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ARTICLE

Retail banking closures in the United Kingdom. Are neighbourhood characteristics associated with retail bank branch closures?

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Abstract

The United Kingdom retail banking sector has been through many changes over the past decade, driven by economic, technological and pandemic factors. This is perhaps most evident through the rationalisation of the branch networks, primarily through branch closures. There is a concern that these closures can have differential effects on certain sections of society, reducing or eliminating their access to cash and financial services. In this study we utilise comprehensive branch-level data and a discrete time-hazard model to identify whether certain neighbourhood types have been disproportionally affected by these closures during the period 2015 to 2021. We find that building society branches are least likely to close, and that competition and the presence of alternative banking facilities (including Post Office branches) influence likelihood of closure. Crucially, neighbourhood type matters, with rural communities continuing to be most impacted, along with those where the predominant work activities are less concentrated, or largely absent. However, in contrast to earlier studies, we find that affluent neighbourhoods were more at risk of branch closure than more diverse and economically challenged neighbourhoods. We conclude by considering these findings in the context of recently introduced legislation to protect access to basic banking and cash withdrawal and deposit facilities.

KEYWORDS

closure, disadvantage, great Britain, neighbourhoods, regression, retail banking

1 | INTRODUCTION

Writing in this Journal, Leyshon et al. (2008) found that the geography of bank and building society closures in Britain between 1995 and 2003 disproportionately impacted less affluent neighbourhoods. In many western countries, these closures have continued, with a move in the retail banking sector away from bricks and mortar branches to alternative channels such as telephone and internet services (Dante & Makridis, 2021). In the context of the United Kingdom (UK),

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this trend in the reduction of branches fits in with the general decline of the traditional high street (Wrigley et al., 2015) amid the so-called 'Death of the high street' (Hughes & Jackson, 2015) which has been exacerbated by the COVID-19 pandemic (Enoch et al., 2022; Nanda et al., 2021).

Whilst these branch network reconfigurations are evolutionary and largely driven by commercial considerations (Marshall et al., 2019), the widespread withdrawal of financial infrastructure can have profound social consequences for wider society, potentially resulting in financial exclusion for some communities and groups in the population, such as the less tech-savvy elderly (Cooper, 2016); those living in more deprived or rural neighbourhoods (Brignall, 2019; Langford, 2021); individuals who prefer to have access to cash to help them budget (Jonker, 2016); and the local residential and working population (Bapat, 2017). Small business may also prefer to have a branch close by so they can deposit their cash takings (Baruch & Baron, 2016).

2 | THE UK BANK BRANCH SECTOR: TRENDS AND IMPACTS

Whilst the Prudential Regulation Authority (PRA), the regulatory body responsible for banks and building societies, recognise 160 banks and 43 building societies incorporated in the UK (Bank of England, 2023), the retail banking market is dominated by around 20 retail banks and building societies offering personal and small business banking services, many with a branch network. Consolidation following the 2008 financial crisis has given rise to five major players—Barclays, Santander, NatWest, Lloyds Banking Group and HSBC, who collectively command a 77% share of the retail banking market (Reuters, 2018). All retail banks (owned by shareholders) and building societies (owned by account holders as 'members') offer a similar range of current account, savings, credit card, mortgage and personal loan products. Consequently, there is little to differentiate between the major banking companies from the consumer perspective. New-entrant 'challenger' banks including Starling, Monzo and Chase (typically without a branch presence) may offer more innovative products, but many consumers report a lack of trust or confidence in using less-established companies in this market (Corfe et al., 2021). Whilst a Competition and Market's Authority (CMA) review of retail banking in the UK implemented new open data principals and a streamlined process for consumers to switch to competitor banks (CMA, 2016), customer inertia means that switching rates are low and challenger banks have not presented a major threat to the key players (Thomas, 2021). Additionally, financial services products such as savings and loans are available from a network of over 250 local credit unions (Association of British Credit Unions Limited, 2023)—financial cooperatives owned by their members—and alternative financial service providers (AFSPs) (many with a high-street 'branch' presence) offering high-cost short-term credit (HCSTC) ('payday loans'), cheque cashing and similar services.

As a result of substantial bank branch closures which have been common across developed nations (Saravia, 2021; The Economist, 2017), the UK has one of the lowest rates of bank branches per head in Europe. Loss of bank branches has gone hand-in-hand with the wider withdrawal of UK banking infrastructure (Browning, 2022; Edmonds, 2018), most notably cashpoints (ATMs), with free ATMs reducing by a quarter between January 2018 and May 2022 (LINK, 2022). Many branches that have survived closure have cuts in opening hours and a reduction in the range of in-branch services available, with more specialised functions (such as mortgages and business banking) centralising within larger (predominantly urban) branches (Griggs, 2016).

Poor access to bank branches or lack of services at those branches can result in financial exclusion, with Leyshon et al. (2008) recognising that bank branches are a core point of contact between customers and financial institutions. Withdrawal of in-person banking services can encourage some households, especially those on lower incomes, to turn to credit from AFSPs (Dunham & Foster, 2015; Graves, 2003), often with considerably less preferential rates (Litt, 2021; Nguyen, 2019). Spatial analysis of bank branch closures (often focused in a US context) has coined the term 'banking desert' (Pollard, 1996), denoting neighbourhoods that lack proximate bank branches, often compounded by low incomes, comparatively lower vehicle ownership rates and a lower propensity to use online banking services (e.g., see Hegerty 2020). In the USA, many census tracts representing banking deserts have a greater provision of AFSPs (such as cheque cashing outlets) than bank branches (Dunham, 2019), with those without a regular bank account relying on AFSPs for basic financial transactions and banking services (Dunham et al., 2018). In the UK, declining rates of cash usage and subsequent ATM closures have resulted in the emergence of corresponding 'cash deserts'/'ATM deserts' and inequalities in access to cash (Ceeney, 2019; Tisher et al., 2020). Appleyard et al. (2021) highlight the utility of AFSPs in the UK, with 5.4 m 'payday loans' (worth approx. £1.3bn) in the UK in 2017–18.

