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### Abstract

In this paper, we study whether and how some of the remuneration rules introduced after the Global Financial Crisis affected bankers' compensation using a unique regulatory dataset on remuneration in six major UK banks during 2014–19. We find that for bankers most affected by limits on their bonus to fixed pay ratios (the bonus cap), total pay growth did not decrease, but compensation shifted from bonuses to fixed remuneration. We also find some evidence which could indicate that requiring bankers' bonuses to be deferred for longer periods was correlated with increases in total compensation and a lower proportion of bonuses being deferred.

**Key words:** Remuneration regulation, bonus cap, deferral, bank regulation.

**JEL classification:** G21, G28, G38, J33, L51.

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# 1. Introduction

Reforms in bank regulation implemented globally since the Global Financial Crisis (GFC) include a set of measures aimed at the incentives of bank staff. For example, many jurisdictions now require that a proportion of bankers' bonuses is awarded in shares, with payments also spread over time (deferred) rather than paid out immediately so as to increase their exposure to banks' long-term risks and align incentives better. In the European Union (EU) and the United Kingdom (UK), bank employees are further subject to a maximum limit on their variable-to-fixed remuneration ratio (the bonus cap) to curb excessive risk-taking incentives. Overall, these regulations reflect the consensus[1] that bankers' pay sizes and structures contributed to the build-up of risk in the years preceding the GFC.

Some evidence suggests that reforms in how bankers are compensated have indeed contributed to greater financial stability. For example, Kleymenova and Tuna (2021) find that the introduction of UK Remuneration Code in 2010 decreased bank contribution to systemic risk. Cerasi et al. (2020) show that bank CEO compensation became more risk-sensitive after the Financial Stability Board (FSB) introduced guidelines on sound compensation practices in 2009. However, relatively less is known about the unintended consequences of individual requirements. For example, in a theoretical model Thanassoulis (2012) points out that a bonus cap, as it is currently designed, would induce banks to pay a higher share of bankers' remuneration in salaries, which would in turn increase banks' fixed cost bases and reduce financial flexibility.[2] Hoffmann et al. (2020a) also use a theoretical model to show that imposing stringent regulatory minima on periods over which bankers' bonuses need to be deferred can create costs as banks would need to compensate staff for the time value of money lost.

To help shed some light on these issues, in this paper we study the effects of remuneration rules using a unique dataset on staff pay sizes and structures in six major UK banks during 2014-2019. We focus on two areas of post-crisis regulation, bonus cap requirements and deferral, and examine whether they led to increases in affected individuals' pay to compensate for the move from initial arrangements, or prompted banks to re-arrange compensation structures to limit the impact of these rules. Unlike the majority of studies on remuneration in banks that focus on top executives only, we use regulatory reporting data on a wider range of bank staff – "material risk-takers," or MRTs. These are individuals who have scope to take decisions that can materially affect the risk profile and soundness of their banks due to seniority, ability to create large exposures, and other criteria, and who therefore constitute a larger and more varied set of bank employees than just the top executives.

[1] See FSB Principles for sound Compensation Practices: https://www.fsb.org/wp-content/uploads/r_0904b.pdf

[2] This prediction is supported by evidence by Colonello et al. (2020) who find that the introduction of the bonus cap in 2014 led to an increase in salaries for affected banks' top executives.

The first remuneration requirement we study is the maximum limit on bankers' variable-to-fixed remuneration ratio – the bonus cap. The requirement was introduced in the EU and UK in 2014, and sets a maximum ratio between MRTs' variable (mostly bonuses) and fixed (comprising of salaries, role-based allowances and benefits) pay at 100%, with banks being allowed to increase the ratio to up to 200% with shareholder approval. Unlike an existing study by Colonnello et al. (2020) that looks at the effects of the bonus cap on top executives' pay and bank performance at the time when it was introduced in 2014, our paper focusses on the period after the rule introduction (2014-2019) due to data constraints. Our identification relies on comparing developments in remuneration of MRTs who come closer to the regulatory limit relative to those to whom the bonus cap is not binding, controlling for their remuneration levels, structures, and previous period pay growth. This approach helps assess the extent to which the findings on the increase in top earners' fixed remuneration in 2014 as a result of the bonus cap as found by Colonnello et al (2020) held in the longer run, after MRTs' expectations might have been adjusted. It also allows us to measure the effects on a much broader set of individuals.

First, we find that the 100% bonus-to-fixed pay limit often cited as the bonus cap threshold was not binding in practice in most of the largest UK banks (they are using the 200% threshold). Around one third of sample MRTs[3] had bonuses exceeding 100% of their fixed pay, and we do not find strong evidence that getting close to the 100% bonus-to-fixed pay limit affected developments in individuals' remuneration relative to colleagues whose bonus-to-fixed pay ratios were further away from the threshold. In particular, comparing MRTs whose bonuses were between 75% and 100% of fixed pay to those for whom the ratio was in the 25%-75% range (or 50%-150% range), we do not find consistent evidence that the 100% bonus cap slowed down bonus growth or increased fixed pay growth.

Our analysis, however, suggests that the 200% bonus-to-fixed pay ratio limit had effects on MRT pay structures. When an MRT's bonus exceeded a 175% bonus-to-fixed pay threshold in a given year, next year their bonus-to-fixed pay ratio grew around 12 percentage points less compared to similar MRTs whose bonus ratio had been between 100% and 175%.[4] This slowdown in bonus ratio growth was mostly driven by higher fixed remuneration growth, which increased by around 5% more than for the rest of MRTs. We find that to achieve higher fixed pay growth, banks have tended to increase MRTs' role based allowances rather than salaries: the former are a form of fixed payments that staff can receive in relation to their roles and so adjusted when they move, and can be treated differently than salaries for pension contributions. Affected MRTs' bonuses grew nearly 4% slower, but insignificantly so once previous period bonus growth is controlled for. We do not find statistically significant evidence that

[3] As explained in further sections, due to data limitations, our sample covers only around 60% of all MRTs in the sample banks.

[4] The effects are stronger if the control group is expanded to all MRTs: MRTs with bonuses in the 175%-200% bonus-to-fixed pay range have their fixed pay grow around 7 percent more, and bonus-to-fixed pay growth 17 pp less, than other MRTs.

affected MRTs' total remuneration growth was slower than for other MRTs, consistent with bonuses being replaced by higher fixed pay.

These results suggest that the finding by Colonnello et al (2020) that the bonus cap leads to a substitution from bonuses to fixed pay has persisted in the years after the bonus cap was introduced. Our findings are unlikely to be driven by bonus reversals or promotions following periods of high bonus growth as the effects above are observed even if we control for the size of MRTs' bonuses, their growth, and the bonus ratio in the preceding period. Furthermore, the finding that the bonus cap is not associated with overall remuneration changes also makes it unlikely that the changes to MRTs' pay structures were driven by promotions, as these could be expected to have led to increases in total pay, and higher salaries rather than role-based allowances.

How important are these effects? As only a small proportion (around 4%) of our sample MRTs fell close to the 200% threshold in 2014-2019, subsequent increases in banks' fixed costs due to substitution from bonuses to fixed pay annually could have been relatively limited. However, the resulting changes in MRT incentives could have an impact on their risk-taking decisions. While theoretically limits on bonus size could weaken MRTs' incentives to take excessive risks, our finding that the bonus cap leads to a substitution from bonuses to other forms of remuneration implies that such effects could be weakened. Furthermore, a lower proportion of total remuneration paid out in bonuses means that MRTs are less exposed to the long-term outcomes of their decisions: whereas a proportion of bonuses needs to be deferred, paid in bank shares, and can be clawed back by banks if misconduct or losses crystallise in the long run, salaries and role-based allowances are paid in cash and not subject to such arrangements.

The second remuneration requirement this paper studies is deferral. To align MRTs' and banks' incentives, remuneration rules require that a proportion of bankers' bonuses is deferred (i.e. payments withheld), and that banks can reduce or cancel deferred bonus payouts following revelations of individual conduct failures or if bank risks crystallise. Furthermore, a proportion of deferred bonuses needs to be granted in the form of bank shares or equivalent instruments. By exposing bankers to the longer-term outcomes of their decisions or bank performance, deferral rules aim to prevent short-termist behaviours and excessive risk-taking, contributing to greater financial stability.

Rather than focussing on the prudential benefits of this rule, our analysis aims to assess whether requiring banks to defer the payments of MRT bonuses for a longer period of time results in an increase in the quantum of total remuneration awarded. Such effects could arise if banks need to compensate MRTs for the time value of money lost as consumption is deferred, as argued in the theoretical literature, but could also result from compensation for increased risk to bankers' personal wealth because of malus or payment in shares arrangements.

To measure these effects, we use the change in UK remuneration requirements implemented in 2016 that lengthened minimum periods over which certain senior bank employees' bonuses needed to be deferred. Until 2016, all largest UK bank MRTs faced the same requirement where at least 40% (60% for certain MRTs) of bonuses needed to be deferred for at least "three to five years", with banks generally setting it at the minimum of three years for most individuals. In 2016, to better reflect the time it takes for individual and bank risks to materialise, regulators increased minimum bonus deferral periods to five or seven years for some senior MRTs, and kept the minimum unchanged for the rest. As a result, this policy change affected only some individuals in each sample bank, which allows us to implement difference-in-difference analysis comparing changes in remuneration sizes and structures for these two groups around the time of the rule change.

Our analysis shows that the total remuneration of MRTs affected by the rule change indeed increased more than that of the unaffected MRTs in 2016, consistent with them being compensated for the longer periods over which their bonuses were deferred and subject to adjustments. Although these findings are subject to several caveats explained below which do not allow us to conclude the changes were the sole result of the change in regulation, they provide empirical support for the theoretical literature which suggests that deferring bankers' pay could lead to increases in total compensation (e.g., Thanassoulis, 2013).

In particular, there are several alternative explanations for why we might observe a higher increase in the total pay of MRTs affected by longer deferral periods, and we implement further analysis attempting to test their validity. First, our findings could result from inherent differences between the populations of affected and unaffected MRTs: the former tended to be more senior, and their pay growth could have been generally faster over time.[5] To address this concern, we run additional analysis focussing on year-on-year remuneration growth rather than levels and find that the change in affected MRTs' total pay growth in 2016 relative to 2015 and 2017 was higher than for the unaffected ones. We find similar effects focussing on fixed pay growth only, suggesting the change was not driven by an increase in affected MRTs' performance and bonuses in 2016.

Another possible explanation for our findings above is that the population of MRTs becoming subject to longer deferral requirements in 2016 coincided with the population of MRTs being promoted, which would also affect their total pay. We are not able to account for changes in MRTs' job positions or seniority in our data, and so cannot directly test for this effect or control for it in our analysis. However, it could be expected that promotions are associated with increases in MRTs' fixed remuneration (salaries). We find that very similar proportions of MRTs faced fixed pay increases between in 2015 and 2017 (before and after the rule change) and 2016 (the year of rule change),

[5] The differences between pay levels would already be controlled for by fixed MRT effects used throughout analysis.

but when it increased, fixed pay rose on average more in 2016 (both in monetary and proportionate terms) than 2015 or 2017. This could suggest that even if the population of MRTs affected by longer deferral period requirements were also promoted in 2016, their fixed pay increased more than it would have in 2015 or 2017 – which could be attributed to longer deferral requirements.

A further caveat regarding our study is that our estimates may be capturing the effects of other rules introduced in 2016 that may also have affected bankers' pay. More specifically, in 2016 the UK implemented the Senior Managers Regime which requires that most senior decision-makers in banks have clearly assigned responsibilities and are accountable for actions within their remit. These individuals (Senior Management Functions, or SMFs) also face the longest deferral period (seven years). As SMFs were likely to have been compensated for their increased accountability under the Senior Managers Regime as well as longer deferral period requirements, in regression analysis we distinguish between them and MRTs who were affected by longer deferral only (i.e. were not SMFs). We find that the latter group faced an increase in total pay, as well – suggesting the Senior Managers Regime was not the sole driver of pay increases in 2016 for the MRTs subject to longer deferral requirements.

