BANK OF ENGLAND

Staff Working Paper No. 929

Gender, age and nationality diversity in UK banks

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July 2021

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Abstract

Using a novel regulatory dataset, we study board and senior manager diversity of gender, age and nationality in UK banks. Gender diversity increased steadily over the last two decades, albeit from a very low base and to only 20% by the end of 2020. Moreover, we find evidence of a 'glass ceiling', with the proportion of females increasing more slowly in the most influential roles. Age and nationality diversity changed less over time. Empirical results suggest that gender and nationality diversity are related to positive risk and performance outcomes, whereas the reverse is true for age diversity. However, these findings are derived from analysing differences between banks, which exhibit substantially more variation than changes in diversity within banks over time. When we only exploit variation in diversity within banks, we do not find any relationship between diversity and outcomes.

Key words: Diversity, bank risk, supervision.

JEL classification: G21, M14.

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The views expressed in this paper are those of the authors, and not necessarily those of the Bank of England or its committees. We are grateful to Maria Barriel, Katherine Dossa, Liam Kirwin and Victoria Manning-Monro for their contributions to this research, and to Bill Francis, Charni Grant, Jens Hagendorff, Anna Jernova, Ieva Sakalauskaite and Mark Walsh for helpful comments and suggestions.

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ISSN 1749-9135 (on-line)

1 Introduction

Diversity has risen up the agendas of businesses, regulators, and governments in recent years. For the UK banking sector, initiatives such as the Davies Review (2015), the Gadhia Review (2016), and changes to the UK Corporate Governance Code[2] around diversity in 2018 testify to growing calls for boards and senior management teams to be more diverse.

Arguments for increasing diversity within firms usually stem from at least one of two perspectives. First, the lack of representativeness among senior management and directors is an equity issue. Providing equal opportunities for advancement regardless of identity attributes such as gender, and better reflecting the population in which institutions operate, would result in greater equity among the upper echelons of firms. Second, diversity is thought to lead to improved performance and reduced risk. Diversity, through a wider representation of opinions, experiences and expertise, can encourage greater challenge and reduce group-think (Bailey 2021; Haldane 2014). Greater challenge, in turn, supports more robust decision-making, which can enhance the performance of a firm and reduce risk.[3] Moreover, a more diverse bank, by better reflecting its customers, is more likely to meet their needs in terms of product design and service (Rathi 2021).

This paper aims to address both these perspectives. First, using a novel dataset constructed from regulatory information, we establish the facts and trends of identity diversity in the UK banking sector for the period 2001-2020. The data we draw on comes from 'Form As' – applications to serve in senior functions[4] submitted by all individuals seeking authorisation by the Financial Services Authority (FSA), and then subsequently the Financial Conduct Authority (FCA) and the Bank of England's Prudential Regulation Authority (PRA). This allows us to explore trends in identity diversity for the following characteristics: gender, age, and nationality.[5] The data therefore are broad – covering all regulated financial institutions in the UK, from large multi-national institutions to small regional banks, and provide in-depth coverage of individuals' traits within banks. This broad scope allows us to describe identity diversity trends for both executive and non-executive directors, as well as senior managers serving in risk, audit, and compliance roles.

We find that the proportion of females in authorised positions has been steadily increasing over time, albeit from a very low base and with much more room to go to achieve equity. At the end of 2001 9% of the total authorised pool of individuals was female, whereas the figure was 20.1% at the end of 2020, still well short of 50%. Moreover, we find that increases in gender diversity has been relatively slower for more senior positions, providing evidence of a 'glass ceiling' in the UK banking sector. This is particularly striking for the CEO position, which has seen a very slow increase, with females making up only 9.7% of CEOs of the 181 banks and building societies (hereafter referred to simply as banks) in our sample at the end of 2020 (up from 1.7% at the end of 2001). We also find that the average age of authorised individuals has increased, while the spread of age within banks (as measured by the standard deviation of age) has remained stable over time. Finally, the proportion of non-UK authorised individuals

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[2] See a summary of the changes here: https://www.frc.org.uk/directors/corporate-governance-and-stewardship/uk-corporate-governance-code.

[3] In this spirit, the Bank of England's Prudential Regulation Authority (PRA) requires that banks have a policy to promote the diversity of skills, thought, and experience of its oversight and management bodies. See the PRA's 2020 letter to bank chairpersons on board diversity here: https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/letter/2020/pra-rules-on-board-diversity.pdf.

[4] Senior functions are those roles which are specified by either the FCA or the PRA under section 59 of FSMA (Approval for particular arrangements), or an FCA governing function as specified in SUP 10C.4.3R of the FCA Rulebook.

[5] As a result of limited data availability, we are unable to analyse diversity of ethnicity.

has also remained stable over time, with around a quarter holding passports from other countries at the end of 2020.

Second, we provide empirical evidence of the relationship between identity diversity and bank risk and performance. Exploiting differences in diversity across banks and employing coarsened exact matching (CEM; Iacus, King, and Porro 2012), we find gender and nationality diversity to be related with positive outcomes – the higher the proportion of females and non-UK citizens in senior functions, the higher the returns and the lower the risk. On the other hand, we find age diversity is associated with negative outcomes. One important caveat, however, is that, the CEM approach is only valid if there are no unobserved variables which differ systematically between treatment and control observations. To address this issue, we also employ Generalised Method of Moments (GMM), which controls for banks fixed effects, thereby only exploiting within bank variation in diversity, as well as the potentially dynamic relationship between diversity and outcomes. Using this approach, we find no positive or negative relationship between identity diversity and bank risk.

There are some caveats to the GMM findings. First, we are unable to control for all time- and bank-varying variables which might be related to both diversity and outcomes (as with CEM). For example, we are not able to control for the share of independent board members in a given bank, which is considered to be an important factor for avoiding group-think and affecting firm outcomes (Vallascas, Mollah, and Keasey 2017; Ferreira et al. 2018; Pathan and Faff 2013), or for cognitive characteristics, for example differences in educational and professional skills and experiences.[6]

Second, the GMM specification, by controlling for all fixed differences between banks, might amount to 'throwing out the baby with the bathwater' (Beck and Katz 2001) – it is precisely these differences, e.g. different cultures around collaboration and inclusivity, that might be the mechanism through which identity diversity affects outcomes.[7] Relatedly, although our time series is long, within-bank variation in diversity is substantially smaller than between-bank variation and is highly persistent over time.

This study makes a number of contributions. While the literature on diversity and firm outcomes has grown quite large in recent years, to the best of our knowledge we are the first to examine the implications for the UK banking sector. Moreover, most studies are limited to analysing how board diversity of listed companies affects performance or valuation metrics. Because we are able to use confidential regulatory data, we are not reliant on publicly available data and therefore are able to include smaller, unlisted banks as well as senior managers below the board level. As a result, we examine the diversity of a wider pool of senior figures, for a wider set of banks than other empirical analyses. We are thus providing new evidence on the relationship between identity diversity and bank outcomes using a unique dataset. Finally, from a regulatory policy perspective, our analysis highlights the need to improve the data collected as part of the regulatory application process. Doing so would improve future research on these questions.

The rest of this working paper is laid out as follows: the next section provides a brief overview of relevant theoretical and empirical literature; section 3 provides details of our data and diversity trends; section 4

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[6] While there is clear evidence of a positive relationship between cognitive diversity – which in many contexts can result from identity diversity – and team performance (see Page 2019), for our sample and specific context, the identity variables we examine may not proxy for cognitive diversity. It could be that identity diverse boards or senior management teams nevertheless all had similar skills, backgrounds, and experiences, or that identity diversity does not lead to cognitive diversity within banks. Due to the limited amount of information available in regulatory applications, we are missing data regarding education, professional experience, and personal values, for example, all which may be better proxies of cognitive diversity.

[7] See, for example, Suss et al. (2021) who use diversity information to proxy for the inclusivity dimension of bank organisational culture.

details the methodology used; section 5 presents our findings and robustness checks; and, finally, section 6 concludes and suggests future research.

2 Overview of relevant academic literature

In theory, the direction of the relationship between identity diversity and firm outcomes is not definitive. On the one hand, diverse boards may bring potential costs to firms, for example via interpersonal conflicts and communication issues (Putnam 2007). On the other hand, diversity can also provide benefits through higher creativity and innovation, broader perspectives, better understanding of customer needs, and greater capacity for problem solving (Cox and Blake 1991; Robinson and Dechant 1997). A more nuanced view suggests that the relationship between diversity and firm outcomes depends critically on contextual factors and whether institutional structures are effectively harnessing its potential (Page 2019). For example, the more uncertain the business environment, or the more uncertain the strategic transformation required, the more there might be returns to diversity.

On the whole, empirical studies on the implications of diversity for firm outcomes find mixed results. These papers can be placed into two distinct categories: first, studies that focus on diversity of easily observable identity attributes such as gender, nationality, ethnicity, and age; and second, studies that aim to measure cognitive diversity, such as through educational and professional experience, and personal values (Kilduff, Angelmar, and Mehra 2000; Milliken and Martins 1996). The majority of research on board diversity focuses on the former as these characteristics are more easily recorded and quantified. A number of studies have looked into the implications of board gender diversity (for example, Adams and Ferreira (2009); Chen, Leung, and Goergen (2017)); racial and ethnic backgrounds (Carter et al. 2010; Erhardt, Werbel, and Shrader 2003); age (Kilduff, Angelmar, and Mehra 2000; Siciliano 1996); and tenure (Hambrick, Cho, and Chen 1996; Tihanyi et al. 2000). Less frequently, researchers have examined diversity of attributes which more directly tap into cognitive elements, for example skills (Adams, Akyol, and Verwijmeren 2018) and education (Berger, Kick, and Schaeck 2014).

We have been able to construct diversity measures related to gender, age, and nationality, and so the following sub-sections examine findings for each of these attributes separately.[8]

2.1 Gender

Studies on gender diversity and firm outcomes have produced mixed findings. A number of research papers provide evidence of a positive relationship between firm performance and gender diversity. Using Tobin's Q as the outcome variable, Carter et al. (2010) show that American firms with a higher proportion of women on the board perform significantly better. Other studies show a positive association between return on assets (ROA), a measure of accounting-based performance, and gender diversity (Shrader, Blackburn, and Iles 1997; Krishnan and Park 2005). Francoeur, Labelle, and Sinclair-Desgagné (2008) show that higher percentages of women managers leads to positive and significant abnormal stockmarket returns for a panel of American firms. In Europe, the evidence of positive associations between gender diversity and financial performance comes from Denmark (Smith, Smith, and Verner

[8] In our descriptive and empirical analysis, we evaluate each of the diversity variables separately. Another approach, which Bernile, Bhagwat, and Yonker (2018) take, is to create a multidimensional index of diversity (which they base on a combination of identity and cognitive characteristics). See also Suss et al. (2021) who aggregate different diversity indicators for the purposes of measuring the inclusivity dimension of bank organisational culture. Unfortunately our data do not allow for this – the nationality variable is incomplete (see Section 3.3), and so a multidimensional diversity measure would be largely based on only two attributes and therefore not contain enough dimensions to make the exercise worthwhile.

2006) and Spain (Campbell and Mínguez-Vera 2008). More recent studies demonstrates that European banks with more gender diverse boards were less likely to receive public bailouts (Cardillo, Onali, and Torluccio 2020) and had less frequent conduct-related fines (Arnaboldi et al. 2021).

Several studies also document evidence of a negative relationship. Adams and Ferreira (2009), for example, find that greater gender diversity in boardrooms is negatively related to financial performance. Using a sample from US mutual funds, Bär, Niessen-Ruenzi, and Ruenzi (2009) also find a negative relationship between gender diversity of the management team and returns. Ahern and Dittmar (2012) exploit the introduction of mandatory board gender quotas in Norway, which they argue constitutes an exogenous shock, and find a negative relationship between increasing diversity and subsequent performance. A study of German banks by Berger, Kick, and Schaeck (2014) finds a small, adverse effect of increased board gender diversity on portfolio risk.

Other researchers do not find there to be a significant association between gender diversity and financial performance (Dwyer, Richard, and Chadwick 2003; Randøy, Thomsen, and Oxelheim 2006; Rose 2007; Marinova, Plantenga, and Remery 2016). Rather than performance, Sila, Gonzalez, and Hagendorff (2016) examine whether gender diversity affects firm risk-taking, finding no evidence of a relationship. A recent study by Bennouri et al. (2018) finds conflicting results depending on the outcome measure evaluated.