The banking sector has made a number of commitments to manage branch closures, including the voluntary introduction of the 'Access to Banking Standard' (Lending Standards Board, 2020) outlining the major banks' commitments to

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engage with communities prior to branch closure, including to help bank users identify opportunities to continue to bank locally. One opportunity is a government-mandated commitment to maintain access to 'universal banking services' via the 11,000 UK Post Office branches (Midgley, 2005), which are ideally suited to the role, with a network of nearly twice the number of branches of all bank and building societies. So, whilst the Post Office branch network has been subject to some closures and rationalisations (Langford & Higgs, 2010), the government has made a pledge to maintain access to Post Office branches, with the publication of a 'minimum network access criteria' (Booth, 2023; Business, Energy and Industrial Strategy Committee, 2020). The Post Office (2022) reports that their branch network actually grew in 2021–22, with overall numbers of Post Offices comparable to pre-pandemic levels. Additionally, and unlike bank branches, Post Offices do not cluster together so are more widely dispersed in the community.

Major banks have also worked together on a pilot scheme to open 'bank hubs', offering a broader range of in-branch services such as mortgages and loans, with 46 more locations identified for this service, enabling consumers to access services from multiple participating banks in a shared branch (Robinson, 2021; Venkataramakrishnan, 2021). Evidence suggests they play an important role in enabling small businesses to bank takings and access change, whilst acting as a footfall generator among consumers, boosting the local retail environment (Barrett, 2021).

Legislation introduced in May 2022 has also given the UK Financial Conduct Authority (FCA) new powers to maintain basic banking infrastructure—the ability to deposit and withdraw cash—in all communities (HM Treasury, 2022). Whilst Post Offices, 'bank hubs' and new legislation may provide ongoing opportunities for in-person banking via traditional means, rapidly growing challenger banks including Monzo, Starling and Chase operate free-to-use online/app-based current accounts without a branch network (Megaw, 2021). The Access to Cash Review (Ceeney, 2019) also identified the potential value of the PayPoint network (payment terminals available within convenience stores) for more widespread access to cash, noting typically long opening hours and their coverage within deprived and rural areas where access to bank branches may be poorest.

Turning to the social and spatial consequences of closures, studies in a UK context typically consider bank branch accessibility in relation to underlying neighbourhood characteristics including urban/rural geography, deprivation and other indicators of neighbourhood type (Langford et al., 2021). In their descriptive analysis, French et al. (2008) offer a historical perspective on varying closure rates in different types of community, finding closures between 1995 and 2003 to be '...both distinctive and regressive' (p. 81), with multicultural, poorer inner-city neighbourhoods more greatly affected than more affluent 'Middle England' areas. Their analysis was subsequently updated using information on branch closures from 2003 to 2012 (French et al., 2014).

In this analysis we update the literature by investigating whether more recent closures have again disproportionately affected certain types of neighbourhoods. To do this, we report on an observational study that examines the characteristics of bank branches which have either closed or remained open and modelling the strength and direction of associations between the risk that a bank branch will close and various neighbourhood attributes. We pose a number of research questions:

RQ1: Are some companies more likely to close branches than others?
RQ2: How important is competition to the risk of bank branch closure?
RQ3: Does having a nearby Post Office impact the risk of bank branch closure?
And the primary focus of this paper:
RQ4: Are some types of neighbourhoods more impacted by bank closures than others?

We use a branch level longitudinal dataset of bank branch closures from 2015 to 2021 in Great Britain, complemented with information on the characteristics of the neighbourhood of the branch, and the competitive retail banking environment. These associations are estimated using a discrete-time hazard model (Singer & Willett, 2003: Part II). Such an approach allows us to jointly account for aspects such as time, company and competition to better distil the varying impacts on types of neighbourhoods (RQ4).

3 | BANK BRANCH NETWORK MODELLING IN THE LITERATURE

There are a number of studies in the literature that have modelled the configuration of bank branch networks to understand the influences and impacts of changes to the network. Some studies model bank branch numbers in aggregate over an area, with the unit of analysis being a city or region, whilst others model at the level of individual bank branches.

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The first part of this review introduces recent studies in this field by their unit of analysis, which is closely linked to the method of analysis. The second section then details the findings of these studies in regard to the covariates used in the models, particularly highlighting how spatial factors and geography are defined and utilised.

3.1 | Unit of analysis and method

We start with the more numerous studies that utilise aggregate (area) data in the context of a changing branch network. In Spain, Alamá and Tortosa-Ausina (2012) model the expansion in the number of bank branches using cross-sectional data at a large municipality geography using both ordinary least squares (OLS) and quantile regression, and in a subsequent study of branch consolidation they incorporated smaller municipalities and used Bayesian techniques to examine the concept of over- and under-branching in certain municipalities (Alamá et al., 2015). In identifying the dynamics of 'banking deserts', Kashian et al. (2018) were naturally inclined towards area level analysis, this time at a US census tract geography, initially using a distance based measure to identify the 5% of tracts that were furthest away from a bank branch, separately for urban, suburban and rural areas. Further analysis compared the composition of banking deserts, using an OLS regression to explore the distance to bank branches as a function of various characteristics. Continuing the theme of banking deserts, Jackowicz et al. (2021) used an OLS model of 267 Polish counties to examine the average yearly growth rate in the number of branches between 2013 and 2018. A panel dataset based on US counties was used by Calzada et al. (2019) to examine the impact of bank mergers pre- and post-Great Recession, using branch density as the measure of banking intensity in a panel regression model. Moving away from an OLS-based analysis, Camacho et al. (2021) used factoring and clustering techniques to identify commonalities and groupings among branchless municipalities in the region of Andalusia, Spain.

Turning to the less common studies that use branch level data, an irregular panel dataset of bank branches was used by Huysentruyt et al. (2013) to explore the presence, entry and exit of individual branches into the banking market of Antwerp, Belgium. Their main finding was that over the 15-year time span (1991–2006) of their study, the intensity of the dynamics in the market increased. Similarly, in their two time period panel data, Martin-Oliver (2019) was able to examine the impact of the 2008 Great Recession on the size and distribution of bank branch networks in Spain, using descriptive statistics and a series of regression models for the growth in distances between branches. Galardo et al. (2021) also considered how the nature of the bank network in Italy was impacted by the Great Recession by comparing the situation between 2007 and 2014 using a linear probability model to estimate the probability that a branch closed between the two dates.