We also find some evidence consistent with banks adjusting affected MRTs' remuneration structures to minimise the impact of these rules. The effects of longer deferral period can be reduced if banks choose to diminish the proportion of an individual's remuneration paid in bonuses (substituting it for salaries), or when the proportion of bonus being deferred is reduced. While we do not find evidence that affected MRTs' bonus-to-fixed pay ratios decreased relative to unaffected MRTs' around the time of the rule change, the proportion of their bonuses deferred in excess of regulatory minima diminished substantially more. In particular, in cases where MRTs had a larger proportion of bonuses deferred than the 40% minimum regulatory requirement (or 60% as applicable to some individuals), this "extra" deferral nearly halved in 2016.[6] These findings provide evidence of an additional channel through which bonus deferral period regulation can have unintended consequences, as while it lengthens the time over which bankers' wealth is exposed to bank losses or misconduct, it might reduce the proportion of their wealth subject to these adjustments.[7]

Our study focusses on the unintended consequences of remuneration requirements, but it needs to be noted that these costs should be weighed against potential gains to financial stability. Theoretical literature on remuneration in banks suggests that shareholders might construct aggressive remuneration structures to encourage risk-taking or other behaviours in order to exploit the public safety net (Hoffmann et al., 2020b), in which case remuneration requirements could contribute to the safety of firms. Another view is that remuneration arrangements in banks are aimed at achieving other objectives such as screening or effort provision, and excessive risk-taking arises as a

[6] It has to be noted that the proportion of bonuses deferred beyond minimum requirements was only around 5% on average in 2015, somewhat higher for affected staff.
[7] Which could further interact with the effects of the bonus cap.

side-effect (Bannier et al., 2013), in which case remuneration requirements could improve financial stability, but have unintended consequences. Hakenes and Schnabel (2014) study these two channels through which bank remuneration structures and riskiness could be linked and show that the efficiency of remuneration requirements depends on whether compensation structures are used to encourage effort or risk-shifting incentives.

Some empirical evidence suggests that remuneration requirements could indeed contribute to greater financial stability. Harris et al (2020) use a laboratory experiment and find that the bonus cap and malus arrangements can curtail incentives for excessive risk-taking, but the effectiveness of the bonus cap is reduced if banks pay for relative rather than absolute performance. Evidence in Kleymenova and Tuna (2021) is consistent with such effects: they compare the riskiness of UK banks to that of non-financial firms and banks in other jurisdictions, and show that banks affected by the introduction of remuneration requirements in 2011 were less exposed to systemic risk and contributed less to it. Cerasi et al (2020) similarly compare banks in jurisdictions implementing remuneration requirements after the GFC to those where such standards are not implemented and find some evidence that top executive compensation in the former has become more linked to the risks taken, potentially reducing incentives for myopic behaviours.

The rest of the paper is structured as follows: Section 2 provides an overview of remuneration requirements applicable to UK banks throughout the sample period. We discuss our dataset in Section 3. Our findings on the effects of the bonus cap are presented in Section 4, and longer minimum deferral periods – in Section 5. Section 6 concludes.

## 2. Remuneration requirements: principles and implementation

### 2.1. Key principles of remuneration requirements

The general objective of regulating remuneration practices in banks is to reduce excessive risk taking that may arise from the structure of remuneration schemes. Key aims and principles of how bankers' pay should be regulated were first outlined in 2009 by the Financial Stability Board's Principles for Sound Compensation Practices,[8] and have been implemented as regulation in many jurisdictions since then. The key areas of remuneration requirements are explained below, and the timeline of their implementation in the UK is summarised in the next section.

**Deferral and malus.** Regulation on bankers' deferral requires that a proportion of their bonus is paid out not at the time of award, but over an extended period of time. Together with requirements that individuals lose part/all of their deferred bonuses if significant losses or misconduct comes to light in the future (i.e. "malus" is applied), deferral

[8] FSB Principles for sound Compensation Practices: https://www.fsb.org/wp-content/uploads/r_0904b.pdf

requirements expose individuals to the long-term outcomes of their decisions on bank performance.

**Clawback**. While malus requires banks not to pay out deferred bonuses if certain risks materialise, clawback requirements concern bonuses that are already paid out. Bank contracts contain provisions allowing them to claw back, or reclaim, bonuses paid if individual malpractice comes to light or banks suffer losses over a certain time period.

**Payment in shares.** Another requirement aimed at aligning the interests of bank staff and financial institutions is for a minimum proportion of bonuses to be paid in bank shares or equivalent financial instruments (in the EU and UK, the minimum is set at 50% of bonuses – both paid out immediately and deferred). As a proportion of shares is deferred, this also exposes bankers' wealth to bank profitability and riskiness in the long run, increasing the alignment of incentives.

**Bonus cap.** In the EU and UK, the bonus cap allows the bonus-to-fixed pay ratio to be at most 100%, which can be increased to 200% with shareholder approval.

### 2.2. Implementation in the UK

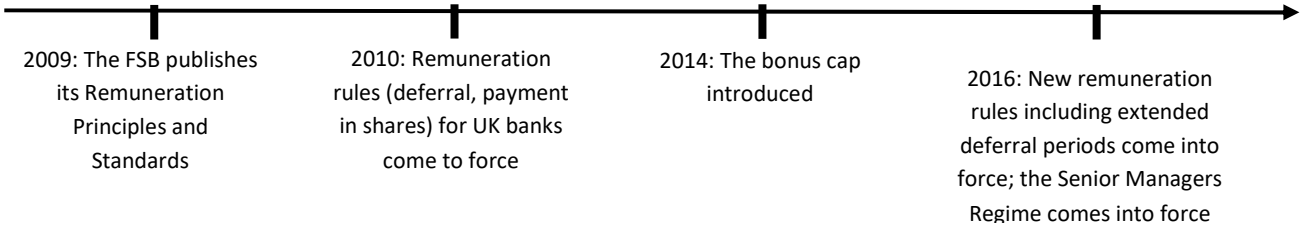
In the UK, remuneration regulation was first introduced in 2010, and evolved over time as new rules were introduced and amendments made (see Figure 1). Only the UK's largest banks (until 2020, with three-year average total assets exceeding GBP 15 bn) are subject to the full set of remuneration requirements, and they do not apply to all employees – only individuals whose bonuses exceed a GBP 500,000 threshold, and MRTs. [9] Over the sample period, MRTs whose total remuneration did not exceed GBP 500,000 and whose bonuses did not constitute more than a third of total pay could also have some remuneration requirements disapplied.

At their introduction in 2010, UK remuneration rules required that at least 40% of MRT bonuses were deferred, the requirement being higher (at least 60%) for MRTs earning more than GBP 500,000 in bonuses and for directors of significant firms. The minimum deferral period was set at three to five years for all MRTs, with deferred bonus payments starting at least a year after awards, and made at most on a pro rata basis. In practice, the majority of banks implemented a three-year deferral period.[10] Furthermore, at least 50% of MRTs' upfront and deferred bonuses were required to be paid in bank shares or equivalent financial instruments.

In 2014, the UK implemented EU-level requirements for a maximum limit on bankers' variable to fixed pay ratio – the "bonus cap". The requirement allows the pay ratio to be at most 100%, or 200% with shareholder approval.

[9] These thresholds changed in 2020.
[10] PRA CP 15/14, para 2.2. https://www.fca.org.uk/publication/consultation/cp14-14.pdf

*Figure 1: The timeline of regulatory changes aimed at individual accountability in UK banks*




In 2016, the UK's banking regulators lengthened the minimum deferral from "three to five" years to at least five years for senior directors and certain other individuals, and to seven years for individuals designated to be Senior Management Function holders (SMFs) under the Senior Managers Regime. Bonus deferral periods were maintained at a minimum of three years for the rest of MRTs. The Senior Managers Regime for banks was introduced in 2016, as well, and aims to ensure that senior individuals are held accountable for their actions. It requires that most senior decision-makers in banks – SMFs – have clearly assigned responsibilities and are accountable for actions within their remit.[11] As a result of both the Senior Managers Regime and longer deferral periods being introduced in 2016, remuneration changes of the most senior individuals could reflect both their new SMF roles with enhanced accountabilities as well as longer required deferral periods of seven years.[12] Table 1 below illustrates how minimum deferral periods changed for various categories of MRTs in 2016.

*Table 1: Requirements for minimum deferral periods for various MRT groups.*

| MRT type | Requirements pre-2016 | Requirements post-2016 | |
|---|---|---|---|
| PRA senior management function holder (SMF) under the Senior Managers Regime | Minimum of 3 to 5 years | Minimum of 7 years | Affected MRTs |
| *MRT* who does not perform a *PRA senior management function*, but takes up certain senior positions. [13] | Minimum of 3 to 5 years | Minimum of 5 years | Affected MRTs |
| Rest of MRTs | Minimum of 3 to 5 years | Minimum of 3 years | Unaffected MRTs |

[11] To further strengthen the alignment of MRT incentives, in 2016 the PRA also strengthened malus and clawback regulation. The time periods over which they can be applied were extended in line with minimum deferral periods, and situations in which malus or deferral could be applied, and expectations towards firms, were set out.

[12] Furthermore, under certain circumstances, for SMFs the seven year clawback period applicable to all MRTs can be extended to ten years.

[13] PRA Rulebook, Remuneration Part 15.17: "Whose professional activities meet the qualitative criteria set out in Article 3(1) to 3(9), 3(10) (but only by virtue of being responsible for a committee referred to therein), 3(13) or 3(15) of the *Material Risk Takers Regulation*."

# 3. Data

## 3.1. Sample

Since 2010, the UK's prudential banking sector regulator (the Prudential Regulation Authority – PRA[14]) has been collecting information on remuneration structures of MRTs in major UK banks as part of a broader data collection on banks' remuneration policies and practices. Although throughout the period the full set of remuneration requirements applied to around 30 banks, the PRA has only been collecting information from those with average three-year assets of at least GBP 50 billion, constituting around 10-15 institutions. Of those, in our analysis we use data on six major UK deposit-takers and exclude international banks' UK operations for data quality reasons.

We chose to start our sample period in 2014, as, although the PRA has been collecting data since 2010, prior to 2014 banks did not have to report MRT remuneration sizes. Instead, banks reported only remuneration structures. Furthermore, in 2014 guidelines on how banks should identify MRTs were clarified at the EU level and the population of MRTs changed considerably, increasing around three-fold between 2013 and 2014. Therefore, starting analysis in 2014 allows us to use a more consistent sample of MRTs.

## 3.2. Tracking individuals over time

To analyse how remuneration requirements affect employee remuneration sizes and structures, we would ideally want to follow the same individuals over time, i.e. have time series data at an individual level. However, the structure of the template used for remuneration data collection does not allow us to do this straightforwardly, as banks do not have to identify individuals by name. Therefore, we are only able to use bank-year observations where we believe that banks' reported information allows us to follow individuals over time (by checking whether their titles, departments, locations or other characteristics remained comparable). We are able to use this information for six banks in the sample for parts of the 2014-2019 period, although with breaks.

The number of MRTs which we were able to follow for at least three years is summarised in Table 2. Over the whole sample period, our tracked MRT data cover around 60% of all MRT observations reported annually, but coverage varies over years.

*Table 2: Number of MRTs with at least 3 years of observations ('matched MRTs')*

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Total obs. |
|---|---|---|---|---|---|---|---|
| **All MRTs** | 4,432 | 4,630 | 4,685 | 4,868 | 4,712 | 4,914 | 28,241 |
| **Matched MRTs** | 1,602 | 2,026 | 3,411 | 3,676 | 3,375 | 2,730 | 16,822 |
| **Number of banks matched** | 5 | 5 | 6 | 6 | 6 | 5 | |
| **% observations matched** | 36% | 44% | 73% | 76% | 72% | 56% | 60% |

[14] Before 2013, this was done by the Financial Services Authority.

### 3.3. Remuneration data

The structure and coverage of the remuneration data used in this analysis differs from information available in banks' public disclosures on top executives' pay that has been commonly used in the literature (for example, by Fahlenbrach and Stulz (2011)), and is a key contribution of our study to the literature. In particular, we have access to information on the size and structure of MRT remuneration that is awarded in a given year. This includes information on amounts of MRTs' fixed and variable remuneration – the former consisting of salaries, role-based allowances,[15] and non-discretionary benefits (i.e. benefits that are standard within the organisation and not awarded solely to individual staff), and variable remuneration consisting of bonuses and discretionary awards (for example, discretionary pension awards that are not part of standard bank-wide pension packages).