Owen and Temesvary (2018) argue that inconclusive results are driven by non-linearities. Using an instrumental variable approach, they show that board gender diversity has positive effects on performance, but only once a threshold level of diversity is passed. Furthermore, this positive effect is only observed in better capitalised banks (which they use as a proxy for management quality). They argue that this diversity benefit, where it exists, is driven by better monitoring and strategic advice. Farag and Mallin (2017) also find positive benefits for a sample of European banks once a threshold proportion is passed, with firms having over 18% and 21% female directors on management and supervisory boards, respectively, being significantly less vulnerable.

2.2 Age

There are relatively fewer studies that investigate the relationship between age and firm outcomes. From a theoretical standpoint, the diversity of age amongst a firm's senior leadership team is expected to be relevant for performance for a couple of reasons. First, as people age they tend to become more patient and risk averse (Hambrick and Mason 1984; Herrmann and Datta 2005). Second, different generations have different life experiences and accumulated knowledge, so the combination of different ages may lead to cognitive diversity as well as more appropriate product and service offerings (Cox and Blake 1991).

As with gender, the empirical evidence is mixed. Some studies find a positive relationship between age and firm performance. For example, Li et al. (2011) find that age diverse insurance companies in China are more likely to have higher performance, as measured by ROA and employee productivity. In a study of listed Malaysian firms, Hassan and Marimuthu (2016) find that the average age of a firm's board of directors is associated with positive performance outcomes. On the other hand, a number of studies reach the opposite conclusion, finding age to be negatively associated with firm outcomes (Tanikawa, Kim, and Jung 2017; Ali, Ng, and Kulik 2014; Berger, Kick, and Schaeck 2014). Arnaboldi et al. (2021) find no relationship between age diversity – measured as the coefficient of variation of board directors' age – and misconduct fines for a sample of European banks.

2.3 Nationality

Theoretical work suggests that nationality diversity may increase the likelihood of cross-cultural communication problems arising and interpersonal conflicts (Cox and Blake 1991). On the other hand, nationality diversity amongst key decision-makers is expected to bring competitive advantages, namely through international networks, commitment to shareholder rights, and the avoidance of managerial entrenchment (Oxelheim and Randøy 2003).

In keeping with the studies examining gender and age, the empirical studies investigating the relationship between nationality heterogeneity and firm performance is also mixed. Using a sample of Norwegian and Swedish firms, Oxelheim and Randøy (2003) indicate a significantly higher Tobin's Q for firms that have Anglo-American nationals in their boardrooms. Using net income as the performance measure, Kaczmarek and Ruigrok (2013) find that board nationality diversity is positively related to financial performance in the UK, the Netherlands, and Switzerland. Nielsen and Nielsen (2013) also find a positive relationship for a panel of European firms.

Other studies find no significant relationship between board nationality diversity and firm performance. Using market share of European firms as the performance measure, Kilduff, Angelmar, and Mehra (2000) fail to find any association. Similar results are found by Rose (2007) for the relationship between the proportion of foreign nationals and stock performance in Denmark.

In sum, the empirical literature for each of these identity attributes is inconclusive. Part of the reason for this might be that previous studies have largely been confined to analysing board diversity and listed firms. Our unique data, elaborated on in the next section, capture listed and unlisted firms, as well as a wider population of executives and senior managers with which to investigate the links between diversity and firm outcomes.

3 Data and diversity trends

The diversity variables are constructed primarily from 'Form As', applications that are completed when a bank applies for an individual to take up a Controlled Function (2001-2016) or Senior Manager Function (from March 2016) in a UK bank (including those domiciled in the UK and subsidiaries of international banks). We compute diversity measures for gender, age, and nationality for all PRA-regulated banks for the period Q4 2001 - Q4 2020 (a total of 181 firms).

For the purposes of our analysis, we have defined four categories of functions: CEO, executive, oversight (non-executive directors), and risk/compliance/audit personnel, in which the regulated population is split up (see **Table A.1** the Annex for a full breakdown of these categories). Changes to the regulatory regime occurred on two occasions throughout our period of study, and each has implications for the trend analysis discussed in this section:

- Updates to the Principle and Code of Practice for Approved Persons (APER) - November 2007; and
- Introduction of the Senior Managers Regime (SMR) - March 2016.

These two regulatory regime changes have led to changes in the definitions of the populations captured by each of the four abovementioned categories. Hence, there are 'breaks' in the continuity of most of these populations. Here we will briefly outline those.

In 2007, the introduction of a new controlled function, the CF29 – Significant Management Function role, which was used as a 'catch-all', captured a wider population and led to an increase in the number of appointments in the executive category. Therefore, the executive population pre- and post-2007 is not the same. The same regulatory change in 2007 meant that some individuals previously captured as performing a risk/compliance/audit related function were now being captured by the new CF29 role, and, hence, classified as executives. Therefore, the pre- and post-2007 risk/compliance/audit populations are not the same either.

The second relevant regulatory change – the introduction of the Senior Managers Regime (SMR) in March 2016 – led to the reclassification of most of the approved functions carried out. One of the aims of the SMR was to capture only the most senior decision-makers within banks. This led to a smaller oversight and executive population being captured by the SMR. Therefore, the pre- and post-2016 oversight and executive populations are not the same. The only population which has not been affected by either of the regulatory regime changes is the CEO.

The significant dates at which the two regime changes occurred are clearly marked in the stylised facts described below. In the analysis to follow, we clearly label the populations which have been affected by regulatory regime changes.

3.1 Gender

Since 'Form As' do not require individuals to disclose their gender, we used the title provided in the forms to determine gender. If the title provided an unambiguous indication of the gender of the individual, then the appropriate gender was allocated. However, in the cases where the title was gender-ambiguous (such as Dr, The Venerable, Major, etc.) or the title was missing, we predicted the gender implied by the first and middle name (if available) using a name-gender database (the *gender* package in R; Mullen (2020)). Then we used a weighted average of the two (placing twice as much weight on the first name) and assigned gender to these individuals where the average provided a strong signal (greater than 90% or less than 10% female). The matching left only around 100 individuals of completely 'unknown' gender out of a total of 41,725 authorised individuals for the entire sample. For these last unknowns, we utilised a manual approach – 'Googling' the individual – to confirm the gender in question.

The data reveal that the proportion of women in senior manager functions has risen steadily since 2001, albeit from a very low base. Around 20% of all authorised individuals in our sample are female at the end of 2020, up from around 10% at the end of 2001 (**Figure 1**).

Figure 1: Proportion female, all banks and authorised positions

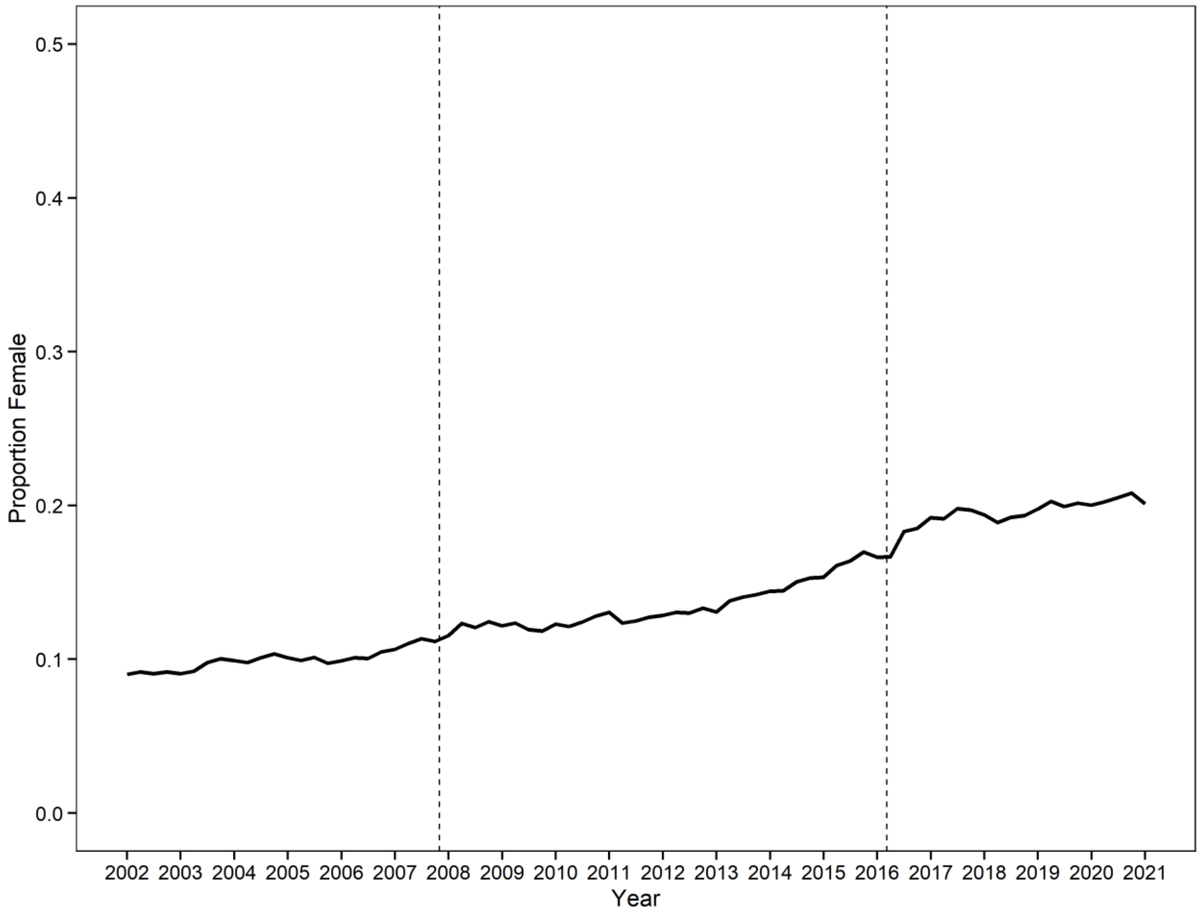


Figure 2 shows the proportion of women broken down by the four categories of functions. All four, despite the changes in the definitions of the populations, have exhibited upward trends in our sample, with risk/compliance/audit increasing at the fastest relative pace and CEO at the slowest relative pace, reaching 9.7% at the end of our sample. This constitutes evidence of the existence of a 'glass ceiling', given that the more senior functions of CEO and executive have the lowest level of female representation and have tended to grow at the slowest relative pace.[9]

Some of the jumps in the trends appear to be mildly driven by the regime changes mentioned above, shown in the dashed vertical lines in **Figure 2**. The 2007 regulatory regime change seems to affect the female representation in both the executive and risk/compliance/audit functions. The increase in the female representation in the executive function is due to the fact that the newly authorised individuals were, relative to the rest of the authorised executives, disproportionately women. The marked increase in the proportion of women in the risk/compliance/audit function is slightly more nuanced, as it reflects a decrease in both the number of risk/compliance/audit appointments and the number of females appointed in risk/compliance/audit functions. As the decline in the total number of risk/compliance/audit function appointments was larger than the decline in females in risk/compliance/audit function roles, this led to an increase in the overall proportion female of the function.

[9] The SMR regime also allows us to monitor the identity diversity of other key positions. **Figure A.1** in the Annex provides trends for the Chairperson, CFO and CRO positions.

The introduction of the SMR in 2016 also affected the proportion of females in executive, and more so, oversight roles. In particular, the current regime no longer captures non-executive directors (NEDs) who do not chair the board or one of the statutory board-subcommittees. These are known as notified NEDs, and we do not have information on them in our dataset. The drop in the oversight proportion at the time of the introduction suggests that these directors are disproportionately female relative to other NEDs. For the executive function, there is very little movement to the proportion female post-SMR, indicating that the reduction in the number of executive appointments was approximately proportionate to the fall in the number of female executives.

