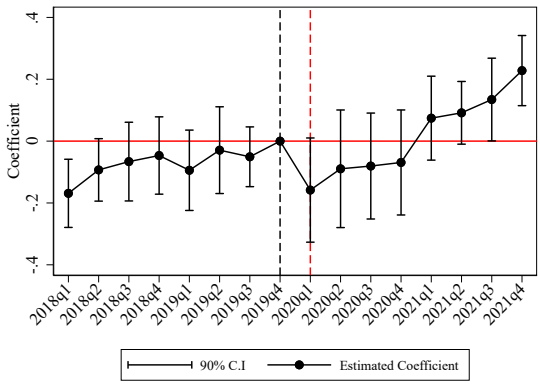
Figure C.4: Dynamic Effects of Market Beta around Brexit

This figure plots dynamics of market beta around Brexit Referendum and Brexit Implementation. We estimate equation (1) replacing *Post* with quarter indicators. UK banks are treated and EU banks serve as controls. Dots represent coefficient estimates with 90% confidence intervals based on bank-clustered standard errors. The black dashed line denotes the benchmark quarter; the red dash line in panel (a) indicates 2016Q2, the time of Brexit Referendum; the red dash line in panel (b) indicates 2020Q1, the time of Brexit Implementation.

(a) Brexit Referendum



(b) Brexit Implementation



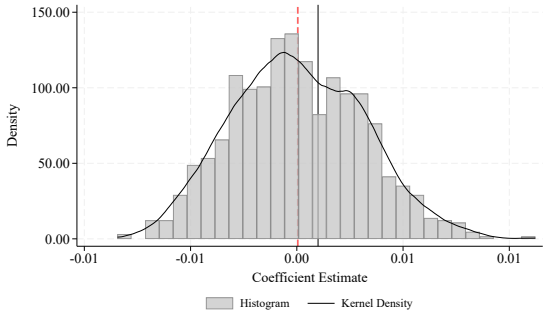
C.4 Placebo Tests

Figure C.5: Distribution of Placebo Effects of $\Delta CoVaR$

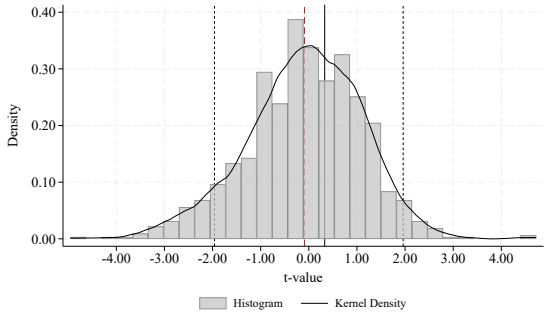
This figure plots the distribution of the placebo effects and the corresponding t-values of $\Delta CoVaR$. The solid line denotes the estimated treatment effect (and the corresponding t-value) based on the true treatment assignment. For actual estimates (t-values) falling outside the plotted range, the corresponding values are reported as text annotations. The black dash line denotes the 5% and 95% quantile of the t-distribution (-1.96 and 1.96).