Our data also cover information on the proportion of bonuses that is deferred, and proportion of both deferred and immediately paid out bonuses that are awarded in the form of bank shares or equivalent instruments. With the exception of 2015 when reporting templates changed, the PRA also collected information on MRTs' deferral periods (in years) for the proportion of bonuses deferred.[16]

## 4. The bonus cap - analysis

In this section, we examine the effects that limits on the maximum allowed ratio between variable and fixed remuneration have on affected MRTs' remuneration sizes and structures. While existing research (Colonnello et al, 2020) has looked at the impact of the bonus cap at the time of its introduction in 2014, we investigate whether this requirement has been having a sustained effect on MRT remuneration structures after bank policies and expectations have been adjusted. Furthermore, while Colonnello et al (2020) identify bonus cap effects by comparing remuneration developments of top EU bank executives who were affected by the new rules to a different extent (had different bonus-to-fixed pay ratios before the rule was introduced), we use a broader sample of employees (MRTs), and study how the remuneration of individuals close to the regulatory bonus-to-fixed pay limit developed relative to their colleagues.

### 4.1. Sample

We use the sample of individuals with at least three years of observations presented in Table 2, the sample period being 2014-2019. We use data from all six sample banks, and so the composition of banks changes over time as one bank is only added to the sample in 2016, and one bank leaves the sample in 2019. We also exclude observations

[15] Following the introduction of EU's bonus cap in 2014, many financial institutions in the EU introduced role based allowances that were intended to qualify as fixed remuneration for the purpose of calculating the bonus-to-fixed pay ratios.

[16] Contrary to information available in banks' public disclosures, we do not have information on the type of award scheme through which bonuses were awarded (i.e. whether these are bonus or long-term incentive plan (LTIP) awards – albeit the use of LTIPs is not significant in the UK), or what proportion of maximum possible award they constituted.

where individuals are reported to leave or newly join their employers in that particular year, individuals whose bonus-to-fixed pay ratio is zero for their whole observation period, and observations where reported MRTs' bonus-to-fixed pay ratios exceeded 200%, as they were likely to be new joiners for whom a different method of calculating the ratio was used.[17] The resulting number of MRTs, and the distribution of their bonus ratios, is summarised in Table 3.

### 4.2. Data analysis

To assess how a binding bonus cap affected developments in MRTs' remuneration, each year, we place all individuals in buckets based on their bonus to fixed pay ratio. We construct eight buckets at 25% increments, the lowest one being the 0-25% bucket and the highest one – 175-200% bucket. The distribution of MRTs along those buckets over time is presented in Table 3. We can see that the proportion of MRTs with the highest bonus-to-pay ratios has been relatively low, at around 3%-4% throughout the sample period; the proportion of MRTs with bonuses in excess of 100% of fixed remuneration was around one-third.

*Table 3: Number of MRTS per variable/fixed pay ratio bucket*

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Total |
|---|---|---|---|---|---|---|---|
| **0-25%** | 80 | 113 | 398 | 411 | 476 | 496 | 1,974 |
| **25-50%** | 191 | 221 | 402 | 466 | 432 | 456 | 2,168 |
| **50-75%** | 275 | 325 | 509 | 610 | 579 | 489 | 2,787 |
| **75-100%** | 564 | 527 | 714 | 632 | 562 | 414 | 3,413 |
| **100-125%** | 291 | 358 | 474 | 498 | 455 | 384 | 2,460 |
| **125-150%** | 93 | 176 | 307 | 389 | 360 | 250 | 1,575 |
| **150-175%** | 37 | 97 | 214 | 241 | 270 | 103 | 962 |
| **175-200%** | 22 | 61 | 176 | 181 | 149 | 36 | 625 |
| **Total** | 1,553 | 1,878 | 3,194 | 3,428 | 3,283 | 2,628 | 15,964 |
| **Proportion of MRTs with bonuses in the top bucket and in the 100%-200% fixed pay range** | | | | | | | |
| **175-200%** | 1.42% | 3.25% | 5.51% | 5.28% | 4.54% | 1.37% | 3.92% |
| **100-200%** | 28.53% | 36.85% | 36.66% | 38.19% | 37.59% | 29.41% | 35.22% |

Figure 2 provides another view of the distribution of MRT pay structures. It shows some clustering of MRT numbers below the 100% ratio, indicating that banks could be reluctant to grant bonuses in excess of 100% of fixed pay, and the 200% ratio at the very highest bonus-to-fixed pay levels.

[17] While remuneration is pro-rated for part-year MRTs when calculating their bonus-to-fixed pay ratios, this is not the case for new joiners for whom the actual bonus received is measured as a ratio of notional fixed remuneration which would have been accrued if they worked a full year. For example, for an individual who was an MRT for three months but not a new joiner, the ratio would be calculated using corresponding three month variable and fixed remuneration figures; for a new joiner the three-month bonus would be divided by fixed pay earned during 12 months.

*Figure 2: The distribution of MRTs by their variable-to-fixed remuneration ratios over the whole sample period, 2014-2019*

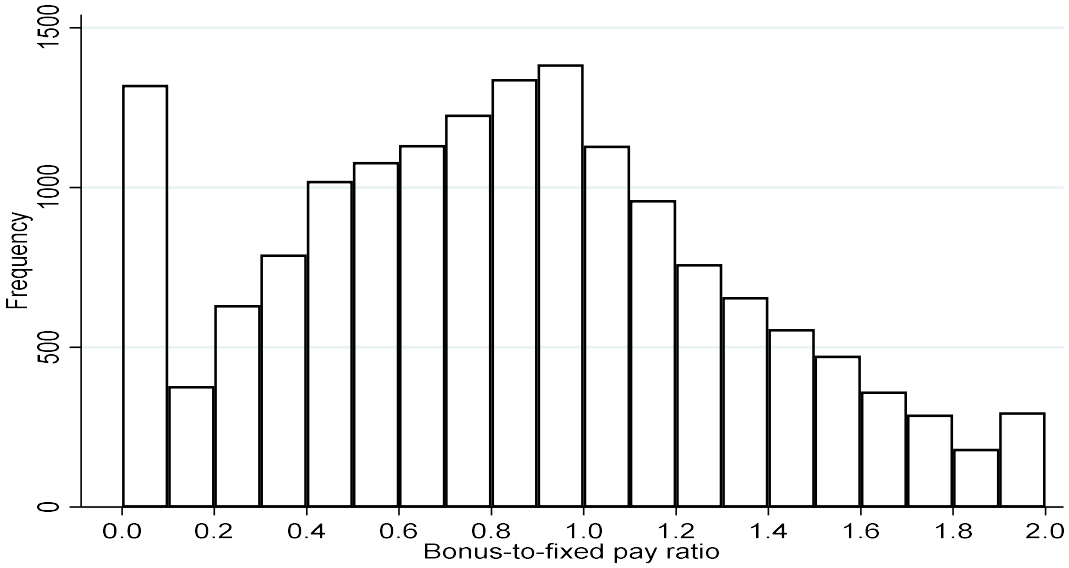



Table 4 summarises mean MRT bonus-to-fixed pay ratio and remuneration amounts for each bonus-to-fixed pay bucket. We can see that MRTs in higher buckets on average earned higher bonuses, fixed pay and total pay.

*Table 4: Mean bonus/fixed pay ratio and total remuneration components per bonus/fixed pay bucket, 2014-2019*

| | ***Bonus/fixed pay ratio*** | ***Bonus, GBP '000s*** | ***Fixed pay, GBP '000s*** | ***Total pay, GBP '000s*** |
|---|---|---|---|---|
| **0-25%** | 6.49% | 35.89 | 331.27 | 384.48 |
| **25-50%** | 38.68% | 129.79 | 326.69 | 460.83 |
| **50-75%** | 62.74% | 266.62 | 403.27 | 672.87 |
| **75-100%** | 87.90% | 386.14 | 427.65 | 811.98 |
| **100-125%** | 111.69% | 494.17 | 440.73 | 930.33 |
| **125-150%** | 136.89% | 614.55 | 462.67 | 1072.94 |
| **150-175%** | 161.28% | 722.52 | 487.19 | 1210.15 |
| **175-200%** | 188.50% | 814.44 | 498.83 | 1319.68 |
| **All MRTs** | 83.62% | 375.23 | 412.46 | 775.07 |

*Note: remuneration amounts have been winsorised at 5$^{th}$ and 95$^{th}$ percentiles.*

Table 5 presents annual growth in MRT remuneration components *before* they reach the bonus-to-fixed pay buckets (year *t-1* to *t*). Overall growth figures constantly increase as we move from lower to higher buckets. Individuals in the highest (175%-200%) bonus-to-fixed pay bucket had experienced the highest annual growth in both bonuses and fixed pay on average, but these high average growth rates were partially driven by extremely high growth experienced by some individuals. Looking at medians (not reported here), we find that the growth in fixed remuneration for these individuals is comparable to MRTs' in the lower buckets.

Table 5: Mean year on year *(t-1 to t) growth in each bonus/fixed pay bucket, 2014-2019*

| | ***Bonus/fixed pay ratio*** | ***Bonus*** | ***Fixed pay*** | ***Total pay*** |
|---|---|---|---|---|
| 0-25% | -74.87% | -60.40% | 2.02% | -28.95% |
| 25-50% | -13.19% | -7.02% | 7.27% | 0.57% |
| 50-75% | -8.56% | -1.92% | 7.78% | 2.31% |
| 75-100% | -2.28% | 4.59% | 7.58% | 5.01% |
| 100-125% | 0.08% | 7.17% | 7.94% | 6.39% |
| 125-150% | 4.16% | 11.48% | 7.78% | 8.75% |
| 150-175% | 10.58% | 18.96% | 8.03% | 13.06% |
| 175-200% | 18.56% | 28.19% | 9.06% | 18.90% |
| All MRTs | -12.18% | -1.74% | 7.18% | 0.58% |

*Note: Growth figures have been winsorised at 5th and 95th percentiles.*

### 4.3. Analysis – descriptive statistics

To assess how binding limits on the variable-to-fixed remuneration ratios affected developments in MRT remuneration sizes and structures, we start by looking at year-on-year changes in MRT remuneration *after* their bonus-to-fixed pay ratio reached a particular bucket. Table 6 shows that bonus growth tended to slow down as we move from lowest (very low bonus to fixed pay ratios the preceding period) to higher buckets, but individuals in the highest buckets still earned relatively large bonus amounts. Contrary to bonus growth, total and fixed remuneration remained on average positively correlated with individuals' previous period bonus ratios, higher performance being accompanied by fixed pay raises that potentially resulted from promotions.

*Table 6: MRT remuneration component amounts and growth by preceding year bonus/fixed pay ratio*

| | **Bonus-to-fixed pay bucket** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **0-25%** | **25-50%** | **50-75%** | **75-100%** | **100-125%** | **125-150%** | **150-175%** | **175-200%** |
| **Remuneration component amounts** | | | | | | | | |
| *Bonus$_{t+1}$ (GBP th)* | 71.05 | 127.01 | 256.36 | 376.77 | 472.02 | 573.02 | 659.87 | 716.1 |
| *Fixed pay $_{t+1}$ (GBP th)* | 276.75 | 312.88 | 405.13 | 443.07 | 454.39 | 471.89 | 522.23 | 565.34 |
| *Total pay $_{t+1}$ (GBP th)* | 350.9 | 435.75 | 654.86 | 804.32 | 914.17 | 1033.76 | 1177.53 | 1272.92 |
| *Variable/fixed pay ratio $_{t+1}$ (%)* | 17.26% | 36.28% | 57.68% | 79.76% | 100.72% | 121.70% | 134.03% | 137.61% |
| **Remuneration component growth the following year (%)** | | | | | | | | |
| *Bonus growth* | 2.04% | 1.07% | -1.35% | -1.02% | -1.84% | -1.73% | -6.80% | -9.28% |
| *Fixed pay growth* | 3.50% | 5.73% | 5.47% | 6.13% | 6.52% | 8.17% | 11.39% | 19.47% |
| *Total pay growth* | -4.98% | 1.03% | 0.78% | 0.83% | 0.93% | 1.47% | 0.45% | 1.06% |
| *Bonus/fixed pay ratio* | -14.69% | -12.05% | -10.79% | -10.43% | -10.19% | -11.07% | -16.94% | -26.88% |

*Note: Growth and amount figures have been winsorised at 5th and 95th percentiles.*

From Table 6 we can also see that while changes in MRT remuneration structures differ consistently as we move along bonus-to-fixed pay buckets, MRTs with highest bonus-to-fixed pay ratios experienced a larger average fall in bonus ratio growth than

the pattern across remaining buckets would suggest. They also experienced considerably higher fixed pay growth, total pay growth not being very different from that in lower buckets (e.g., 150-175%).