Figure 2: Proportion female by function

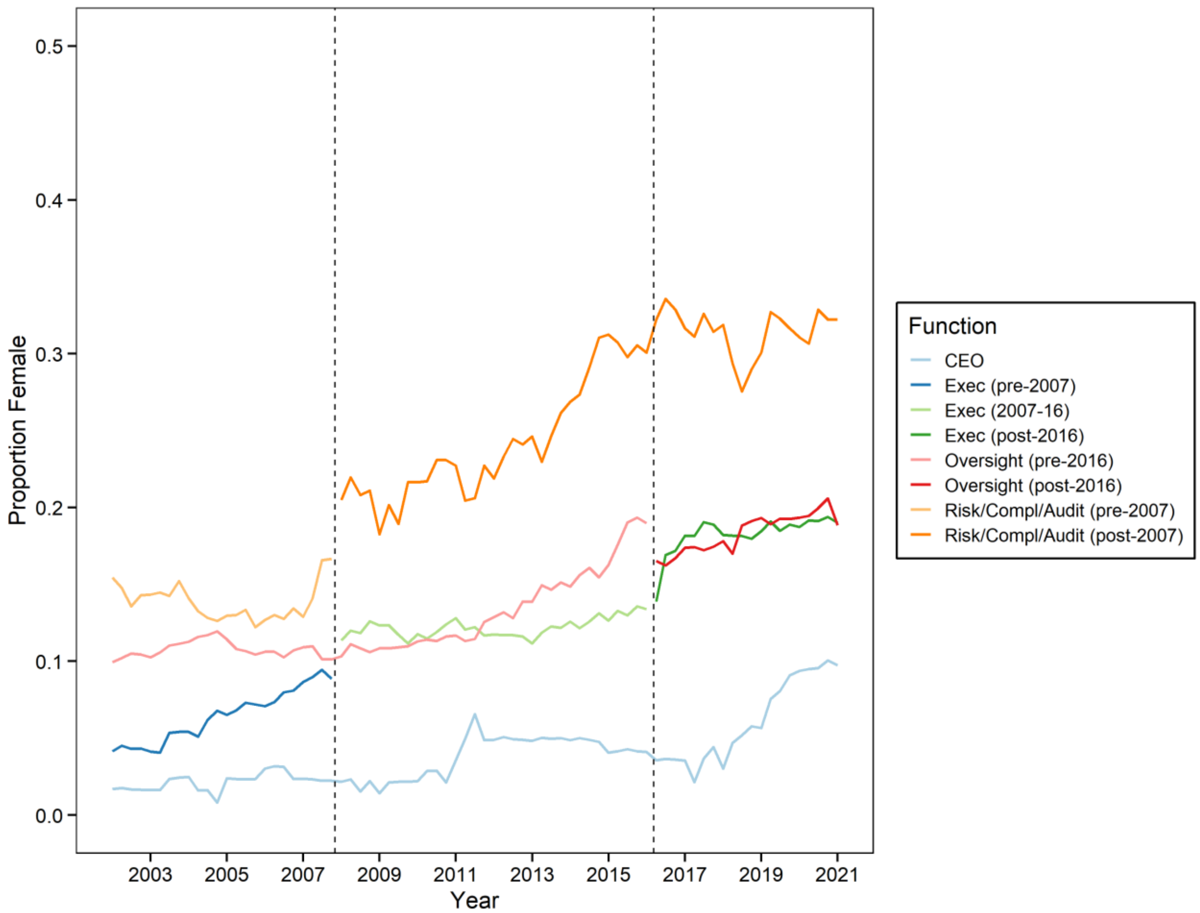


Figure 3: Proportion female by function and bank domicile

Whether a bank is domiciled in the UK or a subsidiary of an overseas bank appears to play a significant role, mainly in terms of the levels of female representation, rather than the general trends, as shown in **Figure 3**. UK subsidiaries of international banks have a relatively higher level of CEO female representation, reaching 13% at the end of the sample period, compared with 8% for UK banks. For both UK and international banks, CEOs have the lowest female representation, and risk/compliance/audit is the function with the highest female representation, reaching approximately 30% for both UK and international banks.

Next, we look at the bank-level quarterly distribution of female representation (represented by boxplots in **Figure 4**). The breakdown reveals a wide variation in female representation across banks. While the trend over time is positive, the median bank at the end of 2020 has only 18.2% females in authorised positions, up from 6.2% at the end of 2001. Notably, there are a large percentage of banks with no females amongst the pool of authorised individuals in any given quarter – 43.9% of banks at the end of 2001 and 18.4% at the end of 2020 (**Figure 5**).

Figure 4: Proportion female at the bank-level

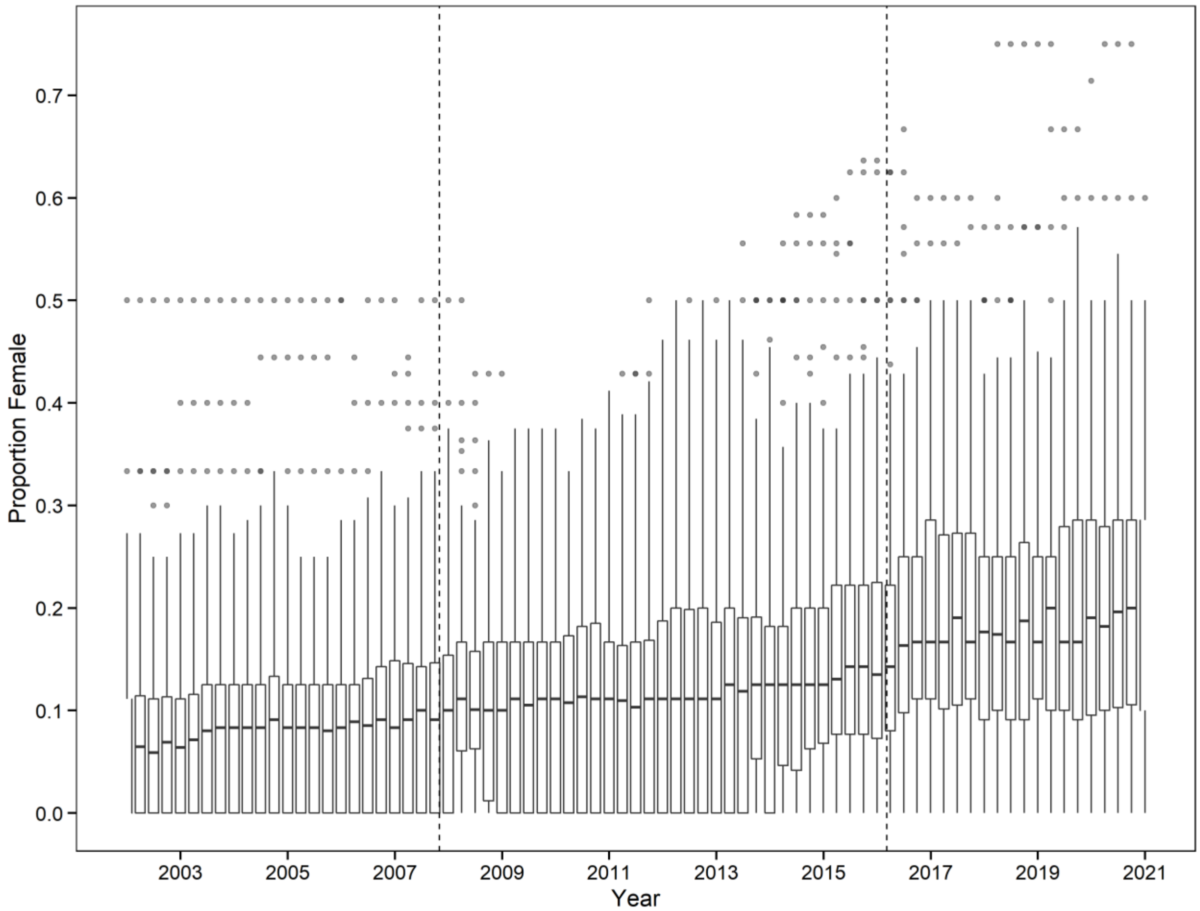
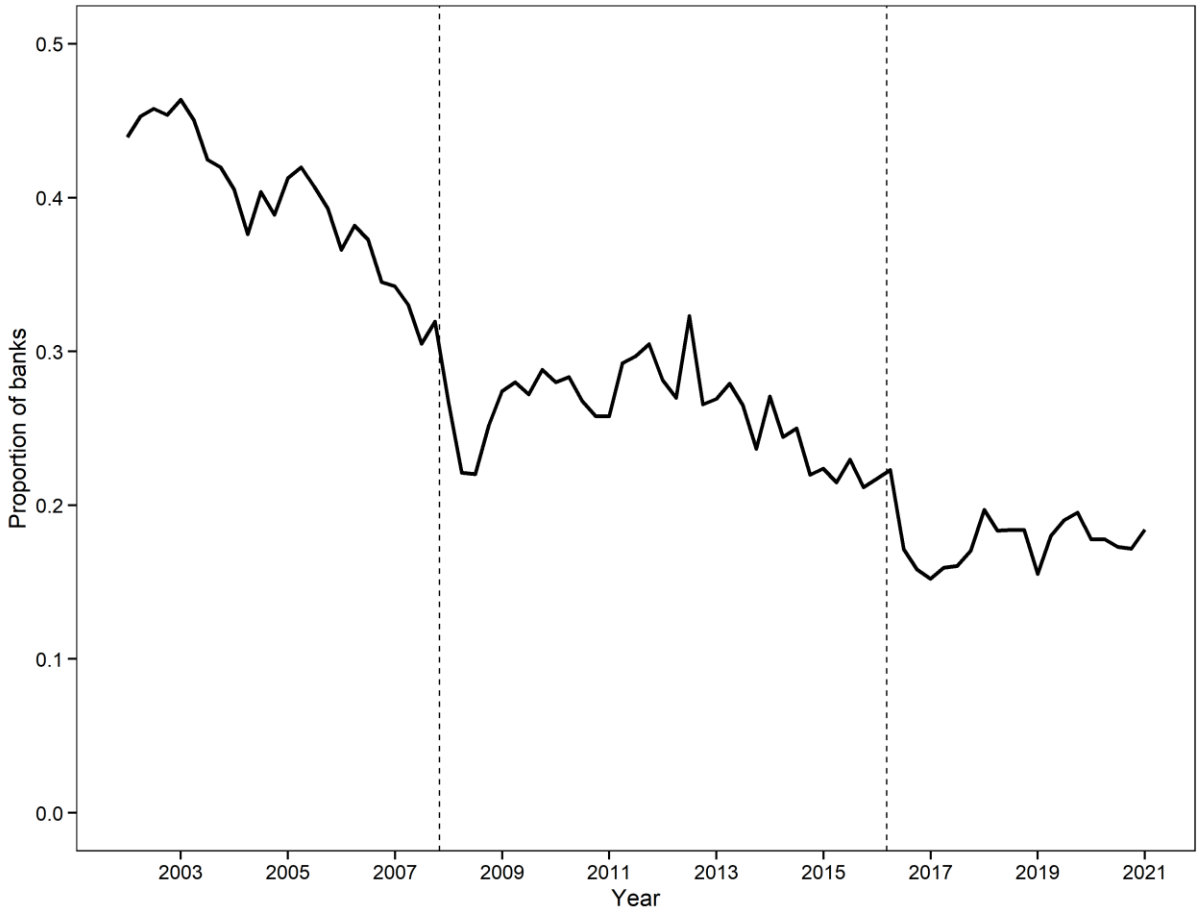


Figure 5: Proportion of banks with no females in authorised positions



3.2 Age

Age is computed using the date of birth provided in 'Form As'. **Figure 6** shows that the overall average age has increased over time, being approximately two years higher at the end of 2020 relative to 2001. We also observe that the overall distribution has become less fat-tailed over time; in other words, the spread of the distribution of age has shrunk.

The increase in average age appears consistent across the different functions, as shown in **Figure 7**. One point to note is the spike in average age for oversight roles in 2016, suggesting that notified NEDs, who were no longer captured by the SMR at that point, are disproportionately younger (which is unsurprising given that more experienced directors tend to serve as more senior positions on bank boards).