3.2 | Covariates

In the studies cited in the previous section, various covariates are used to explain the number of branches or the occurrence of an event such as a branch closure. These fall into a number of categories and assist in the specification of variables for our modelling. First there is the socio-demographic make-up of the region or neighbourhood of the branch. There is a clear distinction reported between urban and rural locations, with urban banking locations more likely to open or remain open (see Argent and Rolley 2000; Birkin et al. 2002), which also holds true during a sustained period of bank branch closures (Langford et al., 2021). Many studies have also analysed the socio-demographics of the population. Huysentruyt et al. (2013) report that for all three time periods in their study (1991, 1996 and 2001), the higher the proportion of elderly in the population, the more likely there was to be growth in the number of branches within their zones. Using their model of the growth in distance between branches, Martin-Oliver (2019) report a negative parameter associated with the growth rate in the elderly population, so as the elderly population grows, the distances between branches grows less. Langford et al. (2021) highlight that bank branch closures in Wales have disproportionately affected the elderly and disabled groups. There is also a potential influence from having a sizeable ethnic population who may use in-branch services to transfer funds across borders (Cirolia et al., 2022). In a Spanish context, Alamá and Tortosa-Ausina (2012) and Alamá et al. (2015) found a positive influence on the number of branches associated with areas having a greater proportion of foreign born residents, and Huysentruyt et al. (2013) also find a positive association between change in the number of branches and a higher proportion of non-Belgians.

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The population of an area is not just restricted to the residential population, but could also includes the working or daytime population that visits the neighbourhood during the day for work or leisure purposes—therefore, the mix of local employment opportunities (construction/retail/tourism) is sometimes important, with Alamá and Tortosa-Ausina (2012) finding that greater levels of construction, retail commerce (but not retail wholesale) and tourism employment increasing the number of branches.

Socioeconomic variables have also been used, captured in a number of ways, including income, levels of household poverty, local unemployment rates or more indirectly though levels of education or property rental prices. For income, Huysentruyt et al. (2013) found a positive association of income with the growth in the number of branches. For unemployment, Alamá and Tortosa-Ausina (2012) and Calzada et al. (2019) estimate a negative influence for unemployment and Martin-Oliver (2019) found that as unemployment grows, the distance between branches grows.

Geographical classifications (and particularly geodemographic classifications) are also useful as a way to summarise the nature of a neighbourhood since they provide summary indicators of the composition of an area, as opposed to a collection of different attributes or a reduction to a single attribute (e.g., affluence). In bank branch closure research, French et al. (2008) analysed varying closure rates between 1995 and 2003 by different area types, finding closures disproportionately impacted negatively on areas classified as multicultural and poorer inner-city neighbourhoods, findings also reported in Leyshon et al. (2008). This research was revisited in French et al. (2014), looking at closures between 2003 and 2012, and whilst reporting a slower rate of branch closure, they found a continuation of this differential, with areas characterised by high unemployment and social renting having higher rates of closure.

Competition for financial services in the neighbourhood has also been used as a predictor. Given that there is seen to be a viable market for such services, the location and concentration of complementary or competing banking options may have an influence. Galardo et al. (2021) found (in Table 14) that banks were more prone to close where they had relatively close branches owned by themselves, but the equivalent distance to a competitor branch was not a significant influence in closure decisions. Moreover, using an index of competition, Kashian et al. (2018) found that areas that could be considered banking deserts exhibited a high degree of monopolistic character, with the range of banking options severely restricted.

4 | DATA AND METHODS

In this section we introduce the data used for our study and the method of analysis. This includes the data that provides the information on if and when branches close and also covariates.

4.1 | Branch dynamics

This study uses bank operating information provided by the location analytics company Geolytix (Geolytix, 2021); it contains a panel dataset from 2015 to 2021 on the bank branches that were open in 2015 and an indication if the branch subsequently closed. Cleaning of these data is necessary to correct some of the locations provided, re-code branches that were open but in fact were closed, add closed branches that were missing, and finally the removal of some duplicate branches. For data compatibility reasons, only branches in Great Britain (England, Scotland and Wales) are used for analysis, removing all brank branches in Northern Ireland. In these cleaned data, use is made of the closure information, the operating company of the branch, and its location. This locational information is particularly valuable since it allows us to establish the branches neighbourhood and competitive environment (Office for National Statistics, 2022a).

4.2 | Time

In this study the time dimension is years, with the year in which the branch closed being the event of interest. Time is modelled as a discrete sequence of six binary variables to indicate the year, with 2015 being the base year. This formulation allows for flexibility in defining the base hazard function (Singer & Willett, 2003, pp. 369–376).

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4.3 | Branch company

The Geolytix data provide us with information on the company operating the bank. This variable measures the effects that are attributable to the commercial considerations of each company.

4.4 | Country within the UK

Within the UK, certain powers and responsibilities over domestic issues have been devolved to the home nations, which in the context of this study are England, Scotland and Wales (MacKinnon, 2015). To account for any legislative, policy or cultural difference between these home nations, a variable is used that identifies which home country the branch is located within.

4.5 | City/town

Next are a set of variables that capture the social and spatial composition of the branches neighbourhood. The first neighbourhood variable that is assigned to the branch is its location on an urban/rural scale with a classification using a nomenclature of cities, towns or villages (Baker, 2018). This classification is driven by the population size of the neighbourhood and allocates census output areas (OAs), each consisting of approximately 125 households, to be parts of Core Cities (London vs. Other), Other Cities, Large Towns, Medium Towns, Small Towns, and Villages and Small Communities. This is our equivalent of the urban/rural distinction cited in many studies, but with a finer gradation within urban locations, where the same city or town can possess different classifications, for example the local authority of Leeds, which is overall recognised as a Core City, has just 64% of its OAs classed as Core City (Other). This variable allows us to identify a differential in the risk of branch closure by the urban context of the neighbourhood of the branch.