### 4.4. Regression analysis

In this section, we implement regression analysis to investigate how (i) bonuses, (ii) fixed pay, (iii) total pay, and (iv) the bonus/fixed pay ratio develop once MRTs reach the 100% or 200% bonus-to-fixed pay ratio and so the bonus cap starts binding to them. To do that, we start by estimating the following equation using the 100% as the regulatory limit of interest (and follow the same approach for the 200% threshold afterwards):

$$\%\Delta y_{i,t} = \alpha + \beta\ bucket[75\% - 100\%]_{i,t-1} + \gamma controls_{i,t-1} + \mu_{b,t} + \epsilon_{i,t} \quad (1)$$

Here we regress individual i's y-o-y % growth of remuneration components on the dummy variable equalling one if an individual's variable/fixed pay ratio was in the 75%-100% range *in the preceding year*. As individuals in this bucket could have received exceptionally high bonuses, limiting their potential to grow in the next period, we control for the bonus amounts received. We also include bank-year fixed effects $\mu_{b,t}$ to control for shocks that hit banks or bank-specific remuneration policies each year, our identification therefore relying on variation of MRT remuneration within each bank annually.

As in Table 6 individuals' remuneration component growth depends on which bucket they are in, using only the 75%-100% (or 175%-200%) bucket dummy variable could lead us to conclude that slower bonus or higher fixed pay growth is a result of the binding constraint whereas this is observed comparing each bucket to the lower ones. Therefore, in regression analysis we further control for the level of individual's variable-to-fixed pay ratio in the previous period, the $bucket[75\% - 100\%]_{i,t-1}$ dummy variable capturing the additional effect of an MRT being close to the 100% bonus cap regulatory limit. In further tests, we also control for preceding period growth of each dependent variable, as it is possible that periods of high bonus or fixed pay growth could be followed by slower growth the next year.

In Table 7, we implement regression analysis (1) testing whether MRTs whose bonus-to-fixed pay ratio was 75%-100% of fixed pay experienced different remuneration size and structure developments than the control group of MRTs whose bonus/fixed pay ratio was further away from this limit, i.e. between 50%-75% and 100%-150%. From columns (1) – (4), the coefficient on $bucket\ 75\% - 100\%_{i,t-1}$ suggests that being in the 75%-100% of fixed pay bucket correlated with lower bonus growth, but not significantly so, also with by and large insignificant effects on their fixed pay growth (columns (5)-(8)), total pay growth (columns (9)-(12)), or changes in the bonus-to-fixed pay ratio (columns (13)-(15)). We find similarly weak effects using a different control group of MRTs whose bonus/fixed pay ratio was between 25%-100% (not reported here).

In Table 8, we focus on the effects of the 200% rather than 100% bonus to fixed pay ratio limit, estimating the effects of $bucket\ 175\% - 200\%_{i,t-1}$ in a sample of MRTs whose

previous period bonus ratio was between 100% and 200% (MRTs with bonuses in 100%-175% range being the control group)[18]. Estimates on $bucket\ 175\% - 200\%_{i,t-1}$ show that the bonuses of MRTs close to the maximum bonus to fixed pay ratio limit grew around 4% slower relative to those of their colleagues (columns (1)-(4)). The effect is however not statistically significant once we control for bonus growth in the previous period. However, for these individuals, fixed remuneration grew by around 5% more than for the rest of MRTs even controlling for their fixed remuneration in the previous period and preceding fixed pay growth (columns (5)-(8)). With bonuses somewhat decreasing and fixed pay rising, their total remuneration did not change statistically significantly (columns (9)-(12)), but the bonus/fixed pay ratio growth was around 12 percentage points lower than for the rest of MRTs (column (15)). The results are similar once we add fixed MRT effects, or compare MRTs in the 175%-200% bonus bucket to a wider set of colleagues whose preceding period bonus ratios were in the 25%-175% range.

In Table 9, we again compare MRTs in the 175%-200% bucket to only those whose bonuses exceeded 100% of fixed pay, but look at changes to remuneration amounts rather than y-o-y % growth, and split fixed remuneration to its components – salaries and role based allowances. As in Table 8 we find that differences in growth in bonus amounts of affected and unaffected MRTs are not statistically significant (columns (1)-(2)), but fixed remuneration of MRTs close to the 200% bonus cap increased more (columns (3)-(4)). We also find that this increase was on average driven by higher role-based allowances rather than salaries. From columns (5)-(8), affected MRTs' salaries did not grow significantly more once we control for their previous period growth and levels. Meanwhile allowance growth is higher and statistically significant: for MRTs close to the bonus cap, RBAs grew 8% more (columns (9)-(10)). We find that the other components of fixed remuneration – non-discretionary pension and other benefits – were not affected by the bonus cap (not reported here).

We do not think that our findings are driven by individuals being close to the bonus cap getting promoted, which would lead to increases in their salaries, or that lower subsequent bonus growth is driven by bonuses "reversing" to some average values. If being in the highest bonus-to-fixed pay ratio bracket was associated with subsequent promotions, it could be expected that individuals' total remuneration would increase, which we do not observe in the data. Furthermore, their fixed pay increases would be driven by higher salaries rather than role-based allowances. Our regression specifications also control for MRTs' bonus sizes and bonus growth, as well as fixed pay sizes and growth, in the preceding period, which should capture the effects of MRTs' promotions if these follow periods of good performance and high bonuses or their growth.

[18] Our dataset includes individuals who we can track over time for at least three years between 2014 and 2019. It therefore excludes individuals who left or were fired after one or two years, perhaps due to inadequate performance at time t. However, we do not think this feature in the dataset affects our conclusion. This is because we compared individuals in the 175%-200% bucket with those in the 100%-175% bucket who were less likely to be affected by inadequate performance.

Overall the evidence presented in this section is consistent with theoretical literature, suggesting that imposing the bonus cap leads banks to rearrange employees' remuneration towards higher fixed pay, leaving total compensation unaffected, rather than resulting in slower growth in bonuses and total remuneration. As we find that the proportion of individuals affected by such limits is low, resulting increases in banks' fixed cost bases annually could have been limited. But as a higher proportion of their pay is now paid out as cash rather than bonuses that need to be deferred and can be subject to malus and clawback provisions, this could reduce top bonus earners' exposures to the long-term outcomes of their decisions and bank performance, and thus diminish their incentives to mitigate long-term risks.

# 5. Effects of deferral requirements - analysis

In this section, we study whether and how lengthening the minimum period over which deferred bonus is paid out affects MRTs' remuneration sizes and structures. The increase of minimum deferral period from three to five or from three to seven years introduced in 2016 affected only some of the MRTs within our sample banks, which allows us to implement difference-in-difference analysis comparing remuneration sizes and structures of affected and unaffected individuals before and after the rule change.

## 5.1. Sample

To assess the impact of longer deferral periods on individual pay structures, we use data on MRT remuneration two years before and after the rule change in 2016. We are only able to track MRTs in five banks for all of this period, and so the number of MRTs used in this analysis is lower than reported in Table 2. Furthermore, since remuneration rules allow banks to disapply certain remuneration requirements, including deferral, to MRTs whose total remuneration does not exceed GBP 500,000 and bonuses do not constitute more than a third of total pay, we exclude these individuals from our sample.[19] Table 10 summarizes the number of observations left for our analysis annually in an unbalanced panel; there were 778 MRTs that appeared in the data in all four years.

To identify the effects of longer deferral periods, we need to distinguish between individuals who were affected by the lengthening of minimum deferral periods in 2016 and those who were not affected. Bank reporting does not allow us to identify MRTs who were affected by the change in regulations in 2016 by their reported characteristics (for example, job titles or indicator variables), and so we use reported deferral periods to distinguish between affected and unaffected groups. As the PRA did not collect this information in 2015 as its data collection template underwent change, we use data for 2014 and 2016 to distinguish between MRTs whose deferral period increased in 2016 ("affected MRTs") from those for whom this was not the case ("unaffected MRTs").

[19] To reduce the incidence of potential reporting mistakes, we also drop observations where reported MRTs' deferral or payment in instruments ratio was below minimum requirements or missing, and observations of 100% reported deferral.

In particular, we treat MRTs whose deferral period was five years in 2016 as affected by the five year requirement unless their deferral period in 2014 was already five years. For some MRTs, deferral period data in 2014 were missing, and we treat them as affected by five-year requirements, as the vast majority of MRTs had deferral periods of three years in 2014 (where reported). Similarly, we treat all MRTs with seven-year deferral periods in 2016 to have been affected by the seven-year requirement, as no MRTs had reported seven year deferral periods in 2014. The number of observations of MRTs affected by the lengthening of deferral periods, also when split to those affected by five year and seven year requirements, are summarised in Table 10. For example, in 2016 there were 74 MRTs with seven year deferral period meaning they were affected by the seven year deferral requirement; 51 of them appeared in the dataset in 2014, 50 – in 2015, and 58 – in 2017.

The distribution of MRTs' reported deferral periods over time is plotted in Figure 3. We note that while the PRA did not collect information on MRTs' deferral periods in 2015 (hence the blank bar for that year), and some data are missing for 2014, there are only a few deferral period observations missing in 2016 and 2017. We can also see that with the rule change in 2016, the number of MRTs having deferral periods of five years increased considerably, and MRTs with seven-year deferral appeared.

*Figure 3: The distribution of sample MRTs' deferral periods – unbalanced panel*

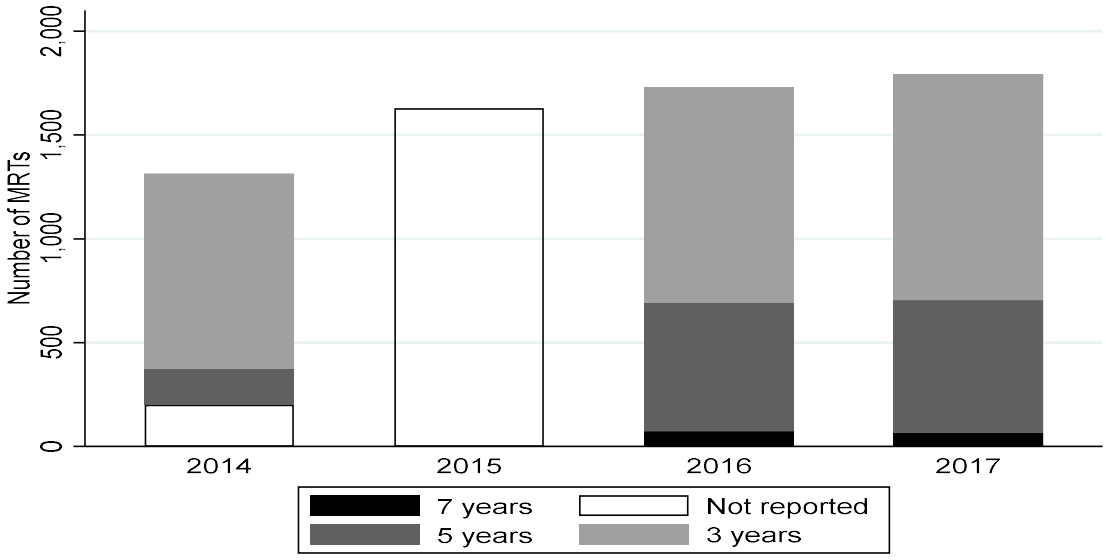



*Table 10 – Number of sample MRTs, split to affected and unaffected groups*

| | 2014 | 2015 | 2016 | 2017 | Appear in all years |
|---|---|---|---|---|---|
| **Number of affected MRTs** | 373 | 476 | 607 | 506 | 298 |
| ***Affected by 5 year requirements*** | 322 | 426 | 533 | 448 | 267 |
| ***Affected by 7 year requirements*** | 51 | 50 | 74 | 58 | 31 |
| **Number of unaffected MRTs** | 940 | 1,152 | 1,121 | 1,286 | 480 |
| **Total number of MRTs** | 1,313 | 1,628 | 1,728 | 1,792 | 778 |

## 5.2. Descriptive statistics

Table 11 presents descriptive statistics of remuneration sizes and structures for MRTs in the unbalanced sample, also when split to MRTs affected and unaffected by changes in deferral requirements.[20] The affected MRTs on average received higher total remuneration, but this was driven mostly by those affected by seven year requirement, who were also identified as SMFs under the Senior Managers Regime. Similarly, SMFs had a higher proportion of bonuses deferred than the rest of the sample, while MRTs affected by the five-year requirement were more comparable to those unaffected.