Figure 6: Distribution of age by year

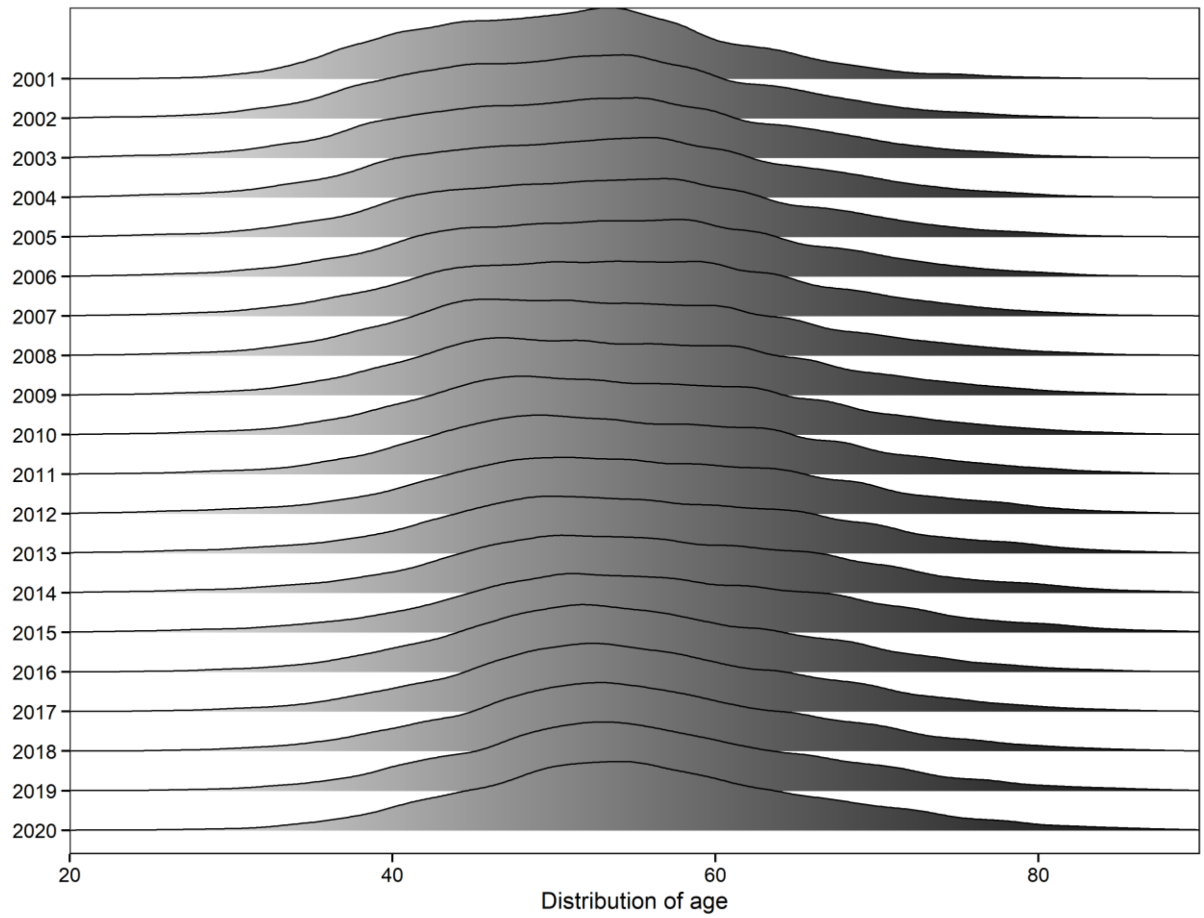
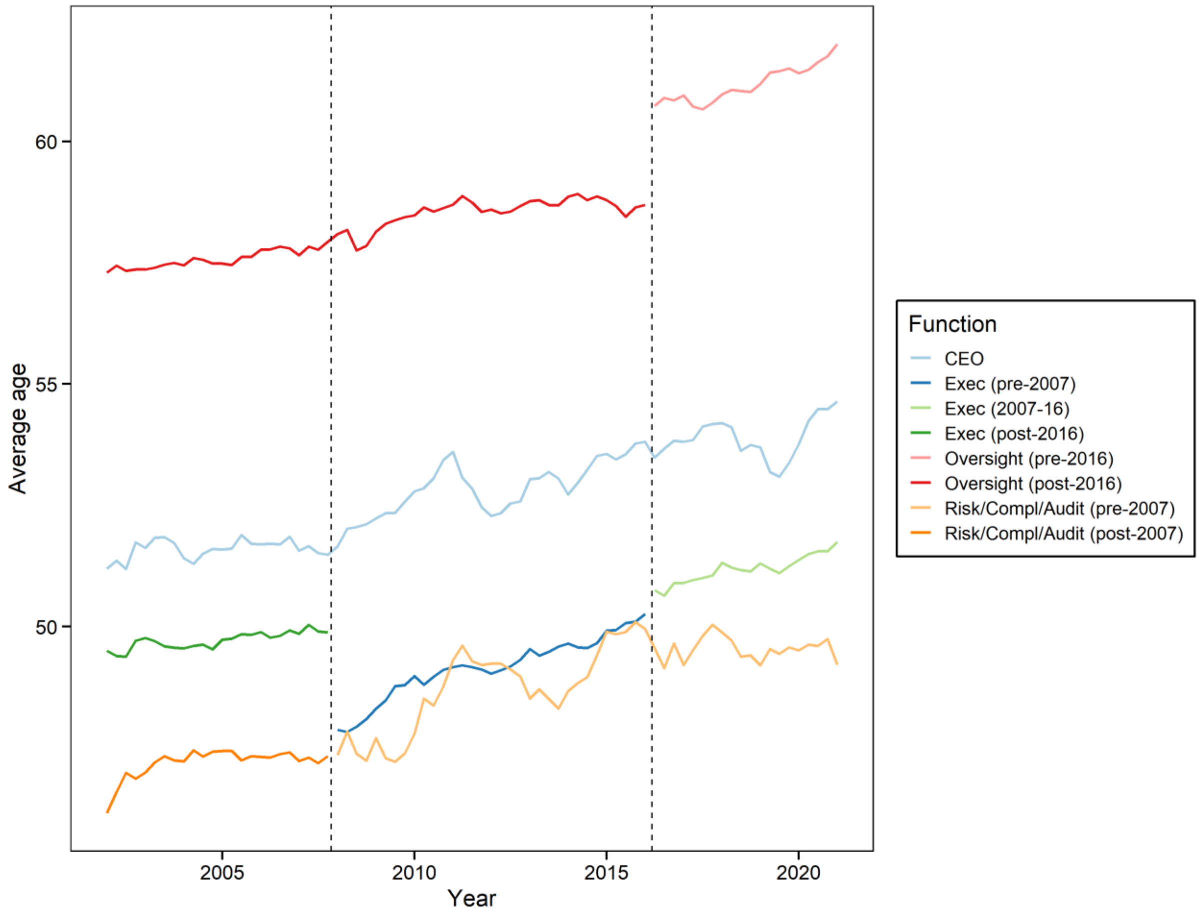
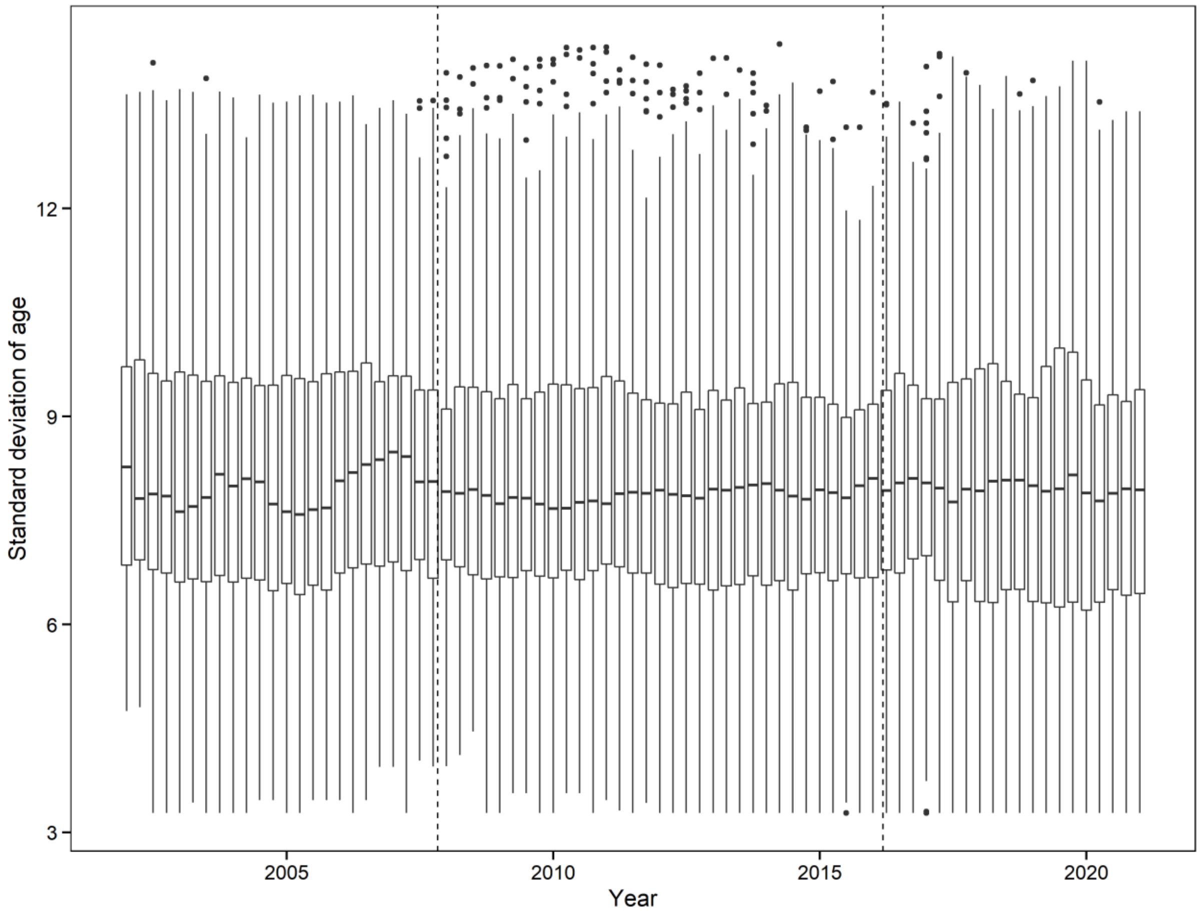


Figure 7: Average age by function



While average age might be of interest, in particular in relation to the relative propensity for younger versus older individuals to take on risk, from a diversity perspective we are more interested in age heterogeneity within banks. The logic is that a bank with a larger dispersion of age is more likely to have greater diversity of thought and experiences, thereby contributing to cognitive diversity. In our empirical analysis we therefore treat the standard deviation of ages in a given bank as one of our main explanatory variables. **Figure 8** provides the distribution of standard deviations of ages across all banks by quarter. We see that the distributions have remained fairly stable over time.

Figure 8: Standard deviation of age within banks by quarter



3.3 Nationality

The data collected from 'Form As' contains information on the nationality as identified by each individual. In the cases where the individual has multiple nationalities, their primary nationality was chosen. This information is incomplete, however, and we only have 41.6% of individuals in our sample having an identified nationality. This equates to only 8% of bank-quarter observations having 90% or above of the relevant individuals having an assigned nationality.

Leaving aside missing observations, the data on nationality suggest that the proportion of all authorised individuals with non-UK citizenship has hovered between 26.5% and 34.7% between 2001 and 2020, with an increase around 2007-8 followed by a steady decline (see **Figure 9**).

Looking at nationality broken down by function reveals some interesting facts (see **Figure 10**). First, the general trend is downward for both the oversight and risk/compliance/audit functions over the period. The percent of non-UK citizens serving in oversight roles went from 42.2% to 21.3% from end 2001 to end 2020. The marked decline in 2016 can be explained by the fact that the decrease in the number of oversight appointments was coupled with an even larger decrease in the number of non-UK oversight function holders. This suggests that notified NEDs, who were no longer captured under following the 2016 regime change, were held disproportionately by non-UK individuals. For risk/compliance/audit functions, the percent of non-UK citizens went from 26.2% to 10.7% for risk/compliance/audit roles. On the other hand, there is has been an increase in the proportion of non-UK citizens serving in executive roles (20.2% to 34.9%). The percent of non-UK CEOs has also increased, going from 28.8% at the end of 2001 to 39.1% at the end of 2020.