4.6 | Composition of the residential population

The mix of people living in the neighbourhood of the branch can be captured using many demographic and socioeconomic dimensions, for example the age structure, the ethnic mix, the income and wealth distribution, or the housing situation. In order to capture all the elements of these dimensions, an open-source geodemographic classification of residential neighbourhoods is used (Gale et al., 2016). This is based on the outputs from the 2011 UK Census and configured for a Lower Super Output Area (LSOA) geography (Office for National Statistics, 2018a). Here we have chosen the more parsimonious Supergroup level which classifies neighbourhoods as one of: Cosmopolitan Student Neighbourhoods; Countryside Living; Ethnically Diverse Professionals; Hard-pressed Communities; Industrious Communities; Inner City Cosmopolitan; Multicultural Living; or Suburban Living. Whilst this classification of the branch's neighbourhood is not part of the formal impact assessment, there are elements of the classification which touch on the assessment, such as the age distribution of the neighbourhood.

4.7 | Characteristics of working population

Just as the nature of the neighbourhood of the branch can be influenced by the characteristics of the people who live within it, there is also the influence of those who travel and work in the neighbourhood. A classification of workplace zones has been created that categorises groups of workplace zones that share similar characteristics in terms of their workers, workplaces and employment/industry types (Cockings et al., 2015). Initially developed for England and Wales, this was later extended to cover the whole of the UK (Office for National Statistics, 2018b). Use here is made of the Supergroup level, which classifies areas as one of: Retail; City and Business Parks; Metro Suburbs; Suburban Services; Manufacturing and Distribution; Rural; or Servant of Society.

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4.8 | Complementary and competing services

An element in the decision to close a branch is linked to the accessibility of alternative providers. Some of these providers may be complementary and not in direct competition with the bank, whereas others will be companies that are in direct competition. To capture these influences, distances are calculated from each branch to the nearest branch of the same company, the nearest Post Office outlet (locations obtained from Ordnance Survey [2014]), and the nearest competing branch. We use Euclidean (straight line) distances for ease of computation, but recognise that many studies have utilised network distance in capturing the accessibility of bank or Post Office branches (e.g., see Langford et al. 2021; Langford et al. 2022).

Given the dynamic nature of the banking and Post Office networks, these distances will vary by year and are recalculated each year. To capture a diminishing return as the distance increases and to reduce the positive skewness, these distances are used in a log formulation. Our primary expectation is that the closer there is a complementary branch or Post Office outlet then the more likely the branch is to close, with the company hoping to transfer customers to their nearby branch, or provide basic facilities through a local Post Office. Alternatively, if a branch of a competitor company is close by the company may fear losing some customers to this competitor company.

4.9 | Catchment dynamics

Two catchment counts are calculated using the number of jobs and the number of small businesses (<50 employees), with an assumption that smaller businesses are more likely to use branch-based banking services (Baruch & Baron, 2016). For jobs, the Business Register and Employment Survey records the number of jobs (rounded) at the location of an employee's workplace (Office for National Statistics, 2021) and is obtained here at the LSOA geography. The count of small businesses is from the Inter Departmental Business Register (IDBR), recording the number of enterprises that were live at a reference date in March of the year, broken down by employment size band (Office for National Statistics, 2022b) and also published at LSOA geography. These data are obtained from the nomis web site (Durham University, 2022) and vary by year (except for jobs in 2021, which are unavailable and instead the jobs in 2020 are repeated). Recognising that the catchment of a branch would probably extend beyond the immediate LSOA, an inverse distance weighting is applied, where neighbourhoods close by contribute more to the branch catchment than those further away (Shepard, 1968), and using a linear inverse distance weighting function with a power of 2. This is shown in the formula:

$$w(u,v) = \frac{1}{d\left(u,v_i\right)^2}$$

where $w(u, v_i)$ is the weight to use in estimating the count; u is the location of the branch; v_i is the centroid of LOSA i. These counts are positively skewed, so a log transformation is used in the model. The expectation is that the larger these catchment sizes, the less likely a branch is to close.

4.10 | Methodology

These data are analysed using a discrete time hazard model, which estimates the contribution of various covariates to the hazard that the branch will close during a time period. For analysis purposes, these data are arranged in 'branch-period' format, with each branch potentially appearing multiple times in the data. Each year that a branch is open contributes one case and attached to this case is an indicator, 0 if the branch is open for the entire year and 1 if the branch closes during that year. When a branch closes, there are no further cases for this branch. Thus a branch will potentially appear for all seven years with a status of 0 if it never closes; and if it does close, with a status of 0 up until its penultimate year and a status of 1 in its final year.

Once the data are in this 'branch-period' format, the estimation of the parameters in these models can be accomplished using the standard statistical technique of logit-regression.

$$\text{logit}\left(\Pr\left\{\left(y=1|x_1,x_2,\ \cdots,x_n\right)\right\}\right) = \beta_0 + \beta_1 x_1 + \ \cdots\ + \beta_n x_n$$

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where

$$\text{logit}(\pi) = \log\left(\frac{\pi}{1-\pi}\right)$$

and y is the binary outcome (0 = open, 1 = closed); x_j are the explanatory variables, for example time dummies, classifications or distances.

Here these models are estimated in the R package using robust standard errors clustered on the branch (R Core Team, 2020).

5 | RESULTS

5.1 | Descriptive statistics

In this section we provide descriptive statistics on our data. Figure 1 shows the spatial distribution of bank closures between 2015 and 2021. The branches that close are seen to be in various locations—urban, sub-urban and rural (Which?, 2022). Counts of closures by year are shown in Table 1 and we see that at the start of 2015 there are 9374 branches open and by the end of 2021 just 5653 (60%) remain open. The years 2017, 2018 and 2021 were years in which a large number of branches closed, with fewest closures in 2020.