*Table 11: Descriptive statistics of MRT remuneration in 2014-2017*

| MRT group | mean | s.d. | n |
|---|---|---|---|
| **Total pay, GBP 000s** | | | |
| All affected MRTs | 943 | 546 | 1962 |
| Affected by 5 year requirements | 876 | 504 | 1729 |
| Affected by 7 year requirements | 1439 | 595 | 233 |
| Unaffected MRTs | 747 | 354 | 4499 |
| **Fixed pay component (salaries + allowances), GBP 000s** | | | |
| All affected MRTs | 470 | 257 | 1962 |
| Affected by 5 year requirements | 439 | 236 | 1729 |
| Affected by 7 year requirements | 705 | 284 | 233 |
| Unaffected MRTs | 381 | 171 | 4499 |
| **% Bonus deferred** | | | |
| All affected MRTs | 55% | 14% | 1962 |
| Affected by 5 year requirements | 53% | 13% | 1729 |
| Affected by 7 year requirements | 66% | 16% | 233 |
| Unaffected MRTs | 51% | 13% | 4499 |
| **% Bonus deferred beyond minimum required** | | | |
| All affected MRTs | 4% | 7% | 1962 |
| Affected by 5 year requirements | 3% | 6% | 1729 |
| Affected by 7 year requirements | 10% | 11% | 233 |
| Unaffected MRTs | 3% | 6% | 4499 |
| **Bonus/fixed pay ratio, %** | | | |
| All affected MRTs | 100% | 36% | 1962 |
| Affected by 5 year requirements | 98% | 35% | 1729 |
| Affected by 7 year requirements | 117% | 42% | 233 |
| Unaffected MRTs | 96% | 33% | 4499 |

*Note: remuneration amount figures have been winsorised at 5$^{th}$ and 95$^{th}$ percentiles.*

Since the proportion of bonuses deferred is subject to minimum requirements, we have also created an additional variable "extra deferral", which is defined as the proportion of bonuses deferred beyond minimum requirements. Remuneration rules require that MRTs are subject to either 40% or 60% minimum deferral, higher requirements applying to individuals who are directors of significant firms, or have bonuses exceeding GBP 500,000. As the data we collect do not include information on which requirement each individual in our sample was subject to, we assume that when deferral beyond 60% is observed, the relevant requirement is 60%, and for observations between 40% and

[20] The summary statistics for a fully balanced panel are similar and not reported here.

60%, the relevant requirement is 40%. This understates the extra deferral for MRTs who are subject to a minimum requirement of 40%, but have more than 60% of bonuses deferred.

### 5.3. Analysis: descriptives

We start the analysis by comparing developments in remuneration sizes and structures for the affected and unaffected MRTs around the introduction of longer minimum deferral periods in 2016. Here, we use the fully balanced sample of 778 MRTs to control for changes in MRT composition.[21] In Table 12, columns (1)-(4) provide average yearly remuneration figures in each group, and column (5) – average individual-level change between 2015 and 2016, with the t-test statistic in column (6) comparing changes of individuals affected by longer deferral requirements to those unaffected.

Starting with changes in MRTs' total remuneration, Table 12 shows that affected MRTs' total pay was higher, and also grew somewhat faster in 2016, compared to unaffected MRTs. Looking at MRTs affected by five and seven year deferral periods separately, the difference in pay growth was higher for the latter group (as noted, these individuals were also identified as SMFs in 2016). Similar dynamics can be observed for the fixed component of MRTs' remuneration (consisting mainly of salaries, but also role-based allowances and other forms of non-performance-related pay) which suggests that higher pay increases of affected MRTs were not driven solely by higher bonus awards. It needs to be noted that as our analysis uses nominal MRT pay, increases in their remuneration amounts could be affected by changes in price levels or industry-wide remuneration growth. As our identification strategy relies on comparing changes in remuneration of individuals affected by longer deferral relative to those unaffected, the effects of inflation or changes in pay levels in the banking sector that affect all MRTs would be captured by the latter (control) group.[22]

In Table 12, we also see that bonus-to-fixed pay ratios diminished in all MRT groups between 2015 and 2016, and it does not appear that affected MRTs' bonus-to-fixed pay ratios decreased materially more relative to those unaffected by longer deferral. The table also shows that the average bonus share deferred fell between 2015 and 2016, decreasing by around 2 percentage points (6 percentage points) for MRTs affected by the five-year (seven-year) requirement. At least initially, such declines are consistent with a regulatory effect.

[21] Results for the unbalanced panel provide similar results and are available upon request.

[22] Furthermore, average UK year-on-year consumer price inflation throughout the sample period was relatively low - around 1% (prices grew by 3% between 2014-2017).

*Table 12: Changes to affected and unaffected MRTs' remuneration sizes and structures following 2016*

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **Average remuneration** | | | | | |
| | **2014** | **2015** | **2016** | **2017** | **Average growth in 2015-2016** | **T-test of 2015-2016 growth difference against unaffected group** |
| **Total MRT pay, GBP 000s** | | | | | | |
| Affected MRTs | 891 | 963 | 1018 | 1096 | 8.9% | 2.49** |
| Affected by 5 year requirements | 839 | 907 | 963 | 1049 | 8.3% | 1.78* |
| Affected by 7 year requirements | 1341 | 1444 | 1498 | 1501 | 13.6% | 3.25*** |
| Unaffected MRTs | 759 | 825 | 869 | 931 | 6.8% | - |
| **Fixed component of MRT pay (salaries +allowances), GBP 000s** | | | | | | |
| Affected MRTs | 449 | 472 | 508 | 532 | 10.9% | 2.62*** |
| Affected by 5 year requirements | 426 | 446 | 481 | 508 | 10.3% | 1.77* |
| Affected by 7 year requirements | 652 | 696 | 742 | 739 | 16.6% | 4.17*** |
| Unaffected MRTs | 388 | 407 | 439 | 462 | 8.9% | - |
| **Bonus/fixed pay ratio, %** | | | | | | |
| Affected MRTs | 97% | 105% | 100% | 109% | -5.27% | 0.17 |
| Affected by 5 year requirements | 95% | 103% | 98% | 107% | -4.69% | 0.48 |
| Affected by 7 year requirements | 109% | 121% | 111% | 125% | -10.26% | 1.03 |
| Unaffected MRTs | 97% | 103% | 98% | 102% | -5.58% | - |
| **% of MRT bonuses deferred** | | | | | | |
| Affected MRTs | 53% | 55% | 53% | 55% | -2.4% | 2.30** |
| Affected by 5 year requirements | 51% | 54% | 52% | 53% | -2.0% | 1.47 |
| Affected by 7 year requirements | 68% | 70% | 64% | 65% | -5.9% | 3.43*** |
| Unaffected MRTs | 50% | 53% | 52% | 53% | -1.2% | - |
| **% of MRT bonuses deferred beyond regulatory minima** | | | | | | |
| Affected MRTs | 3.5% | 4.7% | 2.2% | 3.3% | -2.6% | 5.31*** |
| Affected by 5 year requirements | 2.6% | 3.8% | 1.6% | 2.7% | -2.2% | 4.08*** |
| Affected by 7 year requirements | 11.8% | 12.8% | 6.9% | 8.5% | -5.9% | 6.86*** |
| Unaffected MRTs | 3.3% | 4.5% | 3.5% | 2.6% | -1.0% | - |

*Notes: The data uses the fully balanced panel of 778 MRTs who appeared in the data throughout the whole sample period in Table 10. MRT remuneration amounts have been winsorised at the 5$^{th}$ and 95$^{th}$ percentiles.*

### 5.4. Regression analysis

We start our regression analysis by looking at whether MRTs whose bonuses had to be deferred for a longer period were compensated by a rise in total pay using a standard

difference in difference regression specification, similar to that used in Colonnello et al (2020):

$$\ln(total\ pay)_{i,t} = \alpha + \beta_1 rule_t + \beta_2 rule_t * affected_i + \mu_i + \epsilon_{i,t} \quad (2)$$

In our baseline specification total pay[23] is regressed on *rule*, which is a dummy variable that equals one in the period when longer deferral periods became effective (2016-2017) and zero otherwise (i.e., for the years 2014-2015). Its interaction with *affected*, a dummy variable equalling one for individuals affected by the longer deferral period requirements, is our key variable of interest as coefficient $\beta_2$ captures whether the total remuneration of affected MRTs developed differently from the rest of MRTs when remuneration requirements changed in 2016. We start by comparing all affected MRTs to those unaffected, and later distinguish between those affected by five or seven year requirements. To control for differences in average pay levels and unobservable characteristics between individuals, we also include fixed MRT effects captured by $\mu_i$.

Our regression results for the unbalanced panel during 2014-2017 are presented in Table 13. There, consistent with our hypothesis, we observe that affected MRTs experienced a higher increase in total remuneration after the rule change (column (1)). This result holds after we control for bank-year fixed effects (column (2)) to allow for the possibility that some sample banks might have changed their remuneration policies around 2016 irrespective of the rule change. In columns (3) and (4), we split the affected MRTs to those affected by five-year requirements and seven-year requirements respectively, and estimate the effects for them separately using the unaffected MRTs as the control group. We find that MRTs affected by five year deferral requirement, and not affected by the Senior Managers Regime which applied only to MRTs with seven year deferral periods, experienced higher pay increases than unaffected MRTs (column (3)). This suggests that the Senior Managers Regime introduced at the same time as longer deferral is not the key driver of our findings.

For the group of MRTs affected by seven year deferral requirement (column (4)), pay increases after 2016 were not significantly different from unaffected MRTs. This can be partly explained by data winsorisation: as SMFs were often the highest-earners, replacing most extreme pay observations with lower ones reduces the variability of pay for SMFs (if non-winsorized data is used coefficient $\beta_2$ turns significant (not reported here)). In columns (5)-(8), we repeat the analysis using only MRTs' fixed pay as the dependent variable, and our findings are comparable to those on total pay, confirming that affected MRTs' higher total pay increases in 2016 were not driven by better performance and resulting higher bonuses.

[23] As noted in Section 5.3, we use nominal values of remuneration awards. We would expect that the extent to which price inflation, or changes in industry pay, affected MRT remuneration throughout the sample period would be controlled for by changes to unaffected MRTs' pay that are the control group. For robustness, we reran analysis using fixed year effects; our results remained unchanged.

As the new deferral rules applied to the most senior MRTs, an alternative explanation for our findings in Table 13 is that the affected MRTs have tended to experience higher pay growth over time and not just in 2016 (because of their roles, seniority, or ability). We implement several tests to alleviate this concern. First, in Table 14, we test whether affected MRTs faced higher increase in year-on-year remuneration growth in 2016 (compared to 2015 and 2017) than the unaffected MRTs. To do that, we regress their pay growth on a 2016 year dummy and its interaction with a dummy equal to 1 for affected MRTs, also controlling for fixed MRT effects. If affected MRTs experienced higher pay increases in 2016 relative to the unaffected group because their year on year pay rises tended to be higher in general, we would not observe that their pay increase in 2016 relative to surrounding years would be significantly different than for those unaffected.