Figure 9: Proportion non-UK, all banks and positions

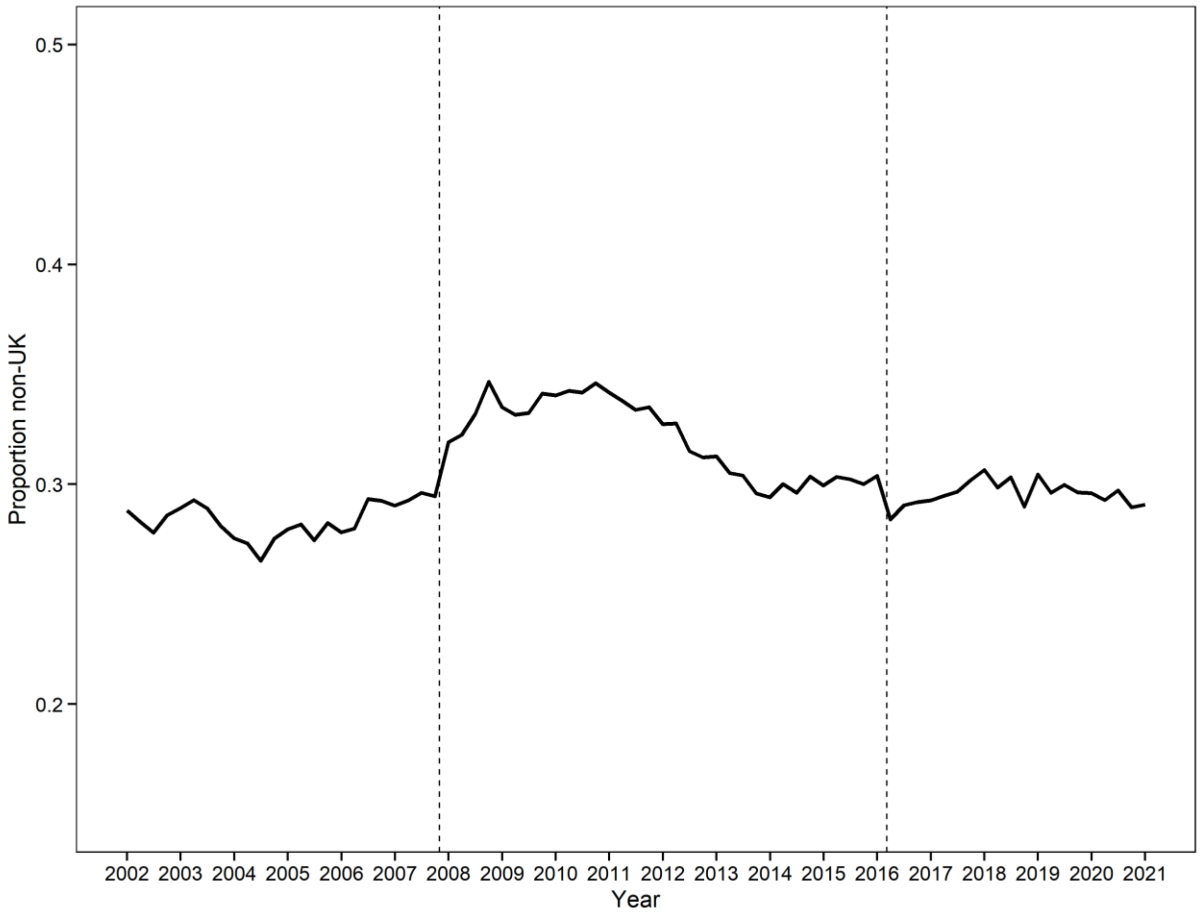
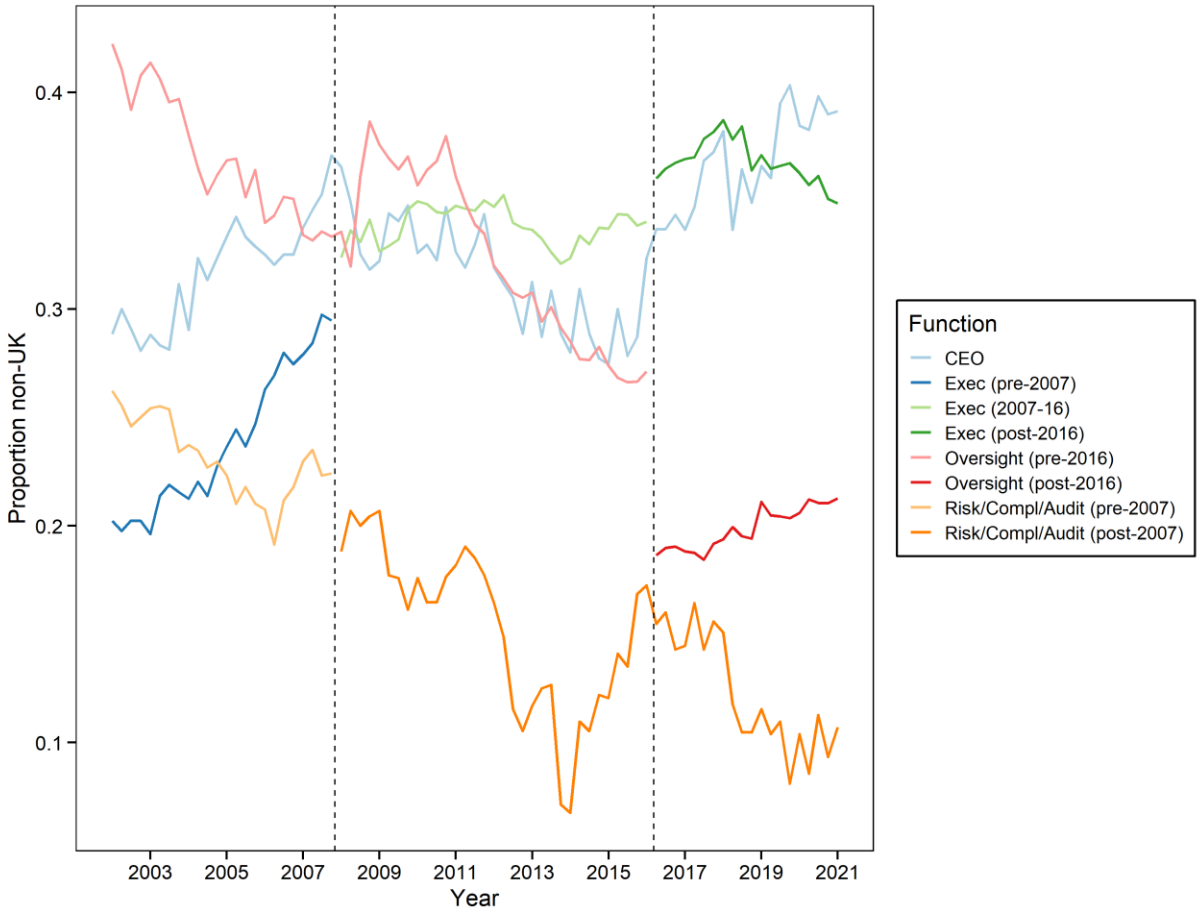


Figure 10: Proportion non-UK by function



Splitting out banks by whether they are UK-domiciled or subsidiaries of international banks reveals, unsurprisingly, that the proportion of authorised individuals who are non-UK is markedly higher across all the functions in international banks compared with UK banks (**Figure 11**). It is particularly noteworthy that the proportion of non-UK CEOs for international banks has decreased from 75% at the end of 2001 to 60.4% by the end of the 2020. The proportion of non-UK CEOs in UK-domiciled banks has increased throughout our sample, albeit from a lower starting point, from 6.5% to 24.6%.

Figure 11: Proportion non-UK by function and bank origin

3.4 Outcome measures and bank-level covariates

We explore several outcome variables, including those conventional in the literature; namely, return on assets (ROA) for performance and the z-score (distance to default measure) for riskiness. ROA is calculated as annualised net profit over total average assets. The z-score is calculated as $Z_{it} = (ROA_{it} + Leverage_{it})/\sigma(ROA)it\tau$, where ROA_{it} is the overall asset return for bank *i* at time *t*, $Leverage_{it}$ is the total equity capital to assets ratio and $\sigma(ROA)_{it\tau}$ is the standard deviation of asset returns calculated over τ periods (we use a 16 quarter window). We take the log of the z-score in our empirical analysis. The z-score thus measures the number of standard deviations asset returns have to decline to offset a bank's equity capital ratio – a higher z-score implies a lower probability of insolvency. Our third outcome measure comes from confidential supervisory assessments from the PRA on the riskiness of banks for the period 2014-2020, known as PIF scores. These range from 1-4, with 4 being the highest risk level. These scores are reviewed officially on a half-yearly basis for all regulated firms.[10]

We also include a number of control variables, in particular: size of the bank (natural log of total assets), the number of authorised individuals, the average risk weight (to proxy differences in balance sheet

[10] For details on the PRA's approach to supervision and its risk assessment framework, please see: https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/approach/banking-approach-2016

composition and business model)[11], and capital adequacy (defined as total Tier 1 capital over risk-weighted assets). We also include a dummy variable for whether the bank is UK-domiciled or a subsidiary of an international bank. The data for ROA and the z-score, as well as bank-level controls, come from quarterly regulatory returns that have been compiled into a dataset known as the *Historical Banking Regulatory Database* (de-Ramon, Francis, and Milonas 2017). This data currently covers the period from 1989 to 2013, and so we supplemented the dataset with regulatory return information from 2014 to end 2020. **Table 1** provides descriptive statistics for all variables (aside from the PIF score, which is omitted for sensitivity reasons).

Table 1: Descriptive statistics for all variables

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Female %	9,936	13.427	12.159	0	0	20	75
Age (s.d.)	9,836	8.090	2.159	3.279	6.633	9.430	14.372
Non-UK %	792	38.961	23.602	0.000	25.000	57.143	90.000
ROA	9,482	0.274	0.937	-4.114	0.111	0.476	4.494
Z-score	8,031	4.374	0.899	0.362	3.830	4.967	7.560
Size	9,936	6.916	2.357	0.211	5.381	8.089	14.641
# Authorised	9,936	12.134	8.690	3	8	13	131
Avg risk-weight	9,619	47.956	18.906	12.393	35.561	58.493	106.126
T1 capital (%)	9,797	24.072	21.140	7.295	13.488	25.220	183.281
UK-domiciled	9,936	0.653	0.476	0	0	1	1

Note: The table provides descriptive statistics for all variables (excluding the PIF score, which is omitted due to sensitivities).

4 Methodology

Our analysis of the relationship between diversity and outcomes proceeds as follows. First, we exploit between-bank variation, performing OLS regression with time fixed effects and bank-level clustered standard errors, and in order to enhance the causal interpretation of our results, coarsened exact matching (CEM; Iacus, King, and Porro 2012). In both cases we lag all explanatory variables by one quarter to alleviate concerns around reverse causality. CEM allows us to match banks that differ on the extent of diversity (which we define as above/below the mean level of diversity in any given quarter) but are similar either exactly or roughly on observables. We match exactly by quarter and whether the bank is domiciled in the UK or not, and coarsely on the other bank-level covariates. Importantly, however, CEM assumes that there are no omitted variables that might be correlated with our diversity and outcome measures.

We first exploit variation between banks for practical and theoretical reasons: analysis of the between- and within-bank variation and in our diversity and outcome variables reveals that, although we have a long time series, there is substantially more variation in the cross-section (see **Figure A.2** in the Annex). From a theoretical perspective, we might think that differences in diversity across banks are qualitatively

[11] Mortgage banks tend to have low average risk weights, while banks which lend primarily to corporates tend to have far larger risk-weights.

different from changes in diversity at a particular bank over time. This might be because ‘true’ diversity (i.e. the translation of diversity into practical differences in management and oversight) changes only slowly over time and is inextricably linked to a bank’s culture of inclusivity (Rathi 2021). Controlling for bank fixed effects will therefore also remove differences in culture which are integral for identifying the relationship between diversity and outcomes.

Nevertheless, we also exploit within-bank variation to see whether there is a relationship between changes in diversity and changes in performance or risk. For this analysis, a bank fixed effects approach might be inappropriate if the relationship between the diversity variables and outcome measures is dynamic rather than static, with past bank risk or performance influencing choices around board and senior management diversity. Indeed, there is empirical research demonstrating a link between diversity of a bank’s board and past performance. Ryan and Haslam (2005) find that banks that are performing poorly are more likely to hire women, a phenomenon they term as the ‘glass cliff’. This result suggests that the proportion of women on a bank’s board and senior management team may be negatively related to past values of performance, and so a fixed effects estimator of current values of diversity on performance would be biased (Wintoki, Linck, and Netter 2012).[12]

It is therefore possible that the within-bank relationship between our outcome measures and diversity variables is dynamic in nature. To deal with this possibility, we follow recent work in the field of corporate governance by adopting a Generalised Methods of Moments (GMM) estimating approach (De Andres and Vallelado 2008; Wintoki, Linck, and Netter 2012; Adams and Ferreira 2009; Farag and Mallin 2017; Sila, Gonzalez, and Hagendorff 2016; Pathan and Faff 2013).[13] As with CEM, the GMM approach does not provide a silver bullet in dealing with endogeneity issues. In particular, omitted time-varying bank-level variables which are related to both diversity and outcomes will bias the estimates. We cannot rule this out, although we include controls in our specification which have been identified in previous research as being relevant.