Looking at the number of closures over the seven-year time span by the covariates in Table 2, we see some patterns. The building society companies tend to have lower percentage closures than their more commercial rivals, which is consistent with findings in an earlier study by Marshall et al. (2000). The rate of closure is greater in Scotland and Wales than it is for England. Closure percentages are low in large and Medium Towns, similar in Cities, and highest for branches

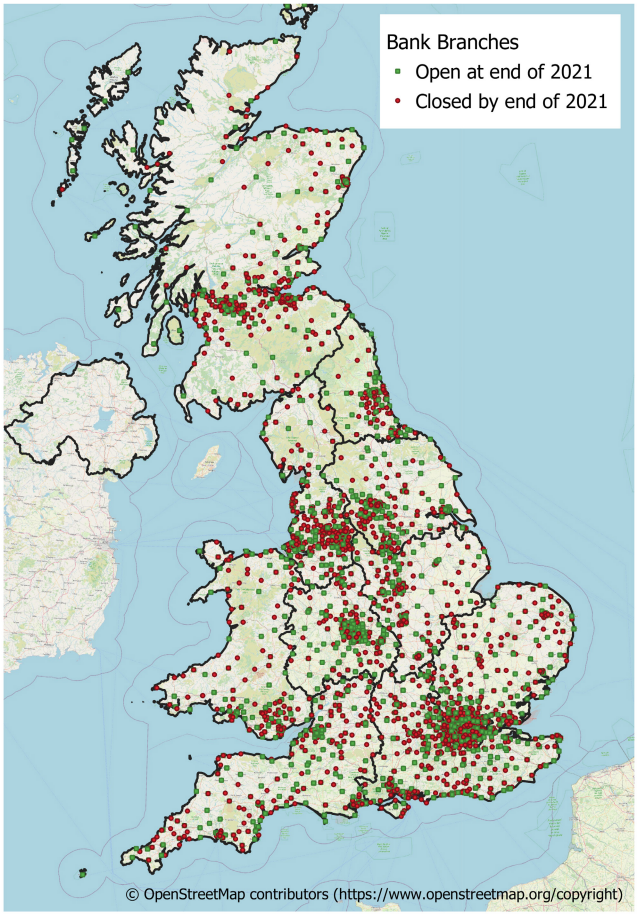

FIGURE 1 Location of bank branches and those that have closed between 2015 and 2021.

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TABLE 1 Statistics on branch closures by year.

Year	Open at beginning	Open at end	Closed at end	Percentage open at start that close
2015	9375	9060	315	3.4%
2016	9060	8574	486	5.4%
2017	8574	7735	839	9.8%
2018	7735	6966	769	9.9%
2019	6966	6529	437	6.3%
2020	6529	6312	217	3.3%
2021	6312	5653	659	10.4%

located in Villages or Smaller Communities. The more urban and cosmopolitan neighbourhoods have the lowest closure rates, and some aspects of affluence or rurality increases closure rates. For the workplace population, branches located in areas where the main work activity is retail have the lowest closure rates, but as the areas become more suburban and rural, the closure rates increase.

5.2 | Model estimates

The estimated model for these data is provided in Table 3. Whilst there is no direct equivalent of the R^2_{adj} statistic normally quoted for OLS regression models (DeMaris, 2002; Menard, 2010), some measures are available to assess the goodness of fit for a model (Osborne, 2014). The Nagelkerke R^2 index has a value of 0.202, which initially appears low compared with OLS models, but good logistic regression models often have low R^2 values compared with OLS models (Hosmer Jr et al., 2000, p. 167). The *c*-index (area under ROC curve) is 0.813, with values above 0.80 indicating excellent discrimination (Hosmer Jr et al., 2000, p. 162). Finally the Brier Score (Brier, 1950), which is an average of the squared prediction errors (akin to a mean square error), is low at 0.058, which is good.

The parameter estimates in Table 3 are the effects on a log odds ratio scale and can be difficult to interpret. What can be interpreted is the direction of influence of the covariate on the risk of bank branch closure. A positive estimate means that as the value of the covariate increases, then so does the risk of closure. A negative parameter estimate means that as the value of the covariate increases, then the risk decreases. We will discuss these findings in the next section and outline some of the mechanisms that may be driving the effects that we are estimating.

6 | DISCUSSION

6.1 | The retail banking environment

It is important to firstly sense-check the control variables, including the companies and the competitive banking environment. In all years after 2015 the parameter estimates for the year dummies are positive and significant, indicating an increase in risk of branch closure after 2015, with smaller increases in 2016 and 2020. These waves are driven by companies undertaking periodic reviews of their branch network and then instigating a batch of branch closures, typically numbering in the tens of branches, and thereafter their network will remain relatively stable. What is perhaps noticeable is the drop in risk of closure during 2020 followed by an acceleration during 2021. There is evidence to suggest that this is in connection with the global COVID-19 pandemic that started in March 2020, possibly driven by uncertainty associated with the pandemic, with some companies deciding to either postpone decisions on closure or implement a temporary closure and wait until a clearer post-pandemic picture has emerged. There is then potential for an accelerated post-pandemic decline in branch networks (see Kreiss [2021] for this scenario in the USA). There is also the possibility that companies may want to pre-empt legislative changes coming into force in 2022, with the UK Financial Conduct Authority gaining the power to fine branks if they leave a community without reasonable access to cash withdrawal and deposit facilities (Markortoff, 2022).

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TABLE 2 Statistics on branch closures by covariate.

	Branches			Indicators	
Covariate	**Open at the start of 2015**	**Closed by the end of 2021**	**Percentage closed**	**Assets £ bn (2021)**	**Employees (2021)**
Company					
Metro	78	0	0.0%	22.6	4184
Coutts	22	0	0.0%	18.2	1721
Allied Irish Bank	15	0	0.0%	12.7	844
Coventry Building Society	70	4	5.7%	54.5	2083
Nationwide Building Society	661	42	6.4%	254.9	18,644
West Bromwich Building Society	37	3	8.1%	6.1	626
Skipton Building Society	95	8	8.4%	29.5	2270
Virgin Money	75	10	13.3%	90.5[b]	7415[b]
Halifax	647	102	15.8%	310.1[a]	23,173[a]
Leeds Building Society	61	13	21.3%	22.5	1361
Yorkshire Building Society	304	73	24.0%	52.7	2354
Bank of Scotland	269	88	32.7%	310.1[a]	23,173[a]
Lloyds	1187	410	34.5%	877.8	57,955
NatWest Bank	1131	477	42.2%	782.0	57,800
Barclays Bank	1305	611	46.8%	1384.3	44,100
Santander	804	378	47.0%	229.1	15,463
HSBC	1017	499	49.1%	346.0	35,000
Trustee Savings Bank	619	331	53.5%	46.7	6137
Clydesdale Bank	128	71	55.5%	90.5[b]	7415[b]
Yorkshire Bank	165	92	55.8%	90.5[b]	7415[b]
Royal Bank of Scotland	480	356	74.2%	106.1	1600
Co-operative Bank	205	154	75.1%	29.3	2598
Great Britain					
England	7847	3030	38.6%		
Scotland	981	451	46.0%		
Wales	547	241	44.1%		
City/Town					
Core City (London)	1242	471	37.9%		
Core City (Other)	800	323	40.4%		