Our findings in Table 14 suggest that while pay growth slowed down for all MRTs in 2016 relative to 2015 and 2017, for those affected by longer deferral requirements the slowdown was significantly lower (column (1)).[24] In column (2), we compare only MRTs affected by five-year deferral requirements to unaffected MRTs, and find that their pay change was more positive, but insignificantly so. In column (3), MRTs affected by seven-year requirements are compared to those unaffected; results suggest that for the former, pay growth increases in 2016 were significantly higher than for the control group. In columns (4)-(6), we repeat the analysis using fixed pay as the dependent variable to find that in 2016, average fixed pay growth increased for all MRTs (so the lower growth in total pay could have been driven by slower bonus growth), but again more so for the affected ones. These findings suggest that the larger increase in affected MRTs' pay in 2016 found in Table 13 need not be driven by the affected MRTs facing higher pay growth than unaffected MRTs over the whole sample period, as the rate at which their pay rose in 2016 was also relatively higher.

In Table 15 we use an alternative approach to disentangle the effects of longer deferral from differences between affected and unaffected MRT groups, focusing on the effect within different MRT groups. First, we focus only on individuals whose deferral period was seven years in 2016, and measure whether their remuneration increased more if they had been subject to three rather than five year deferral in 2014 (columns (1)-(2)). If longer deferral periods were associated with increases in total remuneration, we would expect to see the remuneration of individuals who initially had deferral at three years rising more. In regression analysis we do not find that SMFs whose deferral periods increased more experienced a significantly stronger increase in total remuneration, which could be explained by only eleven MRTs with seven year deferral in 2016 having a three-year deferral period in 2014. In columns (3)-(4), we focus only on MRTs whose deferral period was five years in 2016, looking at whether their income growth was higher if in 2014 they had three year (i.e. were affected by the rule change) than five year (were unaffected) deferral periods. There, we see that MRTs whose deferral period

[24] Analysis in Table 14 uses percentage year-on-year remuneration changes as the dependent variable, but the results are consistent for changes in remuneration amounts, as well (available upon request).

increased had on average higher pay growth in 2015-2016, consistent with them being compensated for postponed consumption and increased risk to personal wealth. Finally in columns 5-6, we repeat the exercise comparing MRTs whose deferral period remained at three years between 2014-2016 to those for whom it increased from three to five years. There, similarly, the lengthening of deferral period was associated with an increase in total remuneration, but not statistically significantly.

Another potential explanation for our findings in Table 13 is that within our sample, the MRTs affected by the rule change in 2016 coincided with the population of MRTs being promoted, and it was the latter effect driving their pay increases. As we cannot account for that outcome using our data, we look at proportions of MRTs receiving increased fixed remuneration before and after the rule change, and whether fixed pay increases (amounts or proportions) were different across the years. If affected MRTs were the same as individuals who were promoted in 2016, we would not expect to see an increase in proportion of MRTs with salary rises in 2016 when compared to 2015 or 2017 when other MRTs would have been promoted and faced pay rises. Furthermore, we would not expect that for individuals facing pay increases, fixed pay rises would be higher in 2016 than in other years due to promotions. Table 16 presents our results for the balanced panel of 778 MRTs: it shows that the proportion of MRTs experiencing rises in salaries has been stable over time, but when those increased, increases were higher in 2016 than either the year before or after. Therefore, although MRTs affected by the rule change could have been also the ones who were being promoted, it could be argued that they faced higher fixed pay rises than they would have in 2015 or 2017 – potentially because of longer deferral periods.

*Table 16: Year on year fixed remuneration growth in 2015-2017, fully balanced MRT panel*

| | 2015 | 2016 | 2017 |
|---|---|---|---|
| Number of MRTs with positive fixed pay growth | 614 | 583 | 524 |
| Number of MRTs | 778 | 778 | 778 |
| % of MRTs with positive fixed pay growth | 79% | 75% | 67% |
| Average fixed pay growth where positive (GBP th) | 40.82 | 65.33 | 48.23 |
| Average % fixed pay growth, where positive | 10% | 15% | 10% |

The increase in affected MRT's pay could be due to both the effects of the time value of money and risk to personal wealth. The former effect might be relatively low: assuming a 4% nominal discount rate, distributing 100% of one's bonus for three years on a pro rata basis would result in around 7.5% of its value lost, which would increase by additional 3.5% of bonuses if extended to seven years – the effect being 1.75% if around 50% of bonuses are deferred as observed in practice. This is somewhat lower

than the estimated effect in Table 13, therefore the time value of money does not fully explain affected MRTs' pay rises.[25]

In remaining analysis we further investigate (i) whether stricter requirements on bonus deferral periods have resulted in banks shifting from paying less variable to more fixed pay for the affected staff, and (ii) whether, where possible, banks attempted to mitigate the impact by diminishing the proportion of bonuses being deferred.

We assess how the ratio between affected MRTs' bonuses and fixed remuneration shifted in 2016 by estimating the following equation:

$$\%\frac{bonus}{fixed\ pay}_{i,t} = \alpha + \beta_1 rule_t + \beta_2 rule_t * affected_i + \beta_3 \ln(total\ pay)_{\{i,t\}} + \epsilon_i \quad (3)$$

where as previously we regress the dependent variable – variable to fixed pay ratio - on the rule dummy and its interaction with the affected dummy variable. We also control for the individual's total pay to capture changes in MRT remuneration structures while keeping their earnings fixed.

The results are presented in Table 17 where we find that around the time of the rule change, the bonus-to-fixed pay ratio decreased for all MRTs, but this effect was not significantly stronger for the affected individuals – neither on average (columns (1)-(2)), nor when split to those affected by five or seven year requirements (columns (3)-(4)).

Finally, in Table 18 we investigate whether the proportion of bonuses being deferred (the part of MRTs' bonuses affected by longer deferral requirements) changed for the affected individuals more than the rest of MRTs, by estimating the following function:

$$\%\ of\ bonus\ deferred_{i,t} = \alpha + \beta_1 rule_t + \beta_2 rule_t * affected_i + X\ controls_{\{i,t\}} + \epsilon_i \quad (4)$$

We regress the proportion of MRT bonuses deferred on the rule dummy and its interaction with the affected dummy variable, also controlling for individual's total pay and bonus-to-fixed pay ratio. These control variables aim to capture the effects of firms' internal policies potentially determining how the proportion of bonuses deferred changes as individuals earn higher bonuses or total remuneration. As the proportion of bonuses deferred was subject to minimum requirements of 40% or 60% depending on MRTs' pay levels (observable to us) or seniority (unobservable in the data), we also use "extra deferral" calculated as the difference between the proportion of bonuses deferred and regulatory minima as the dependent variable. As the data does not allow us to fully distinguish between MRTs with different requirements, we assume a 60% minimum where observed proportion of bonuses deferred exceeds 60%, and a 40% minimum where observed deferral is lower than 60%.

Regression results in Table 18 provide evidence consistent with dynamics in Table 12: in 2016 the proportion of bonuses deferred for the affected MRTs decreased

[25] These effects could be higher if individuals discounted future earnings more heavily, but potentially lower in a low interest rate and inflation environment during the sample period.

significantly more than for those unaffected by longer deferral, even after controlling for their pay levels and structures and fixed bank-year effects to account for potential changes in bank-wide remuneration policies (columns (1)- (3)). Focussing on extra deferral, we find similar effects (columns (4)-(6)). When affected MRTs are split to those affected by five year and seven year requirements, although the effects are statistically significant for both groups, they are more material for the latter group: MRTs whose deferral increased to seven years had the proportion of their bonuses deferred fall by nearly 5 percentage points more than for the unaffected MRTs (columns (7)-(10)). In absolute terms, this fall is not sizeable, however it constitutes a considerable proportion of what had been deferred beyond the minimum requirements (and so could be adjusted), being 6pp on average (14 percentage points for individuals affected by seven-year deferral requirements (SMFs) and 5 percentage points for rest of affected MRTs).

To ensure that our results are not driven by other changes in remuneration policies in banks, as a robustness check we reran the analysis excluding each sample bank in turn. Our results remain similar, although lose statistical significance in some specifications (albeit none of the banks is driving our findings on both remuneration size and proportions of bonuses deferred). This could be attributed to a reduction in the number of observations if a large bank is dropped, but could also be explained if some banks have tended to reduce affected MRTs' extra deferral, whereas others – to increase their total pay in response to the rules.

## 6. Conclusion

This paper explores a novel dataset on pay sizes and structures in major UK banks to study the impact of regulation on key risk-takers' remuneration structures, shedding light on possible unintended consequences that derive from such rules. In particular, we seek evidence on the extent to which limits on the ratio between MRTs' variable and fixed remuneration induced banks to shift remuneration from variable to fixed pay, rather than limit the growth in bonuses as intended. Furthermore, we evaluate whether banks have increased total remuneration so as to compensate individuals for the opportunity costs due to longer deferral requirements, or whether they changed other aspects of remuneration so as to reduce the impact of these restrictions.

Overall, we find some evidence that confirms theoretical predictions that restrictions on the maximum variable-to-fixed remuneration ratio potentially resulted in higher fixed pay, and that longer deferral periods could have resulted in higher remuneration of the affected individuals. Furthermore, we find that longer deferral periods were associated with a decrease in the proportion of bankers' bonuses being deferred and, therefore, a lower proportion of key risk takers' wealth being exposed to banks' long-term outcomes.

Whether these effects outweigh the benefits of the remuneration requirements aimed at aligning the incentives between bank decision-makers and other stakeholders remains an open question. In our sample, measuring such a link between the changes in remuneration rules and bank risk is obscured by the introduction of other prudential

measures, lack of a comparable control group, and the prudential benefits of measures such as longer deferral potentially being manifested over a long period of time. Further work is needed in this space.

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**Table 7: The effects of reaching the 100% cap limit on MRTs' remuneration.**

Sample individuals: MRTs in Table 2 who were not new joiners/leavers and whose variable/fixed remuneration ratio was between 50% and 150% in t-1; sample period: 2014-2019.

Dependent variables are y-o-y % changes in MRTs' variable remuneration, fixed remuneration, and total remuneration calculated as (($value_t$-$value_{t-1}$)/$value_{t-1}$), or change in the bonus/fixed pay ratio measured in percentage points ($ratio_t$-$ratio_{t-1}$). '*Bucket 75%-100%* $_{i,t-1}$' is a dummy variable which equals 1 if an individual's bonus/fixed pay ratio was higher than 75% and not higher than 100% in t-1. *'Ln(bonus, GBP th)* $_{i,t-1}$*', 'ln(fixed pay, GBP th)* $_{i,t-1}$*'* and *'ln(total pay, GBP th)* $_{i,t-1}$*'* are natural logarithms of (1+respective remuneration amounts) in the preceding period; changes in bonuses, fixed pay or total pay are y-o-y % changes from year t-2 to t-1 (($value_{t-1}$-$value_{t-2}$)/$value_{t-2}$). All variables are winsorised at 5% highest and lowest amounts. Robust standard errors in parentheses.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dependent variable: | | | | | | | | | | | | | | |
| | **% bonus change$_t$** | | | | **% fixed pay change$_t$** | | | | **% total pay change$_t$** | | | | **Change in bonus/fixed pay ratio$_t$** | | |
| Bucket 75%-100% $_{i,t-1}$ | -0.0120 | -0.0123* | -0.0103 | -0.00968 | -0.00354 | -0.00288 | 0.00234 | 0.00552* | -0.00497 | -0.00540 | -0.00207 | -0.00303 | 0.00394 | -0.00716 | -0.0128 |
| | (0.00750) | (0.00750) | (0.00774) | (0.0101) | (0.00235) | (0.00232) | (0.00262) | (0.00302) | (0.00450) | (0.00448) | (0.00523) | (0.00665) | (0.00772) | (0.00761) | (0.00993) |
| ln(bonus, GBP th) $_{i,t-1}$ | | -0.0229*** | -0.0292*** | -0.0173* | | | -0.0352* | -0.00905 | | 0.0457*** | -0.0246 | 0.0770 | | 0.001000 | 0.0147 |
| | | (0.00611) | (0.00774) | (0.00985) | | | (0.0213) | (0.0186) | | (0.0167) | (0.0608) | (0.0709) | | (0.00808) | (0.0106) |
| (bonus/fixed pay) $_{i,t-1}$ | | | 0.0262 | 0.0101 | | | 0.0767*** | 0.0378* | | | 0.0429 | -0.0362 | | -0.143*** | -0.174*** |
| | | | (0.0188) | (0.0236) | | | (0.0231) | (0.0205) | | | (0.0351) | (0.0405) | | (0.0195) | (0.0259) |
| (bonus/fixed pay) change $_{i,t-1}$ | | | | | | | | | | | | | | | -0.0831** |
| | | | | | | | | | | | | | | | (0.0398) |
| % bonus change $_{i,t-1}$ | | | | 0.128*** | | | | 0.0621*** | | | | -0.0178 | | | 0.139*** |
| | | | | (0.0263) | | | | (0.00711) | | | | (0.0280) | | | (0.0392) |
| ln(fixed pay, GBP th) $_{i,t-1}$ | | | | | | -0.0400*** | -0.00607 | -0.0260 | | | | | | | |
| | | | | | | (0.00252) | (0.0222) | (0.0196) | | | | | | | |
| % fixed pay change $_{i,t-1}$ | | | | | | | | 0.0889*** | | | | | | | |
| | | | | | | | | (0.0154) | | | | | | | |
| ln(total pay, GBP th) $_{i,t-1}$ | | | | | | | | | | -0.0915*** | -0.0202 | -0.109 | | | |
| | | | | | | | | | | (0.0194) | (0.0623) | (0.0731) | | | |
| % total pay change $_{i,t-1}$ | | | | | | | | | | | | 0.262*** | | | |
| | | | | | | | | | | | | (0.0484) | | | |
| Fixed bank-year effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 7887 | 7887 | 7887 | 5177 | 7887 | 7887 | 7887 | 5178 | 8170 | 8170 | 8170 | 5419 | 8170 | 8170 | 5421 |
| Adj. $R^2$ | 0.124 | 0.126 | 0.126 | 0.124 | 0.116 | 0.146 | 0.154 | 0.163 | 0.0689 | 0.0788 | 0.0798 | 0.0764 | 0.0783 | 0.0878 | 0.0687 |