5 Results

The results for the OLS regression with time fixed effects are presented in **Table 2**. We look at four main explanatory variables: the proportion of females in authorised positions, a binary variable which takes the value of 1 if there is at least one female in an authorised position, the standard deviation of age, and the percent of individuals who are not UK citizens. All models include the abovementioned controls, and standard errors are clustered at the bank-level. The coefficients are standardised – i.e. they are interpreted as the expected change in standard deviations of y for a one standard deviation change in x.

In general, we see that greater gender and nationality diversity are positively associated with outcomes, while greater age diversity is negatively associated with firm outcomes. With regards to gender, the higher the proportion of females in authorised positions, the lower the riskiness of the bank (as measured by both the PIF and z-score). In terms of economic significance, a one standard deviation increase is associated with an expected 0.093 decrease in the standard deviation of the PIF score, and a 0.099 increase in the z-score. The coefficient in the financial performance model is no longer significant ($p < 0.1$) and smaller (0.019). We see a similar pattern when we look at the female binary coefficient, albeit the coefficients are substantively larger and significant for all outcome measures. Having at least some

[12] Wintoki, Linck, and Netter (2012) also point out that even if there is no causal relationship running from diversity to our outcome measures, the biased fixed effects regressions could yield statistically significant yet spurious estimates.
[13] Our base models utilise the system GMM approach.

female representation amongst the authorised population is associated with an increase in returns and decrease in riskiness.

Looking at the coefficient on nationality diversity (columns 4, 8 and 12 of Table 2), we see a substantively large effect for risk but an insignificant coefficient for financial performance. A one standard deviation increase in the proportion of non-UK individuals is associated with a 0.177 decrease in the PIF score and 0.315 increase in the z-score.

In terms of age dispersion, we find that the higher the dispersion of ages, the higher the expected riskiness, as measured by the z-score, and the lower the expected returns, with coefficients of -0.161 and -0.027 respectively. The coefficient for the age variable is insignificant when the outcome measure is the PIF score, however (Column 3).

Table 2: OLS regression results

	Dependent variable:											
	PIF				Z-score				ROA			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Proportion female	-0.093***				0.099***				0.019*			
	(0.011)				(0.014)				(0.011)			
Female binary		-0.120***				0.155***				0.059**		
		(0.029)				(0.029)				(0.028)		
Age s.d.			0.015				-0.161***				-0.027***	
			(0.011)				(0.011)				(0.010)	
Proportion non-UK				-0.177***				0.315***				-0.007
				(0.043)				(0.075)				(0.053)
# Authorised	0.141***	0.149***	0.139***	-0.275*	-0.019*	-0.025**	-0.023**	0.035	-0.009	-0.012	-0.009	0.010
	(0.020)	(0.020)	(0.020)	(0.160)	(0.011)	(0.011)	(0.010)	(0.042)	(0.010)	(0.010)	(0.010)	(0.042)
Size	0.089***	0.088***	0.090***	-0.024	-0.149***	-0.156***	-0.163***	-0.047	0.092***	0.088***	0.087***	0.106
	(0.018)	(0.019)	(0.019)	(0.105)	(0.015)	(0.015)	(0.015)	(0.081)	(0.014)	(0.014)	(0.014)	(0.065)
T1 Cap	0.080***	0.078***	0.088***	0.196***	-0.061***	-0.061***	-0.070***	-0.067*	-0.055***	-0.054**	-0.061***	0.012
	(0.016)	(0.016)	(0.016)	(0.046)	(0.018)	(0.018)	(0.019)	(0.040)	(0.021)	(0.021)	(0.022)	(0.043)
Avg risk weight	0.019*	0.032***	0.038***	0.033	0.052***	0.043***	0.057***	0.254***	0.181***	0.180***	0.185***	-0.027
	(0.011)	(0.011)	(0.011)	(0.040)	(0.015)	(0.015)	(0.015)	(0.038)	(0.015)	(0.015)	(0.015)	(0.035)
UK-domiciled	-0.335***	-0.377***	-0.379***	-1.030***	0.154***	0.181***	0.196***	0.335**	0.127***	0.125***	0.130***	0.425***
	(0.027)	(0.027)	(0.027)	(0.149)	(0.030)	(0.030)	(0.029)	(0.132)	(0.029)	(0.029)	(0.029)	(0.136)
Time fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	3,830	3,830	3,797	124	7,693	7,693	7,615	512	9,020	9,020	8,932	671
R^2	0.149	0.137	0.132	0.643	0.065	0.061	0.084	0.223	0.069	0.069	0.070	0.267

Note: *p<0.1; **p<0.05; ***p<0.01
Bank-level clustered standard errors in parentheses. All continuous variables are standardised.

The CEM results are presented in Table 3. Overall, the results are substantively the same as in Table 2, albeit the coefficient for the standard deviation of age is no longer significant when the PIF score or ROA are the outcome measures. Columns 1 to 3 provide the results for gender, where the coefficient for ‘Treated’ provides the effect of having at or above average gender representation in that given quarter. The coefficients suggest a substantive gender effect on riskiness and financial performance. Being above average in gender is expected to reduce the PIF score by -0.254 and increase the z-score and ROA by 0.141 and 0.055, respectively.

For the effect of age diversity on bank outcomes, the coefficient on the treatment variable is only significant when the outcome measure is the z-score (-0.251). Finally, for the nationality treatment, having an above average proportion of non-UK citizens in any given quarter is expected to reduce riskiness but there is no significant effect for ROA. The coefficients on the PIF and z-score are -0.701 and 0.31, respectively.

Table 3: CEM regression results

	Dependent variable:								
	PIF	Z-score	ROA	PIF	Z-score	ROA	PIF	Z-score	ROA
		Gender			Age			Nationality	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treated	-0.254***	0.141***	0.055***	-0.004	-0.251***	-0.017	-0.701***	0.310**	0.068
	(0.032)	(0.023)	(0.019)	(0.030)	(0.023)	(0.021)	(0.170)	(0.121)	(0.076)
# Authorised	0.118***	-0.041**	-0.002	0.134***	-0.096***	-0.023	-0.448**	0.347***	-0.022
	(0.027)	(0.016)	(0.014)	(0.023)	(0.025)	(0.023)	(0.178)	(0.098)	(0.062)
Size	0.219***	-0.175***	0.064***	0.144***	-0.132***	0.127***	-0.222	-0.553***	-0.029
	(0.024)	(0.016)	(0.014)	(0.025)	(0.020)	(0.018)	(0.190)	(0.113)	(0.062)
T1 Cap	0.045*	-0.209***	-0.036**	0.120***	-0.028*	-0.061***	-0.060	-0.085	-0.371***
	(0.026)	(0.019)	(0.015)	(0.020)	(0.015)	(0.014)	(0.199)	(0.156)	(0.116)
Avg risk weight	0.037*	-0.035**	0.258***	0.061***	0.060***	0.172***	-0.024	0.142*	-0.096**
	(0.021)	(0.015)	(0.012)	(0.017)	(0.012)	(0.011)	(0.103)	(0.084)	(0.046)
UK-domiciled	-0.343***	-0.057	0.184***	-0.585***	0.279***	0.153***	-1.631***	-0.455	0.223
	(0.045)	(0.042)	(0.031)	(0.037)	(0.030)	(0.026)	(0.560)	(0.297)	(0.154)
Time fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Banks	173	154	177	172	153	176	15	35	43
Observations	3,622	7,101	8,496	3,699	7,299	8,640	75	233	406
R^2	0.129	0.088	0.081	0.166	0.075	0.069	0.646	0.319	0.367

Note: *p<0.1; **p<0.05; ***p<0.01

'Treated' is a binary variable defined as above the mean level of diversity, where the mean is calculated within each quarter.

Observations are weighted to account for the possibility of multiple matches per control observation.

Bank-level clustered standard errors are in parentheses.

All continuous variables are standardised.

The GMM specification results are presented in **Table 4**. The GMM specifications include a one-quarter lag of the dependent variable on the right hand side, and the internal instruments used are two, three and four quarter lags of the dependent variable, as well as one to four quarter lags of each of the diversity variables. All models include control variables. We are unable to include the nationality variable in the GMM estimation due to the high proportion of missing data.

In contrast to the OLS and CEM regression results, none of the coefficients are significantly different from zero. Moreover, the interval estimates are small in a substantive sense, with the standardised coefficients ranging from 0.0003 to 0.001 for the percent female, 0.004 to 0.055 for the female binary variable, and 0.002 to 0.029 for the standard deviation of age.

Arrelano-Bond second order autocorrelation tests are insignificant ($p > 0.05$) in all GMM specifications, meaning autocorrelation is not present and the estimates are consistent. The Sargan/Hansen test of instrument exogeneity is also not rejected, providing assurance that the internal instruments are not invalid.

Table 4: GMM regression results

	Dependent variable:								
	PIF			Z-score			ROA		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Y lag	0.932***	0.934***	0.939***	1.308***	1.037***	1.176***	0.988***	0.993***	0.985***
	(0.019)	(0.048)	(0.025)	(0.157)	(0.087)	(0.189)	(0.037)	(0.047)	(0.051)
Proportion female	0.0003			0.001			0.0004		
	(0.001)			(0.002)			(0.001)		
Female binary		0.034			0.055			-0.004	
		(0.066)			(0.091)			(0.100)	
Age s.d.			-0.002			-0.029			-0.005
			(0.005)			(0.022)			(0.011)
# Authorised	0.001	0.0002	0.001	-0.001	-0.001	-0.0007	-0.001	-0.001	-0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.0004)	(0.0004)	(0.001)	(0.0003)
Size	0.002	0.005	0.003	0.003	-0.002	-0.002	0.001	0.002	0.002
	(0.003)	(0.005)	(0.003)	(0.011)	(0.005)	(0.010)	(0.002)	(0.002)	(0.002)
T1 cap	0.0004*	0.001	0.0005	0.001	0.0004	0.0004	-0.0002	-0.0002	-0.00004
	(0.0002)	(0.0004)	(0.0003)	(0.001)	(0.0004)	(0.0007)	(0.0004)	(0.001)	(0.0004)
Avg risk weight	0.001**	0.001*	0.001**	0.001	0.0002	0.001*	-0.0002	-0.0001	0.0001
	(0.0003)	(0.0004)	(0.0003)	(0.001)	(0.001)	(0.0003)	(0.0003)	(0.001)	(0.001)
Observations	3511	3511	3511	7348	7348	7348	8591	8591	8591
Banks	170	170	170	150	150	150	173	173	173
Sargan	1	1	1	1	1	1	1	1	1
Autocorrelation (1)	0	0	0	0.04	0.009	0.01	2e-04	4e-04	2e-04
Autocorrelation (2)	0.484	0.466	0.477	0.62	0.61	0.73	0.061	0.052	0.064

Note: *p<0.1; **p<0.05; ***p<0.01

Robust standard errors in parentheses. All continuous variables are standardised.

The internal instruments used are two, three and four quarter lags of the dependent variable, as well as one to four quarter lags of each of the diversity variables.

We are unable to include the nationality variable in the GMM estimation due to the high proportion of missing data.

Robustness checks

We run a number of robustness checks for both the CEM and GMM specifications. First, in order to avoid inconsistencies in the authorised population over time as a result of regulatory regime changes described in Section 3, we restrict our sample to the SMR regime (from March 2016). We find qualitatively similar results (reported in **Table A.2** and **Table A.3** in the Annex). We also alter the definition of diversity used. Rather than a simple proportion for the gender variable, we compute Blau statistics. This is a concave function that reaches a maximum of 0.5, penalising distance away from parity equally (i.e. a 10% gender ratio is as bad as 90%). The index is given by the following function: $1 - (g^2 + (1 - g)^2)$, where g = the gender ratio. We also examine whether an alternative measure of age spread within banks, namely the interquartile range, produce different results (it does not – see **Table A.4** and **Table A.5**). Lastly, we conduct a sub-group analysis as a robustness check. First, we remove from our sample UK subsidiaries of international banks. We might question whether the inclusion of these banks is appropriate given that the information we have in our dataset is not at the highest (global) level of consolidation, and so the diversity statistics we have for these banks are oftentimes not the group-level decision-makers, but rather sub-group boards and executive committees. Excluding these banks (see **Table A.6** and **Table A.7**) does not provide a qualitatively different results for our estimates of diversity.