$$\Delta CoVaR^{system|i}_{95\%,t}$$

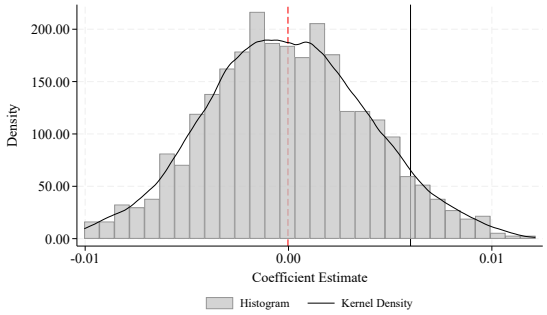
(a) Event Date 1 (2022Q3): Coefficient



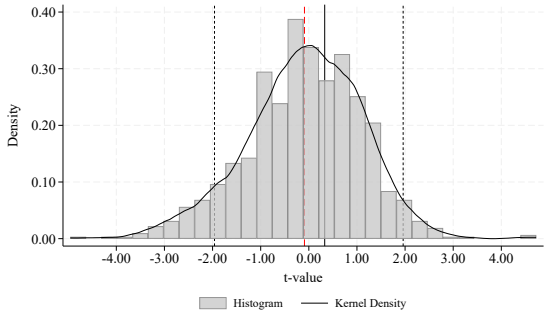
(b) Event Date 1 (2022Q3): t-value



(c) Event Date 2 (2023Q4): Coefficient

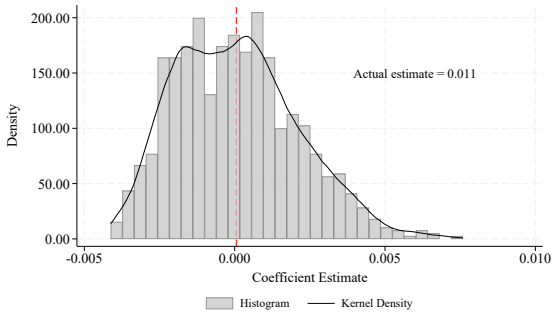


(d) Event Date 2 (2023Q4): t-value

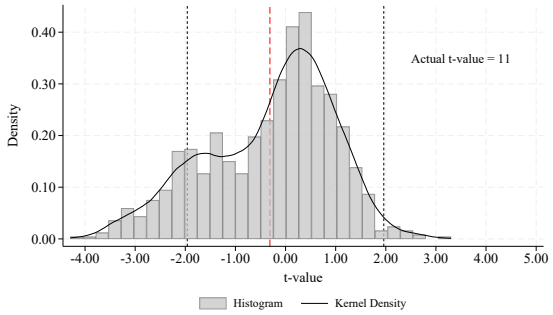


$$\Delta CoVaR^{i|system}_{95\%,t}$$

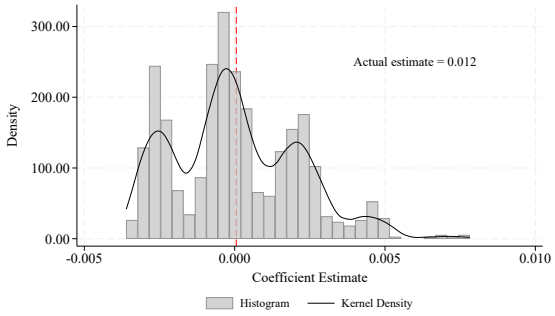
(e) Event Date 1 (2022Q3): Coefficient



(f) Event Date 1 (2022Q3): t-value



(g) Event Date 2 (2023Q4): Coefficient



(h) Event Date 2 (2023Q4): t-value

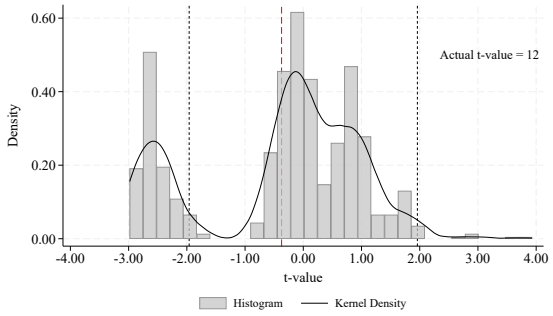
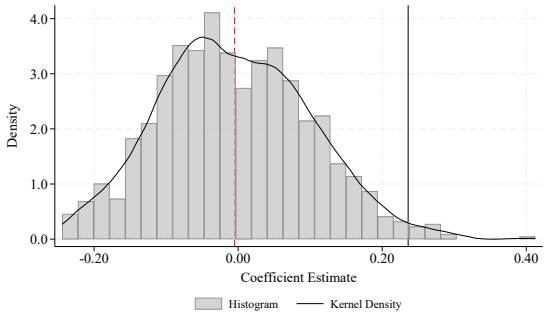


Figure C.6: Distribution of Placebo Effects of Variable-Fixed Ratio

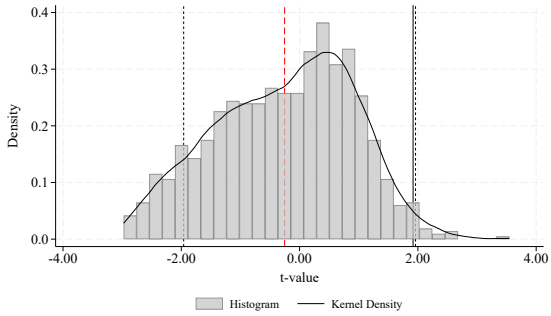
This figure plots the distribution of the placebo effects and the corresponding t-values of variable-fixed ratio for other senior managers and non-senior managers. The solid line denotes the estimated treatment effect (and the corresponding t-value) based on the true treatment assignment. The black dash line denotes the 5% and 95% quantile of the t-distribution (-1.96 and 1.96).