**Table 8: The effects of reaching the 200% cap limit on MRTs' remuneration.**
Sample individuals: MRTs in Table 2 who were not new joiners/leavers and whose variable/fixed remuneration ratio was higher than 100% in t-1; sample period: 2014-2019. Dependent variables are y-o-y % changes in MRTs' variable remuneration, fixed remuneration, and total remuneration calculated as (($value_t$-$value_{t-1}$)/$value_{t-1}$), or change in the bonus/fixed pay ratio measured in percentage points ($ratio_t$-$ratio_{t-1}$). '*Bucket 175%-200%* $_{i,t-1}$' is a dummy variable which equals 1 if an individual's bonus/fixed pay ratio was higher than 175% in t-1. *'Ln(bonus, GBP th)* $_{i,t-1}$*', 'ln(fixed pay, GBP th)* $_{i,t-1}$*'* and *'ln(total pay, GBP th)* $_{i,t-1}$*'* are natural logarithms of (1+respective remuneration amounts) in the preceding period; changes in bonuses, fixed pay or total pay are y-o-y % changes from year t-2 to t-1 (($value_{t-1}$-$value_{t-2}$)/$value_{t-2}$). All variables are winsorised at 5% highest and lowest amounts. Robust standard errors in parentheses.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dependent variable: | | | | | | | | | | | | | | |
| | **% bonus change$_t$** | | | | **% fixed pay change$_t$** | | | | **% total pay change$_t$** | | | | **Change in bonus/fixed pay ratio$_t$** | | |
| Bucket 175%-200% $_{i,t-1}$ | -0.0397*** | -0.0326** | -0.0402** | -0.0165 | 0.111*** | 0.0783*** | 0.0524*** | 0.0503*** | 0.0127 | 0.00737 | -0.0101 | 0.00672 | -0.317*** | -0.172*** | -0.121*** |
| | (0.0137) | (0.0141) | (0.0187) | (0.0251) | (0.00551) | (0.00618) | (0.00722) | (0.00929) | (0.00901) | (0.0102) | (0.0129) | (0.0174) | (0.0221) | (0.0287) | (0.0382) |
| ln(bonus, GBP th) $_{i,t-1}$ | | -0.0203** | -0.0224** | -0.0161 | | 0.121*** | -0.00957 | -0.0233 | | 0.125*** | -0.0570 | -0.000681 | | 0.0341** | 0.0469** |
| | | (0.00950) | (0.00999) | (0.0138) | | (0.0105) | (0.0206) | (0.0249) | | (0.0446) | (0.0904) | (0.114) | | (0.0138) | (0.0186) |
| (bonus/fixed pay) $_{i,t-1}$ | | | 0.0151 | 0.00400 | | | 0.117*** | 0.118*** | | | 0.0708** | 0.0242 | | -0.281*** | -0.300*** |
| | | | (0.0252) | (0.0335) | | | (0.0161) | (0.0199) | | | (0.0308) | (0.0389) | | (0.0341) | (0.0453) |
| (bonus/fixed pay) change $_{i,t-1}$ | | | | | | | | | | | | | | | -0.146*** |
| | | | | | | | | | | | | | | | (0.0567) |
| % bonus change $_{i,t-1}$ | | | | 0.0334 | | | | 0.0707*** | | | | -0.0969** | | | 0.125 |
| | | | | (0.0355) | | | | (0.0111) | | | | (0.0491) | | | (0.0765) |
| ln(fixed pay, GBP th)$_{t-1}$ | | | | | | -0.165*** | -0.0447** | -0.0241 | | | | | | | |
| | | | | | | (0.0105) | (0.0192) | (0.0231) | | | | | | | |
| % fixed pay change $_{i,t-1}$ | | | | | | | | 0.0876*** | | | | | | | |
| | | | | | | | | (0.0206) | | | | | | | |
| ln(total pay, GBP th) $_{i,t-1}$ | | | | | | | | | | -0.162*** | 0.0141 | -0.0238 | | | |
| | | | | | | | | | | (0.0451) | (0.0885) | (0.111) | | | |
| % total pay change $_{i,t-1}$ | | | | | | | | | | | | 0.284*** | | | |
| | | | | | | | | | | | | (0.0830) | | | |
| Fixed bank-year effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 4521 | 4521 | 4521 | 2990 | 4521 | 4521 | 4521 | 2990 | 4610 | 4610 | 4610 | 3059 | 4610 | 4610 | 3059 |
| Adj. $R^2$ | 0.114 | 0.115 | 0.115 | 0.104 | 0.198 | 0.261 | 0.269 | 0.259 | 0.0766 | 0.0851 | 0.0859 | 0.0683 | 0.155 | 0.167 | 0.144 |

**Table 9: The effects of reaching the 200% cap limit on MRTs' remuneration amounts and fixed pay composition.**
Sample individuals: MRTs in Table 2 who were not new joiners/leavers and whose variable/fixed remuneration ratio was higher than 100% in t-1; sample period: 2014-2019 (2015-2019 for RBA analysis).
Dependent variables are y-o-y GBP changes in MRTs' variable remuneration (columns 1-2) and fixed remuneration (columns 3-4), and % and amount y-o-y changes in fixed remuneration components – salaries (columns 5-8) and role-based allowances (columns 9-12) . ''*Bucket 175%-200%* $_{i,t-1}$' is a dummy variable which equals 1 if an individual's bonus/fixed pay ratio was higher than 175% in t-1. *'Ln(bonus, GBP th)* $_{i,t-1}$*', 'ln(fixed pay, GBP th)* $_{i,t-1}$*'* and *'ln(total pay, GBP th)* $_{i,t-1}$*'* are natural logarithms of (1+respective remuneration amounts) in the preceding year; *'bonus, GBP th*$_{i,t-1}$*', 'fixed pay, GBP th*$_{i,t-1}$*'* and *'total pay, GBP th* $_{i,t-1}$*'* are their GBP values; changes in remuneration components are y-o-y % changes from year t-2 to t-1 ($(value_{t-1}-value_{t-2})/value_{t-2}$). All variables are winsorised at 5% highest and lowest amounts. Robust standard errors in parentheses.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dependent variable: | | | | | | | | | | | |
| | $Bonus_t$ | | $Fixed\ remuneration_t$ | | $Salary_t$ | | | | $Role\text{-}based\ allowance_t$ | | | |
| | Change in GBP th | | Change in GBP th | | % change | | Change in GBP th | | % change | | Change in GBP th | |
| Bucket 175%-200% $_{i,t-1}$ | -44.59*** | -22.77 | 46.85*** | 22.36*** | 0.0452*** | 0.00869 | 7.950*** | 0.587 | 0.263*** | 0.0800*** | 39.47*** | 16.45*** |
| | (10.73) | (19.76) | (3.586) | (6.354) | (0.00811) | (0.0133) | (2.070) | (3.532) | (0.0164) | (0.0256) | (3.329) | (5.480) |
| bonus, GBP th $_{i,t-1}$ | | -0.128*** | | 0.145*** | | 0.000110*** | | 0.0165*** | | -0.0000432 | | 0.0540*** |
| | | (0.0172) | | (0.0247) | | (0.0000166) | | (0.00395) | | (0.0000416) | | (0.0136) |
| (bonus/fixed pay) $_{i,t-1}$ | | 21.40 | | -2.134 | | 0.0249 | | 9.683** | | 0.268*** | | 16.34** |
| | | (21.35) | | (10.09) | | (0.0190) | | (4.389) | | (0.0334) | | (7.690) |
| (bonus/fixed pay) change $_{i,t-1}$ | | 21.01 | | 37.39*** | | 0.0349* | | 8.445** | | 0.208*** | | 41.44*** |
| | | (23.06) | | (7.634) | | (0.0180) | | (4.290) | | (0.0340) | | (8.528) |
| fixed pay, GBP th $_{i,t-1}$ | | | | -0.192*** | | | | | | | | |
| | | | | (0.0268) | | | | | | | | |
| % fixed pay change $_{i,t-1}$ | | | | 46.73*** | | | | | | | | |
| | | | | (14.11) | | | | | | | | |
| ln(salary, GBP th) $_{i,t-1}$ | | | | | | -0.274*** | | | | | | |
| | | | | | | (0.0192) | | | | | | |
| % salary change $_{i,t-1}$ | | | | | | 0.0183 | | 8.897 | | | | |
| | | | | | | (0.0301) | | (7.119) | | | | |
| salary, GBP $th_{t-1}$ | | | | | | | | -0.196*** | | | | |
| | | | | | | | | (0.0172) | | | | |
| ln(RBA, GBP th)$_{t-1}$ | | | | | | | | | | -0.0136 | | |
| | | | | | | | | | | (0.0134) | | |
| % RBA change $_{i,t-1}$ | | | | | | | | | | 0.135*** | | 28.65*** |
| | | | | | | | | | | (0.0302) | | (6.080) |
| RBA, GBP th $_{i,t-1}$ | | | | | | | | | | | | -0.113*** |
| | | | | | | | | | | | | (0.0206) |
| Fixed bank-year effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 4521 | 2990 | 4521 | 2990 | 4610 | 3059 | 4610 | 3059 | 2970 | 1804 | 4610 | 1849 |
| Adj. $R^2$ | 0.0934 | 0.107 | 0.0994 | 0.139 | 0.535 | 0.640 | 0.336 | 0.419 | 0.303 | 0.296 | 0.263 | 0.197 |