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TABLE 2 (Continued)

Covariate	Branches			Indicators	
	Open at the start of 2015	Closed by the end of 2021	Percentage closed	Assets £ bn (2021)	Employees (2021)
Other City	712	278	39.0%		
Large Town	1622	457	28.2%		
Medium Town	1874	513	27.4%		
Small Town	2212	1060	47.9%		
Village or Smaller Community	913	620	67.9%		
Residential					
Cosmopolitan Student Neighbourhoods	1507	411	27.3%		
Multicultural Living	911	293	32.2%		
Inner City Cosmopolitan	915	295	32.2%		
Hard-pressed Communities	1763	590	33.5%		
Ethnically Diverse Professionals	1623	661	40.7%		
Industrious Communities	2060	1070	51.9%		
Suburban Living	306	195	63.7%		
Countryside Living	290	207	71.4%		
Workplace					
Retail	5108	1524	29.8%		
City and Business Parks	1027	332	32.3%		
Servants of Society	674	275	40.8%		
Metro Suburbs	887	476	53.7%		
Manufacturing and Distribution	140	81	57.9%		
Suburban Services	1016	668	65.7%		
Rural	523	366	70.0%		

[a]Combined for Halifax/Bank of Scotland Group (HBOS).

[b]Combined for Virgin Money Group.

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TABLE 3 Discrete time hazard model results.

	Variable	Estimate	Standard error	Wald *Z*	Pr(>|*Z*|)	Significance
	Intercept	−10.7968	0.3985	−27.10	<0.0001	***
Year	2015	(base)				
	2016	0.6327	0.0758	8.35	<0.0001	***
	2017	1.4486	0.0700	20.70	<0.0001	***
	2018	1.6033	0.0713	22.48	<0.0001	***
	2019	1.2099	0.0786	15.39	<0.0001	***
	2020	0.5795	0.0922	6.28	<0.0001	***
	2021	1.9467	0.0754	25.83	<0.0001	***
Brand	Metro	(base)				
	Courtaulds	0.8199	0.3752	2.1900	0.0289	*
	Allied Irish Bank	1.0553	0.2291	55.8100	<0.0001	***
	Coventry Building Society	7.1630	0.5246	13.6500	<0.0001	***
	Nationwide	7.8021	0.2285	34.1500	<0.0001	***
	West Bromwich Building Society	7.8924	0.6378	12.3700	<0.0001	***
	Skipton Building Society	8.4305	0.4457	18.9100	<0.0001	***
	Halifax	9.0862	0.1996	45.5200	<0.0001	***
	Yorkshire Building Society	9.3481	0.2258	41.4000	<0.0001	***
	Bank of Scotland	9.3472	0.1784	55.1800	<0.0001	***
	Lloyds	9.3726	0.1823	51.4200	<0.0001	***
	Virgin Money	9.4848	0.3648	26.0000	<0.0001	***
	Barclays Bank	9.8443	0.3929	2.6900	0.0072	**
	Leeds Building Society	9.9074	0.3434	28.8500	<0.0001	***
	NatWest Bank	10.1158	0.1804	56.0600	<0.0001	***
	Trustee Savings Bank	10.1768	0.1850	55.0100	<0.0001	***
	Santander	10.3064	0.1785	57.7300	<0.0001	***
	HSBC	10.6343	0.1816	58.5700	<0.0001	***
	Yorkshire Bank	11.0960	0.2259	49.1200	<0.0001	***
	Clydesdale Bank	11.2031	0.2265	41.2700	<0.0001	***
	Royal Bank of Scotland	11.2599	0.1892	59.5000	<0.0001	***
	Co-operative Bank	12.7851	0.2422	46.2600	<0.0001	***
Great Britain	England	(base)				
	Scotland	−0.8909	0.0970	−9.18	<0.0001	***
	Wales	−0.0612	0.0832	−0.74	0.462	
City/Town	Core City (London)	(base)				
	Core City (Other)	0.0063	0.1091	0.0600	0.9543	
	Large Town	0.0231	0.1036	0.2200	0.8234	
	Medium Town	0.0898	0.1043	0.8600	0.3891	
	Other City	0.1960	0.1128	1.7400	0.0823	
	Small Town	0.8078	0.1050	7.7000	<0.0001	***
	Village or Small community	1.1983	0.1264	9.4800	<0.0001	***

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TABLE 3 (Continued)

	Variable	Estimate	Standard error	Wald *Z*	Pr(>|*Z*|)	Significance
Residential	Inner City Cosmopolitan	(base)				
	Multicultural Living	0.2165	0.1120	1.93	0.0532	
	Cosmopolitan Student Neighbourhoods	0.3131	0.1177	2.66	0.0078	**
	Hard-pressed Communities	0.5055	0.1234	4.10	<0.0001	***
	Ethnically Diverse Professionals	0.7112	0.1093	6.51	<0.0001	***
	Industrious Communities	0.7522	0.1245	6.04	<0.0001	***
	Suburban Living	0.7601	0.1448	5.25	<0.0001	***
	Countryside Living	0.8024	0.1626	4.94	<0.0001	***
Workplace	Retail	(base)				
	Servants of Society	0.1757	0.0758	2.32	0.0204	*
	City and Business Parks	0.1946	0.0847	2.30	0.0216	*
	Suburban Services	0.4022	0.0646	6.23	<0.0001	***
	Rural	0.4469	0.0972	4.60	<0.0001	***
	Manufacturing and Distribution	0.4529	0.1563	2.90	0.0038	**
	Metro Suburbs	0.5618	0.0758	7.41	<0.0001	***
Continuous	Same brand	−0.5546	0.0267	−20.76	<0.0001	***
	Competitor brand	0.1255	0.0121	10.36	<0.0001	***
	Post Office	−0.0547	0.0202	−2.71	0.007	**
	Jobs	−0.4248	0.0419	−10.15	<0.0001	***
	Businesses	0.0173	0.0576	0.30	0.764	

Note: Significance codes: 0 '***', 0.001 '**', 0.01 '*', 0.05 '.', 0.1 ' ' 1.