Other Senior Managers

(a) Coefficient

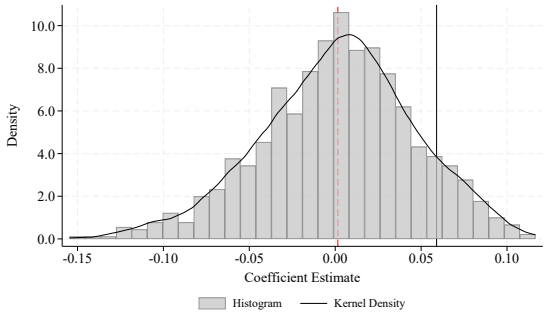


(b) t-value



Non-senior Managers

(c) Coefficient



(d) t-value

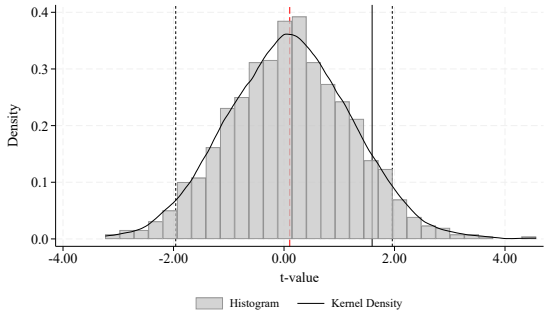
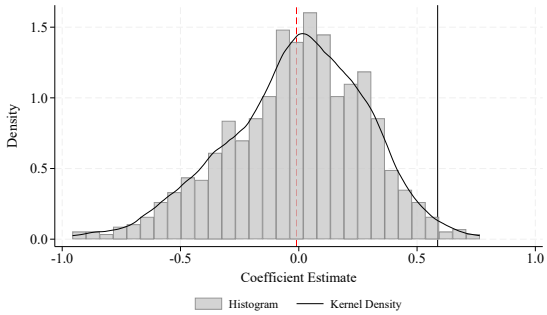


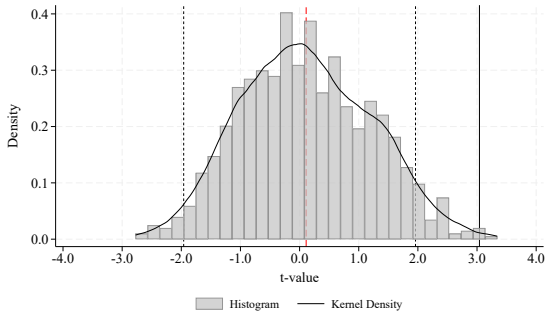
Figure C.7: Distribution of Placebo Effects of Leverage

This figure plots the distribution of the placebo effects and the corresponding t-values of leverage. The solid line denotes the estimated treatment effect (and the corresponding t-value) based on the true treatment assignment. For actual estimates (t-values) falling outside the plotted range, the corresponding values are reported as text annotations. The black dash line denotes the 5% and 95% quantile of the t-distribution (-1.96 and 1.96).

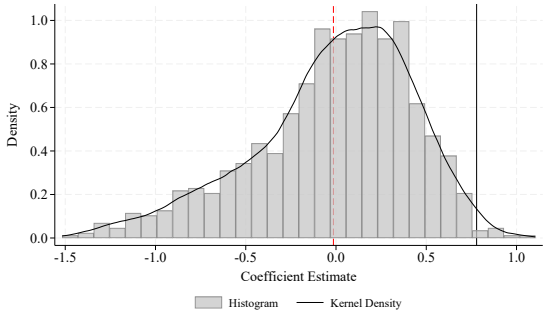
(a) Event Date 1 (2022Q3): Coefficient



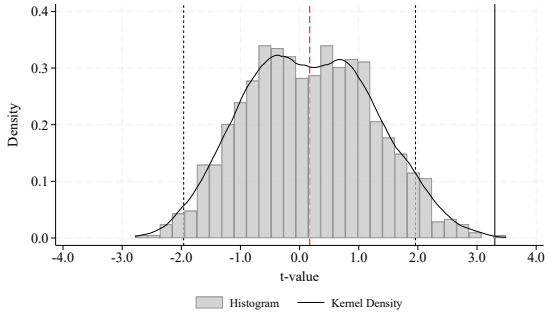
(b) Event Date 1 (2022Q3): t-value



(c) Event Date 2 (2023Q4): Coefficient



(d) Event Date 2 (2023Q4): t-value



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