6 Discussion and conclusion

This paper utilises a newly constructed dataset based on the population of all individuals authorised to perform significant functions in UK banks. We first examine diversity trends from 2001 to 2020, finding a number of striking facts: the proportion of women in senior positions has been steadily increasing over time, however there is far more room to go before equity is achieved, particularly for the most senior positions where progress has been relatively slower. Age and nationality diversity have been more stable overall.

We then examine the relationship between identity diversity and bank outcomes, as measured by subjective supervisory assessments of bank risk, the z-score, and ROA. Our analysis of between-bank variation finds evidence that both gender and nationality diversity are positively associated with bank outcomes (i.e. improved performance and reduced riskiness), whereas age diversity is negative associated with outcomes. However, when we restrict ourselves to within bank variation and control for the potentially dynamic relationship using a GMM approach, the coefficient estimates are, in all cases, insignificantly different from zero.

It is important to stress, however, that we are assuming that there are no time-varying omitted variables which affect both diversity and bank outcomes. For example, we cannot control for the fraction of independent board members. This factor has been shown to be a mechanism through which diversity affects outcomes (Ferreira et al. 2018), and its omission from the above analysis could affect the results. In the case of CEM and the time fixed effect regression, we additionally assume that we have not omitted any important bank-level variables. Without plausible exogenous variation in our explanatory variables of interest, we fall short of making a convincing causal claim about the relationship between identity diversity and bank outcomes.

The analysis conducted for this paper represents only an initial foray into the effects of diversity on bank outcomes. One avenue for future research is to expand the range of diversity variables available for analysis to those that are potentially more closely related to cognitive diversity. In this paper, we are only able to make use of data on identity diversity and are not able to look at diversity of educational and professional experience, for example. This aspect is important because identity diversity might matter for outcomes only insofar as it leads to cognitive diversity (Page 2019). While in many contexts identity diversity would be expected to lead to beneficial cognitive diversity, in our context it might not be the case. Future research might instead try to more directly measure cognitive diversity, thereby allowing us to evaluate the effect of board and senior manager diversity of skills, thought and experience.

Annex

Table A.1: List of authorised roles included

Function	Role type
CF1 Director	Executive
CF2 Non-Executive Director	Oversight
CF3 Chief Executive	Executive
CF8 Apportionment and Oversight	Risk/Audit/Compliance
CF10 Compliance Oversight	Risk/Audit/Compliance
CF11 Money Laundering Reporting	Risk/Audit/Compliance
CF14 Risk Assessment	Risk/Audit/Compliance
CF15 Internal Audit	Risk/Audit/Compliance
CF28 Systems and controls	Executive
CF29 Significant management	Executive
SMF1 Chief Executive	Executive
SMF2 Chief Finance	Executive
SMF3 Executive Director	Executive
SMF4 Chief Risk	Executive
SMF4 Chief Risk Function	Executive
SMF5 Head of Internal Audit	Executive
SMF6 Head of Key Business Areas	Executive
SMF7 Group Entity Senior Manager	Executive
SMF8 Credit Union Senior Manager	Executive
SMF9 Chair of the Governing Body	Oversight
SMF10 Chair of the Risk Committee	Oversight
SMF11 Chair of the Audit Committee	Oversight
SMF12 Chair of the Remuneration Committee	Oversight
SMF13 Chair of the Nominations Committee	Oversight
SMF14 Senior Independent Director	Oversight
SMF16 Compliance Oversight	Risk/Audit/Compliance
SMF17 Money Laundering Reporting Officer (MLRO)	Risk/Audit/Compliance
SMF18 Other Overall Responsibility	Executive
SMF24 Chief Operations	Executive

Figure A.1: Proportion female for additional SMF function, 2016-2020

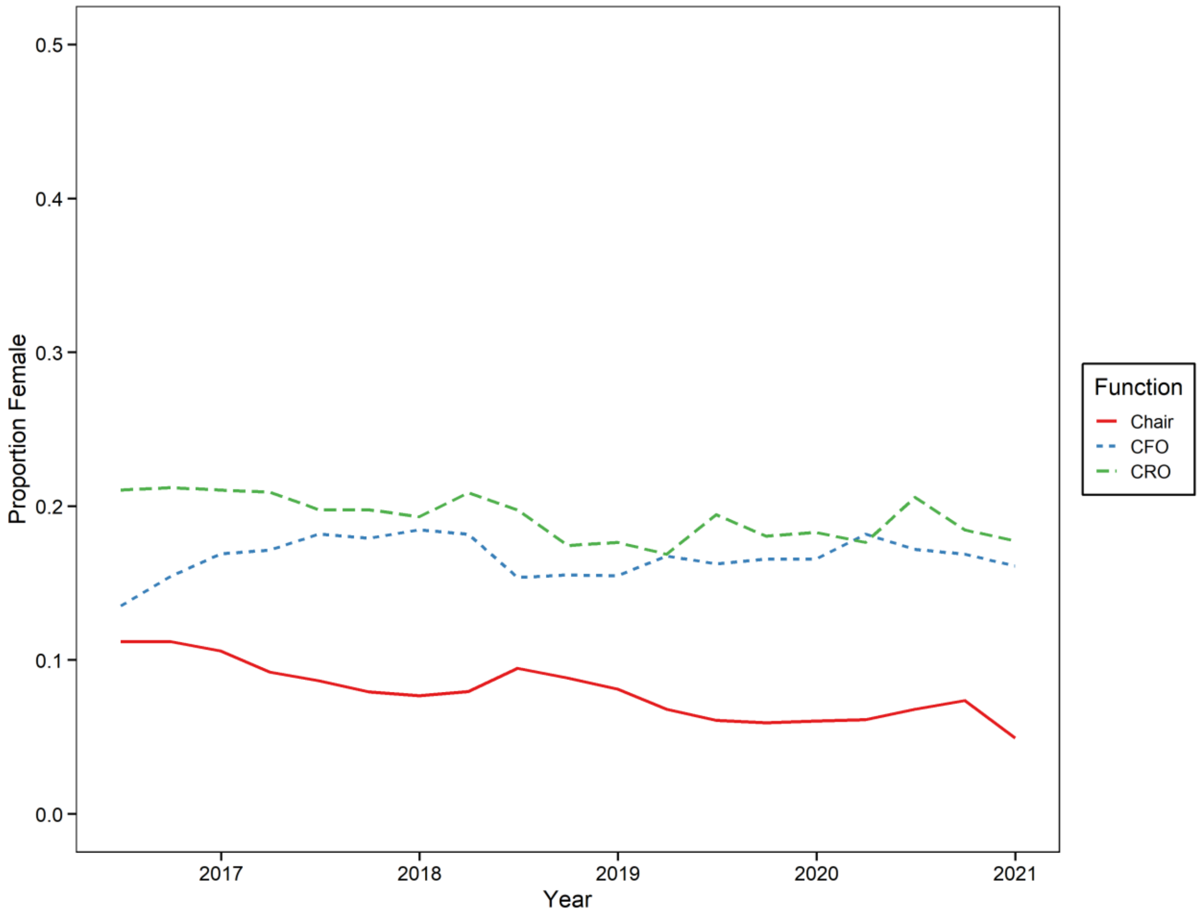
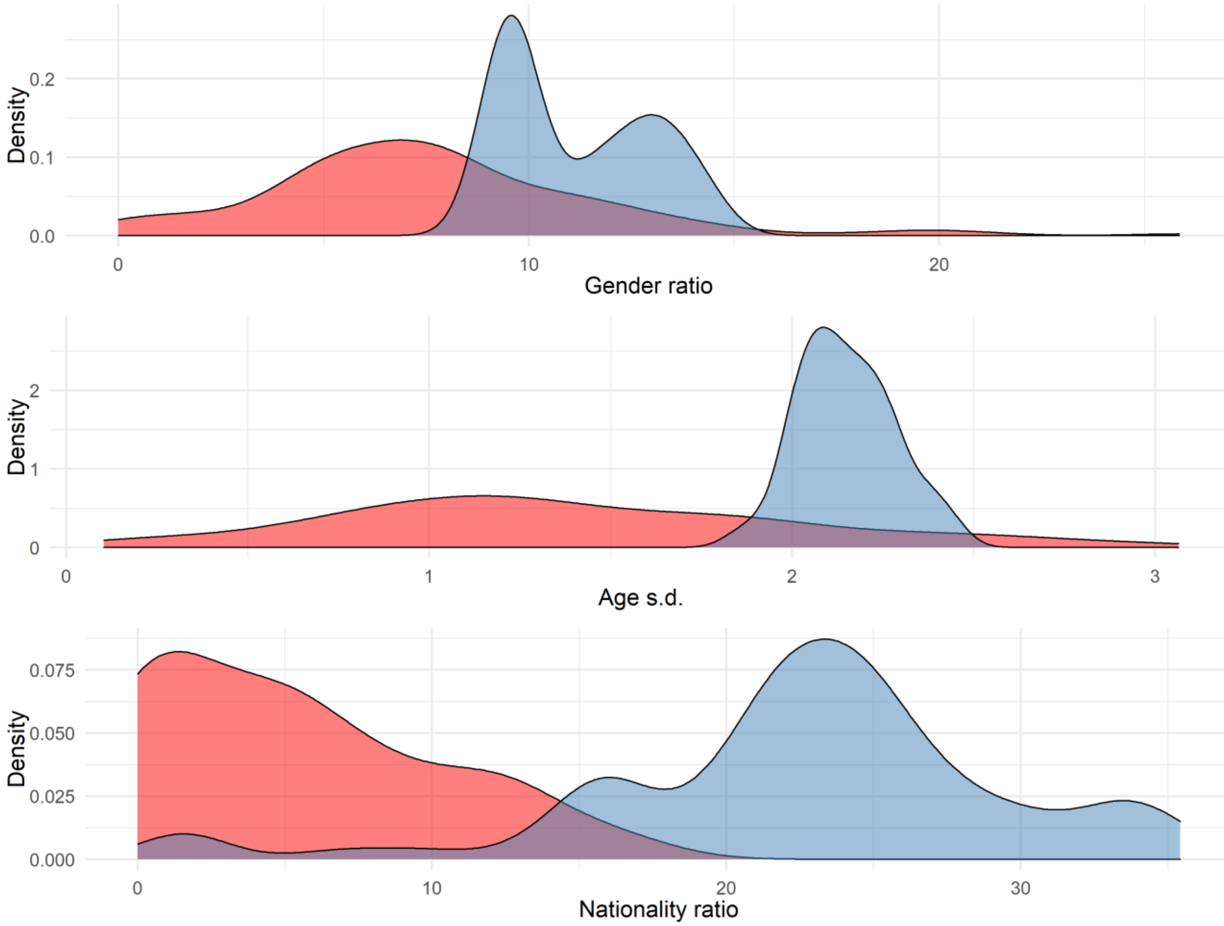


Figure A.2: Between- and within-bank variation (standard deviations)



Note: The figures provide the standard deviation density plot for each variable. Red is within-bank standard deviation (total banks = 181), and blue is the standard deviation within-quarter (T = 77).

Robustness checks

Table A.2: CEM regression results, post-SMR regime

	Dependent variable:					
	PIF	Z-score	ROA	PIF	Z-score	ROA
		Gender			Age	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	-0.247***	0.402***	0.068*	-0.029	-0.198***	-0.003
	(0.038)	(0.043)	(0.035)	(0.036)	(0.044)	(0.039)
# Authorised	0.029	-0.259***	-0.004	-0.012	-0.066*	-0.026
	(0.030)	(0.037)	(0.028)	(0.030)	(0.039)	(0.034)
Size	0.201***	0.008	0.175***	0.169***	-0.164***	0.203***
	(0.031)	(0.035)	(0.028)	(0.031)	(0.041)	(0.035)
T1 Cap	0.073***	-0.039	-0.097***	0.132***	0.150***	-0.095***
	(0.028)	(0.032)	(0.027)	(0.023)	(0.028)	(0.025)
Avg risk weight	0.090***	-0.081***	0.321***	0.087***	0.015	0.192***
	(0.025)	(0.029)	(0.023)	(0.020)	(0.026)	(0.022)
UK-Domiciled	-0.332***	-0.210***	0.199***	-0.627***	0.243***	0.217***
	(0.051)	(0.066)	(0.048)	(0.044)	(0.057)	(0.048)
Time fixed effects	Y	Y	Y	Y	Y	Y
Banks	170	137	170	169	134	170
Observations	2,616	2,089	2,513	2,590	2,032	2,481
R^2	0.089	0.094	0.125	0.161	0.073	0.090

Note: *p<0.1; **p<0.05; ***p<0.01

'Treated' is a binary variable defined as above the mean level of diversity, where the mean is calculated within each quarter.