Turning to the companies, Metro, Coutts and Allied Irish Bank closed no branches, so all other companies have a positive effect relative to the base brand, Metro. The only significant merger to have occurred during this time period was between the Virgin Money, Clydesdale and Yorkshire bank companies, with some geographically duplicated branches closing and others coming under the Virgin Money brand (Jackson, 2018). The Co-operative company is particularly notable in its increased probability of closure relative to all other companies, this is a bank that underwent some corporate trauma during this period (Mangan & Byrne, 2018), triggering a keen reassessment of its branch network and financial sustainability. Conversely, mutually owned building societies on the whole appear to be less likely to close a branch compared with the commercial bank companies (see also Marshall et al., 2000).

6.2 | Spatial/geographic factors

All other things being equal and relative to branches located in England, Scottish branches were less likely to close, but Welsh branches were similar in their risk of closure to that for England. Both Scotland and Wales have devolved governments that have powers over a number of matters (MacKinnon, 2015), such as economic development and planning, which could allow for a contrasting policy framework for branch banking. Additionally, Scotland has a history of a banking industry that is distinct to that in the rest of Great Britain (Gaskin, 2013), with a number of bank companies identifying strongly with Scotland.

Relative to branches in the Core City (London), those located in other types of cities or larger towns did not show significantly greater risk, but those in smaller towns or villages did, with a pronounced increased risk for Villages and Small Communities, which continues the trends found in previous UK studies (Argent & Rolley, 2000; Birkin et al., 2002; Langford et al., 2021). Chakravarty (2006) highlights that the trend reported here, which leads to a concentration of

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branches in urban areas, opens up the potential for social exclusion in access to financial services and it is concerning that this has continued the previously identified inequality in closure rates.

Examining the classification of the residential population, which is arguably of primary interest here, all neighbourhood types show significant increase in risk relative to Inner City Cosmopolitan and Multicultural Living. The smallest difference is for Cosmopolitan Student Neighbourhoods, which as the name suggest, are a younger population, located in university cities and towns with high education but limited disposable income. The next neighbourhood with a moderate risk of closure is Hard-pressed Communities, which is the most deprived type, primarily located in industrial towns and includes people living in social rented accommodation and with low ethnic diversity. The remaining four types, Ethnically Diverse Professionals, Industrious Communities, Suburban Living, and Countryside Living, have a similar risk and are all relatively affluent in nature, with their constituent groups described using terms like 'affluent', 'prospering' and 'comfortable'. These results are somewhat counter to our expectation and previous reported trends—that branches located in the more affluent neighbourhoods would be least likely to close. In their studies from 2003 to 2012, French et al. (2008) and French et al. (2014) found that closures more notably impact multicultural and poorer inner-city communities over affluent 'Middle England' areas. What we are potentially seeing here is that during 2015–21, the scope for further closures has shifted now to these previously largely untouched affluent communities, with branch networks in more deprived areas resistant to further closures since they have either already been 'optimised' or are already banking deserts.

We switch now to a characterisation of areas based on the size and composition of the working population. Relative to zones where the dominant activity is *Retail* all workplace zones show an increase in the risk of closure, and all of these increases are significant at the 5% level. This demonstrates that branches located on primary high streets and in city centres benefit from the additional accessibility and viability associated with other activities, particularly retail. This positive agglomeration effect is also seen in the next two types of zone, with Servants of Society zones having their predominant economic activity taking place in the public sector and City and Business Parks having a focus on employment in the information, communication, technology, finance, scientific and technical sectors. These are two types of zones where there is a concentration of high-end employment opportunities, and branches in these zones have the next lowest risk of closure. The next two zones are more heterogeneous, and locations where employment activity takes place are likely to be more disperse. In Suburban Services zones the economic activity is mainly centred around health/social care, construction and public utilities and unsurprisingly, in Rural zones the predominant activities are related to agriculture, forestry and fishing. Zones of the type Manufacturing and Distribution are characterised by a low density of workforce, covering large estates which are a challenge to serve by geographically restricted bank branches. The final zone is Metro Suburbs, which has the highest risk of closure and are characterised by a more transient and less geographically focused employment population, that either work at or from home or are self-employed. Even though their work nominally takes place in the zone, the nature of their work allows them to access facilities in other types of zone during the day if desired.

6.3 | Complementary and competing services

The parameters on distance to the nearest same company branch or Post Office outlet are negative, meaning that the further away these complementary locations are, the lower the risk of closure. This is consistent with our primary expectation that a company may be more willing to close a branch where there is a reasonable alternative for their customers to use and which is not in direct competition. Conversely and also expectedly, the parameter for the distance to a competitor's branch is positive, so the further away the competition is, the more likely the branch is to close. This is a larger effect than that for the negative association with Post Office outlets, suggesting competition is a key concern, perhaps driven by ease of switching accounts (pay.uk, 2022). This may make companies particularly wary of exiting a local neighbourhood that has a strong presence of a competitor company and also seeking reassurance that it will not necessarily be left as the last bank in the neighbourhood.

6.4 | Demand factors

The measure of the number of jobs in the locality is negative and significant, so the more jobs in the vicinity of the branch, the lower the risk of closure. This is what would be expected, with a branch able to serve both the neighbourhood residential and workplace populations. Conversely, the influence from the number of small businesses is positive, counter to our

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expectation, but it is not significant at the 10% level. With banking companies potentially insensitive to these businesses, there may be wider implications for the viability and operation of small businesses in some locations accepting cash.

6.5 | Limitations and further work

In this study we have provided a consideration of the nature of how different types of neighbourhoods and zones have been impacted by bank branch closures. In formulating the model, no account was taken of the potential for companies to open branches. A search of the media for news stories of branch bank openings does provide some instances of new branch openings, but they are not common.