**Table 13: Longer deferral period effects on MRT remuneration sizes.**
Sample individuals: unbalanced panel of MRTs in Table 3; sample period: 2014-2017.
The dependent variable is the natural logarithm of individual's total or fixed remuneration (columns 1-4 and 5-8, respectively), winsorised at 5% lowest and highest values. *'Rule'* is a dummy variable which equals 1 for the periods 2016-2017 and 0 for 2014-2015. '*Affected'* is a dummy variable which equals 1 for MRTs who were affected by the change in deferral requirements and 0 for those unaffected. '*Individuals affected by increase to 5 years'* is a dummy variable equalling one for individuals whose deferral periods were three years or unreported in 2014, and five years in 2016; '*Individuals affected by increase to 7 years'* is a dummy variable equalling one for individuals whose deferral period was 7 years in 2016. Regressions in columns (1)-(2) and (5)-(6) use all sample MRTs; those in columns (3) and (7) compare MRTs affected by five year deferral requirements only to those unaffected; and columns (4) and (5) compare MRTs affected by seven year deferral only to those unaffected. All variables are winsorised at 5% highest and lowest amounts. Robust standard errors in parentheses.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Dependent variable: | | | | | | | |
| | LN (TOTAL PAY) | | | | LN (FIXED PAY) | | | |
| $rule_t$ | 0.109*** | 0.106*** | 0.109*** | 0.109*** | 0.126*** | 0.227*** | 0.126*** | 0.126*** |
| | (0.00538) | (0.0249) | (0.00538) | (0.00538) | (0.00457) | (0.0152) | (0.00457) | (0.00457) |
| $rule_t$ x $affected_i$ | 0.0315*** | 0.0316*** | | | 0.0151* | 0.0191** | | |
| | (0.00956) | (0.00950) | | | (0.00894) | (0.00919) | | |
| $rule_t$ x affected by increase to 5 $years_i$ | | | 0.0372*** (0.00998) | | | | 0.0174* (0.00923) | |
| $rule_t$ x affected by increase to 7 $years_i$ | | | | -0.0121 (0.0231) | | | | -0.00277 (0.0258) |
| Fixed MRT effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed bank-year effects | No | Yes | No | No | No | Yes | No | No |
| N | 6461 | 6461 | 6228 | 4732 | 6461 | 6461 | 6228 | 4732 |
| Adj. $R^2$ | 0.205 | 0.336 | 0.208 | 0.175 | 0.298 | 0.374 | 0.304 | 0.291 |

**Table 14: Longer deferral period effects on MRT remuneration growth.**
Sample individuals: unbalanced panel of MRTs in Table 3; sample period: 2015-2017.
The dependent variable is the year-on-year change in MRTs' total or fixed remuneration (columns 1-3 and 4-7, respectively), calculated as (remuneration $_t$- remuneration $_{t-1}$)/ remuneration $_{t-1}$ and winsorised at 5% lowest and highest values. *'2016 dummy'* is a dummy variable which equals 1 in 2016 and 0 in 2015 and 2017. '*Affected'* is a dummy variable which equals 1 for MRTs who were affected by the change in deferral requirements and 0 otherwise. *'Individuals affected by increase to 5 years'* is a dummy variable equalling one for individuals whose deferral periods were three years or unreported in 2014, and five years in 2016; *'Individuals affected by increase to 7 years'* is a dummy variable equalling one for individuals whose deferral period was 7 years in 2016. Regressions in columns (1) and (4) use all sample MRTs; those in columns (2) and (5) compare MRTs affected by five year deferral requirements only to those unaffected; and columns (3) and (6) compare MRTs affected by seven year deferral only to those unaffected. All variables are winsorised at 5% highest and lowest amounts. Robust standard errors in parentheses.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Dependent variable: | | | | | |
| | (Total pay$_t$ – Total pay$_{t-1}$) / Total pay$_{t-1}$ | | | (Fixed pay$_t$ – Fixed pay$_{t-1}$) / Fixed pay$_{t-1}$ | | |
| 2016 dummy$_t$ | -0.0239*** | -0.0239*** | -0.0239*** | 0.0311*** | 0.0311*** | 0.0311*** |
| | (0.00560) | (0.00560) | (0.00560) | (0.00397) | (0.00397) | (0.00397) |
| 2016 dummy$_t$ x affected$_i$ | 0.0180* | | | 0.0188** | | |
| | (0.00940) | | | (0.00800) | | |
| 2016 dummy$_t$ x affected by increase to 5 years$_i$ | | 0.0143 | | | 0.0154* | |
| | | (0.00957) | | | (0.00799) | |
| 2016 dummy$_t$ x affected by increase to 7 years$_i$ | | | 0.0489* | | | 0.0476 |
| | | | (0.0280) | | | (0.0289) |
| Fixed MRT effects | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 3944 | 3792 | 2756 | 3944 | 3792 | 2756 |
| Adj. $R^2$ | 0.00871 | 0.00964 | 0.0135 | 0.0572 | 0.0543 | 0.0534 |

**Table 15: Longer deferral period effects on remuneration sizes within affected MRT groups.**
Sample individuals: unbalanced panel of MRTs in Table 3 with non-missing deferral period data for 2014; sample period: 2014-2017.
The dependent variable is the natural logarithm of individual's total remuneration, winsorised at 5% lowest and highest values. *Rule* is a dummy variable which equals 1 for the periods 2016-2017 and 0 for 2014-2015. '*MRT's deferral 3 years in 2014'* is a dummy variable equalling 1 if MRT had deferral of 3 years in 2014, and 0 if their deferral period was 5 years. *'MRT's deferral 5 years in 2016'* is a dummy variable if in 2016, the MRT's deferral period was 5 years, and zero otherwise. In columns (1)-(2), the interaction term '*Rule x MRT's deferral 3 years in 2014'* measures whether among MRTs who were affected by the seven-year deferral requirement, total remuneration increased more if their deferral periods were three years in 2014 (rather than five years). In columns (3)-(4), the interaction term '*Rule x MRT's deferral 3 years in 2014'* measures whether among MRTs whose deferral period was 5 years in 2016, total remuneration increased more if their deferral periods had been three years in 2014 (rather than five years). In columns (5)-(6), the interaction term '*Rule x MRT's deferral 5 years in 2016'* measures whether among MRTs whose deferral period was three years before the rule change, total remuneration increased more if their deferral periods increased to five years in 2016 relative to those for whom it remained at three years. All variables are winsorised at 5% highest and lowest amounts. Robust standard errors in parentheses.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable: | **LN (TOTAL PAY)** | | | | | |
| Sample: | MRTs whose deferral period was 7 years in 2016 | | MRTs whose deferral period was 5 years in 2016 | | MRTs whose deferral period was three years in 2014 and three or five in 2016 | |
| $Rule_t$ | 0.0682*** | 0.208*** | 0.0851*** | -0.000108 | 0.123*** | 0.0754*** |
| | (0.0193) | (0.0175) | (0.0158) | (0.0544) | (0.00751) | (0.0163) |
| $Rule_t$ x MRT's deferral 3 years in $2014_i$ | 0.0610 | 0.0797 | 0.0576*** | 0.0830*** | | |
| | (0.0621) | (0.0776) | (0.0181) | (0.0223) | | |
| $Rule_t$ x MRT's deferral 5 years in $2016_i$ | | | | | 0.0115 | 0.0157 |
| | | | | | (0.0119) | (0.0116) |
| Fixed MRT effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed bank-year effects | No | Yes | No | Yes | No | Yes |
| N | 168 | 168 | 1886 | 1886 | 3104 | 3104 |
| Adj. $R^2$ | 0.165 | 0.194 | 0.245 | 0.378 | 0.240 | 0.388 |

**Table 17: The effects of longer deferral periods on bonus/fixed pay ratio.**
Sample individuals: unbalanced panel of MRTs in Table 3; sample period: 2015-2017.
The dependent variable is the ratio between an individual's variable and fixed remuneration. *'Rule'* is a dummy variable which equals 0 before 2016. '*Affected'* is a dummy variable which equals 1 for MRTs who were affected by the change in deferral requirements. '*Individuals affected by increase to 5 years*' is a dummy variable equalling one for individuals whose deferral periods were three years or unreported in 2014, and five years in 2016; '*Individuals affected by increase to 7 years'* is a dummy variable equalling one for individuals whose deferral period was 7 years in 2016. ln(total pay) is the natural logarithm of MRT's total remuneration, and bonus/fixed pay ratio is their previous period bonus/fixed pay ratio. Regressions in columns (1) - (2) use all sample MRTs; those in column (3) compares MRTs affected by five year deferral requirements only to those unaffected; and column (4) compares MRTs affected by seven year deferral only to those unaffected. All variables are winsorised at 5% highest and lowest amounts. Robust standard errors in parentheses.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Dependent variable: | Bonus/fixed pay ratio | | | |
| $rule_t$ | -0.114*** | -0.349*** | -0.116*** | -0.118*** |
| | (0.00838) | (0.0393) | (0.00843) | (0.00845) |
| $rule_t$ x $affected_i$ | 0.0192 | 0.0101 | | |
| | (0.0146) | (0.0146) | | |
| $rule_t$ x affected by increase to 5 $years_i$ | | | 0.0132 | |
| | | | (0.0148) | |
| $rule_t$ x affected by increase to 7 $years_i$ | | | | 0.0630 |
| | | | | (0.0475) |
| $ln(total\ pay)_{i,t}$ | 0.794*** | 0.756*** | 0.805*** | 0.827*** |
| | (0.0451) | (0.0514) | (0.0460) | (0.0483) |
| Fixed MRT effects | Yes | Yes | Yes | Yes |
| Fixed bank-year effects | No | Yes | No | No |
| N | 6461 | 6461 | 6228 | 4732 |
| Adj. $R^2$ | 0.255 | 0.293 | 0.270 | 0.281 |

**Table 18: The effects of longer deferral periods on proportion of bonuses deferred.**
Sample individuals: unbalanced panel of MRTs in Table 3; sample period: 2015-2017.
The dependent variable is % of MRTs' bonuses deferred (columns 1-3), or % bonuses deferred in excess of 60% (where at least 60% deferred) or 40% (where deferral is lower than 60%) (columns 4-10). *'Rule'* is a dummy variable which equals 0 before 2016. '*Affected'* is a dummy variable which equals 1 for MRTs who were affected by the change in deferral requirements. '*Individuals affected by increase to 5 years'* is a dummy variable equalling one for individuals whose deferral periods were three years or unreported in 2014, and five years in 2016; '*Individuals affected by increase to 7 years'* is a dummy variable equalling one for individuals whose deferral period was 7 years in 2016. Regressions in columns (1) - (6) use all sample MRTs; those in columns (7) and (8) compare MRTs affected by five year deferral requirements only to those unaffected; and columns (9) and (10) compare MRTs affected by seven year deferral only to those unaffected. All variables are winsorised at 5% highest and lowest amounts. Robust standard errors in parentheses.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Dependent variable: | | | | | | | | | |
| | % of bonus deferred | | | % of bonus deferred in excess of 40% or 60% | | | | | | |
| $rule_t$ | -0.00108 | -0.0147*** | -0.123*** | -0.00814*** | -0.0105*** | -0.0636*** | -0.00814*** | -0.00967*** | -0.00814*** | -0.0105*** |
| | (0.00237) | (0.00242) | (0.0149) | (0.00132) | (0.00163) | (0.00728) | (0.00132) | (0.00164) | (0.00132) | (0.00176) |
| $rule_t$ x $affected_i$ | -0.0163*** | -0.0238*** | -0.0106*** | -0.0129*** | -0.0148*** | -0.00452** | | | | |
| | (0.00461) | (0.00423) | (0.00351) | (0.00277) | (0.00272) | (0.00219) | | | | |
| $rule_t$ x affected by increase to 5 $years_i$ | | | | | | | -0.00814*** | -0.0101*** | | |
| | | | | | | | (0.00280) | (0.00275) | | |
| $rule_t$ x affected by increase to 7 $years_i$ | | | | | | | | | -0.0495*** | -0.0499*** |
| | | | | | | | | | (0.00786) | (0.00795) |
| ln(total pay) $_{i,t}$ | | 0.151*** | 0.144*** | | 0.0305*** | 0.0254*** | | 0.0246*** | | 0.0288*** |
| | | (0.0108) | (0.0112) | | (0.00662) | (0.00682) | | (0.00665) | | (0.00804) |
| bonus/total pay ratio, $\%_{i,t}$ | | 0.283*** | 0.278*** | | 0.0994*** | 0.0878*** | | 0.115*** | | 0.0762*** |
| | | (0.0284) | (0.0263) | | (0.0168) | (0.0152) | | (0.0164) | | (0.0185) |
| Fixed MRT effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed bank-year effects | No | No | Yes | No | No | Yes | No | No | No | No |
| N | 6461 | 6461 | 6461 | 6461 | 6461 | 6461 | 6228 | 6228 | 4732 | 4732 |
| Adj. $R^2$ | 0.00725 | 0.215 | 0.390 | 0.0418 | 0.0849 | 0.361 | 0.0292 | 0.0760 | 0.0542 | 0.0851 |