Observations are weighted to account for the possibility of multiple matches per control observation.

Bank-level clustered standard errors in parentheses. All continuous variables are standardised.

Nationality variables are omitted due to insufficient number of observations

Table A.3: GMM regression results, post-SMR regime

	Dependent variable:								
		PIF			Z-score			ROA	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Y lag	0.934***	0.903***	0.925***	1.023***	1.036***	1.019***	0.994***	0.998***	0.985***
	(0.025)	(0.033)	(0.030)	(0.038)	(0.066)	(0.042)	(0.034)	(0.033)	(0.030)
Proportion female	0.0002			0.001			0.001		
	(0.001)			(0.001)			(0.002)		
Female binary		0.005			0.011			0.029	
		(0.074)			(0.060)			(0.050)	
Age s.d.			-0.0001			-0.012*			-0.0001
			(0.004)			(0.006)			(0.010)
# Authorised	0.001	0.002	-0.0001	-0.001	-0.001	-0.002	-0.002	-0.001	-0.002
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Size	0.004	0.006	0.007	0.006	0.006	0.003	0.006	0.003	0.005
	(0.004)	(0.006)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)	(0.003)	(0.005)
T1 Cap	0.001*	0.001	0.001	0.001*	0.001	0.001*	0.0004	0.0004	0.0003
	(0.0003)	(0.0004)	(0.0004)	(0.001)	(0.001)	(0.001)	(0.0003)	(0.0004)	(0.0005)
Average risk weight	0.001	0.001	0.001*	0.001	0.0003	0.001	-0.0001	-0.0001	-0.0002
	(0.0004)	(0.001)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.001)	(0.0004)	(0.0004)
Banks	170	170	170	136	136	136	168	168	168
Observations	2590	2590	2590	2058	2058	2058	2446	2446	2446
Sargan	1	1	1	0.995	1	0.999	0.999	1	1
Autocorrelation (1)	0	0	0	1e-04	0.002	6e-04	0.0358	0.0315	0.0326
Autocorrelation (2)	0.1	0.106	0.093	0.763	0.782	0.737	0.636	0.618	0.647

Note: *p<0.1; **p<0.05; ***p<0.01

Robust standard errors in parentheses. All continuous variables are standardised.

The internal instruments used are two, three and four quarter lags of the dependent variable, as well as one to four quarter lags of each of the diversity variables.

We are unable to include the nationality variable in the GMM estimation due to the high proportion of missing data.

Table A.4: CEM regression results, alternative diversity measures

	Dependent variable:								
	PIF	Z-score	ROA	PIF	Z-score	ROA	PIF	Z-score	ROA
		Gender			Age			Nationality	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treated	-0.198***	0.152***	0.033*	0.041	-0.238***	-0.070***	0.070	0.291**	-0.136
	(0.032)	(0.023)	(0.020)	(0.030)	(0.023)	(0.020)	(0.274)	(0.117)	(0.092)
# Authorised	0.117***	-0.075***	-0.003	0.142***	-0.074***	-0.005	-0.503	-0.093	-0.015
	(0.030)	(0.019)	(0.017)	(0.026)	(0.021)	(0.018)	(0.305)	(0.156)	(0.109)
Size	0.193***	-0.152***	0.066***	0.113***	-0.116***	0.098***	-0.172	-0.266**	0.205***
	(0.025)	(0.017)	(0.015)	(0.025)	(0.017)	(0.016)	(0.268)	(0.104)	(0.079)
T1 Cap	0.058**	-0.191***	-0.059***	0.070***	-0.050***	-0.032**	0.129	0.028	0.041
	(0.024)	(0.018)	(0.015)	(0.020)	(0.016)	(0.014)	(0.167)	(0.065)	(0.048)
Avg risk weight	0.033	-0.024	0.238***	0.042**	0.051***	0.197***	0.154	0.358***	-0.005
	(0.020)	(0.015)	(0.012)	(0.017)	(0.012)	(0.011)	(0.169)	(0.075)	(0.054)
UK-domiciled	-0.392***	-0.017	0.187***	-0.601***	0.248***	0.209***	-0.599	-0.506***	-0.243*
	(0.042)	(0.039)	(0.029)	(0.037)	(0.031)	(0.026)	(0.778)	(0.173)	(0.133)
Time fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Banks	174	155	177	174	156	177	16	34	41
Observations	3,705	7,184	8,700	3,732	7,333	8,682	52	273	439
R^2	0.114	0.084	0.079	0.145	0.078	0.073	0.620	0.282	0.265

Note: *p<0.1; **p<0.05; ***p<0.01
'Treated' is a binary variable defined as above the mean level of diversity, where the mean is calculated within each quarter.
Observations are weighted to account for the possibility of multiple matches per control observation.
Bank-level clustered standard errors in parentheses. All continuous variables are standardised.

Table A.5: GMM regression results, alternative diversity measures

	Dependent variable:											
	PIF				Z-score				ROA			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Y lag	0.933***	0.931***	0.918***	0.930***	1.088***	1.104***	1.177***	0.980***	0.977***	0.973***	0.983***	0.993***
	(0.020)	(0.021)	(0.023)	(0.020)	(0.136)	(0.132)	(0.090)	(0.108)	(0.025)	(0.028)	(0.020)	(0.029)
Proportion female (exec + oversight)	0.007				0.010				0.001			
	(0.012)				(0.061)				(0.023)			
Blau index		0.007				0.033				-0.003		
		(0.014)				(0.067)				(0.022)		
Female threshold			0.007				-0.075				-0.027	
			(0.037)				(0.111)				(0.043)	
Age IQR				-0.010				-0.009				0.008
				(0.011)				(0.046)				(0.018)
# Authorised	-0.005	-0.004	-0.003	-0.00003	-0.004	-0.004	0.011	-0.002	-0.008	-0.007	-0.005	-0.006
	(0.009)	(0.008)	(0.010)	(0.009)	(0.009)	(0.011)	(0.016)	(0.009)	(0.005)	(0.005)	(0.007)	(0.005)
Size	0.012	0.017	0.019	0.013	0.020	0.021	0.027*	-0.001	0.010**	0.010**	0.010**	0.006
	(0.011)	(0.012)	(0.012)	(0.011)	(0.023)	(0.021)	(0.014)	(0.014)	(0.005)	(0.005)	(0.005)	(0.005)
T1 Cap	0.012	0.013*	0.015*	0.013*	0.021	0.028	0.021*	0.006	-0.002	-0.001	-0.002	-0.002
	(0.008)	(0.008)	(0.008)	(0.007)	(0.021)	(0.023)	(0.012)	(0.012)	(0.008)	(0.008)	(0.008)	(0.007)
Avg risk weight	0.019**	0.020**	0.019***	0.018***	0.012	0.017	0.003	0.007	0.003	0.002	-0.001	-0.002
	(0.007)	(0.008)	(0.007)	(0.006)	(0.017)	(0.018)	(0.010)	(0.004)	(0.008)	(0.008)	(0.006)	(0.006)
Banks	170	170	170	170	151	151	151	151	174	174	174	174
Observations	3549	3549	3549	3549	7434	7434	7434	7434	8692	8692	8692	8692
Sargan	1	1	1	1	1	1	1	1	1	1	1	1
Autocorrelation (1)	0	0	0	0	0	0	0	0	5e-04	3e-04	1e-04	3e-04
Autocorrelation (2)	0.427	0.424	0.439	0.426	0.071	0.06	0.038	0.101	0.027	0.026	0.027	0.036

Note: *p<0.1; **p<0.05; ***p<0.01

Robust standard errors in parentheses. All continuous variables are standardised.

The internal instruments used are two, three and four quarter lags of the dependent variable, as well as one to four quarter lags of each of the diversity variables.

We are unable to include the nationality variable in the GMM estimation due to the high proportion of missing data.

Table A.6: CEM regression results, UK-domiciled banks

	Dependent variable:					
	PIF	Z-score	ROA	PIF	Z-score	ROA
		Gender			Age	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	-0.209***	0.106***	0.083***	0.056	-0.273***	-0.015
	(0.039)	(0.027)	(0.022)	(0.038)	(0.026)	(0.025)
# Authorised	0.189***	-0.037*	0.027	0.173***	-0.106***	0.013
	(0.030)	(0.019)	(0.016)	(0.028)	(0.025)	(0.026)
Size	0.239***	-0.227***	0.044***	0.179***	-0.186***	0.110***
	(0.029)	(0.020)	(0.016)	(0.029)	(0.021)	(0.021)
T1 Cap	-0.133***	-0.223***	-0.022	-0.100***	-0.170***	-0.011
	(0.026)	(0.020)	(0.017)	(0.026)	(0.018)	(0.017)
Avg risk weight	-0.015	-0.094***	0.281***	0.065***	-0.096***	0.302***
	(0.024)	(0.016)	(0.013)	(0.020)	(0.014)	(0.013)
Time fixed effects	Y	Y	Y	Y	Y	Y
Banks	113	98	115	111	97	114
Observations	2,355	5,250	5,909	2,396	5,300	5,936
R^2	0.175	0.105	0.098	0.118	0.122	0.109

Note: *p<0.1; **p<0.05; ***p<0.01

'Treated' is a binary variable defined as above the mean level of diversity, where the mean is calculated within each quarter.

Observations are weighted to account for the possibility of multiple matches per control observation.

Nationality variables are omitted due to number of observations. Bank-level clustered standard errors in parentheses. All continuous variables are standardised.

Table A.7: GMM regression results, UK-domiciled banks

	Dependent variable:								
	PIF			Z-score			ROA		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Y lag	0.920***	0.935***	0.927***	1.389***	1.518***	1.245***	0.946***	1.018***	0.968***
	(0.032)	(0.058)	(0.030)	(0.169)	(0.325)	(0.392)	(0.076)	(0.060)	(0.059)
Proportion female	0.0002			0.010*			-0.001		
	(0.001)			(0.005)			(0.002)		
Female binary		-0.079			0.038			0.083	
		(0.069)			(0.247)			(0.274)	
Age s.d.			-0.003			0.017			0.010
			(0.007)			(0.059)			(0.029)
# Authorised	0.002*	0.001	0.002*	-0.001	0.001	0.0001	-0.0005	-0.0002	0.0001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.0004)	(0.0004)
Size	0.004	0.007	0.003	0.065**	0.039	0.022	-0.0003	-0.004	-0.00003
	(0.005)	(0.006)	(0.005)	(0.027)	(0.028)	(0.035)	(0.008)	(0.009)	(0.003)
T1 Cap	-0.001	-0.001	-0.001	0.010**	0.006*	0.003	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)	(0.005)	(0.002)	(0.001)	(0.001)
Avg risk weight	0.001	0.0005	0.0004	0.014***	0.003	0.002	-0.0001	-0.0004	0.0001
	(0.001)	(0.0005)	(0.0004)	(0.005)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)
Banks	109	109	109	94	94	94	109	109	109
Observations	2249	2249	2249	5273	5273	5273	5858	5858	5858
Sargan	1	1	1	1	1	1	1	1	1
Autocorrelation (1)	0	0	0	0.001	0.0084	0.0382	0.0394	0.0163	0.0276
Autocorrelation (2)	0.279	0.291	0.288	0.027	0.091	0.073	0.22	0.232	0.233

Note: *p<0.1; **p<0.05; ***p<0.01

Robust standard errors in parentheses. All continuous variables are standardised.

The internal instruments used are two, three and four quarter lags of the dependent variable, as well as one to four quarter lags of each of the diversity variables.

We are unable to include the nationality variable in the GMM estimation due to the high proportion of missing data.

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