In this study we have used the straight line distance to LSOAs, other branches or a Post Office. Whilst this is the simplest measure, an alternative would be to calculate the actual journey time to these locations, using information on the configuration of the road or public transport network and information on journey times or timetables. In a US context, Boscoe et al. (2012) found that whilst correlations between straight line and road distances can be high (in the region of 0.9), the actual road distances and journey times can be half as long again as the straight line distances.

We have also been unable to capture or model the impact of changes to branch opening hours or cuts to in-branch services on risk of closure. The Geolytix data that we used capture branch opening and closing times by day of the week for approximately 60% of the branches within the database. However, for the majority of closed branches, these data are missing and therefore do not enable us to identify the opening hours prior to closure. Subsequent work could consider the extent to which reductions in branch opening hours, preceding branch closure, are an indication that a branch is at risk of closure. However, it is possible that reductions in branch opening hours may actually maintain the viability of a branch, with examples of the Nationwide building society reducing some branch opening hours in order to maintain the long-term sustainability of that branch (see Nationwide, 2023). We therefore infer that the relationship between branch opening hours and risk of closure is complex and worthy of further investigation.

This study is relevant to the period of study, 2015–21, and describes this phenomenon during that time and also where we were in late 2021. However, caution is required if we try to extrapolate much beyond this time frame. This is perhaps best illustrated by our contrasting findings to those reported in French et al. (2008) and French et al. (2014), who identified that in the period 2003–12 the most affluent areas were least impacted by branch closures, whilst in our study, the more affluent areas were actually the most impacted. To expect any trends in branch reductions to continue is risky given that at some point either there is no more capacity for rationalisation, or all banking companies withdraw and there is no scope for further reductions.

7 | CONCLUSIONS AND RECOMMENDATIONS

Returning to our four research questions, using the model outputs we are able to provide some answers, opinions and recommendations.

7.1 | RQ1: Are some companies more likely to close branches than others?

Yes. Branches that are part of a building society generally have a lower risk of closure than the traditional commercial banks. A company that is undergoing consolidation after a merger shows higher risk of closure. A troubled bank, the Co-operative shows the highest risk of closure. This supports previous work which identified that building society branch numbers remained relatively stable during the 2008–20 study period, in spite of considerable closure of traditional commercial banks (Langford, 2021).

7.2 | RQ2: How important is competition in the risk of bank branch closure?

As anticipated, competition is important (Galardo et al., 2021). Bank companies want to retain their customers by offering alternatives and they are cognisant of the proximity of competing companies. Additionally, companies may be wary of being the last branch to leave a neighbourhood (HM Treasury, 2022).

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7.3 | RQ3: Does having a nearby Post Office impact the risk of bank branch closure?

Yes. Bank branches are on average more likely to close when there is a nearby Post Office outlet that is able to substitute for some of their services. The Post Office network is more extensive in the UK than the combined branch network of all the retail banks (Sonea & Westerholt, 2021), so it can provide a useful alternative for many customers, with coverage typically geographically dispersed across urban and rural areas. However, restricted Post Office opening hours in many rural localities, Post Office closures, and the limited range of banking tasks that can be completed at a Post Office may limit the extent to which the Post Office is a viable substitute for bank branch closures (House of Commons, 2019; Hurley, 2017; Megaw, 2020; Sonea et al., 2019) However, as noted in Section 2, the government has made a commitment to maintain the Post Office network with the overall number of branches increasing in 2021–22, and the overall number of branches stable in comparison to 2015–16 (Post Office, 2022).

7.4 | RQ4: Are some types of neighbourhoods more impacted by bank closures than others?

In short, yes, but at times and in different ways to the findings of previous studies. There is evidence that branches are more at risk of closure in rural neighbourhoods, continuing trends found in previous research, but also now there is increased risk in some affluent neighbourhoods, with the least at risk of closure being branches located in urban cosmopolitan neighbourhoods. In workplace zones where there is a concentration of employment, particularly those that are linked to retail activities or of a high-end nature, the risk of closure is least. The risk is greatest where the employment activity is dispersed, less dense, or in actual fact, taking place elsewhere.

7.5 | Recommendations

Policy on bank branch closures sits within the context of them predominantly being operated by large private corporations, generally acting in their own business interests However, as noted earlier, recent UK Financial Conduct Authority legislation (from 2022) exists to attempt to maintain minimum service levels (HM Treasury, 2022). This is a welcome policy in principle, which will hopefully be stringently enforced, but could be strengthened beyond the requirement for 'reasonable' provision to more specific spatially associated legislation as adopted in other countries—for example, in Spain where places with over 500 participants will have at least one type of financial service provision (e.g., ATM, bank branch, mobile branch). With more nuance, specific neighbourhood types as used in this paper could be used to more comprehensively assess the local context when considering the fairness of branch closures. Demand for cash has increased recently due to the UK cost of living crisis as people control their budgets more tightly (BBC, 2022), emphasising the importance of access to ATMs and other sources of on demand cash.

The UK high street is in a state of flux at the moment, with a range of outcomes from 'gentrification' which can enliven a location (Yee & Dennett, 2022), through to the so-called 'Death of the high street' (Hughes & Jackson, 2015). Whilst there is no quick fix for this later outcome, and retail banking branches seem highly unlikely to buck the trend and operationalise mass openings, it is possible that alternative provision that is less reliant on buoyant high streets could be further expanded, such as mobile branches that go to the customer (e.g., see Natwest, 2023) and/or the expansion of banking hubs with access to a range of services from different providers (LINK, 2023), both of which would benefit from taking into account the geodemographics of previous bank closures when assessing need.

7.6 | Final comment

This study is not the 'last word' in understanding the how, where and when of bank branch closures, but continues a thread of research into this phenomenon. What needs to be recognised in formulating any policy to help in these situations is that we should not 'fight the last war' but recognise that whilst past harm needs to be addressed, new battlegrounds may present themselves. So, whilst Retail workplace zones here have the lowest risk of closure, if the 'Death of the high street' does occur, will bank branches here also be at a heightened risk of closure?

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DATA AVAILABILITY STATEMENT

Due to licensing conditions it is not possible to resupply to third parties the data used that support the findings of this study. However the data are directly available from the sources referenced in the article.

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