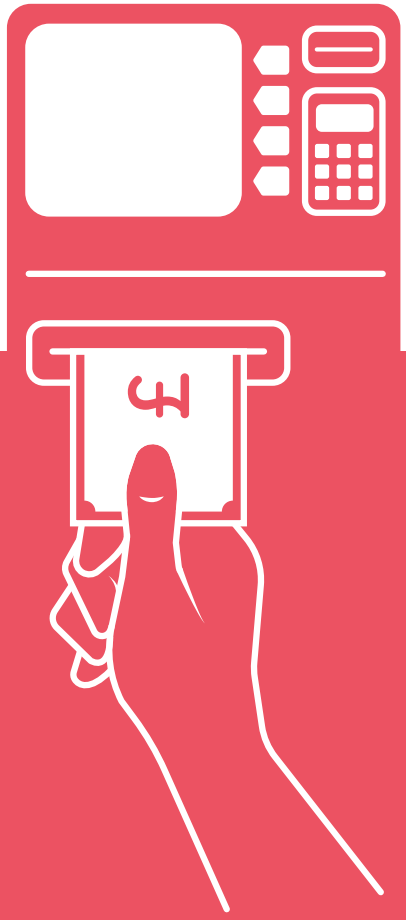
MAPPING THE AVAILABILITY OF CASH



A CASE STUDY OF BRISTOL'S FINANCIAL INFRASTRUCTURE

Authors: Daniel Tischer, Jamie Evans & Sara Davies

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Daniel Tischer, Jamie Evans & Sara Davies
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ABOUT THIS REPORT

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Personal Finance Research Centre (PFRC), School of Geographical Sciences, University of Bristol, University Road, Bristol, BS8 1SS.

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ABOUT THE AUTHORS

Daniel Tischer is a Lecturer in Management at the University of Bristol. His research interests include the study of (global) finance and banking, including ethical banking, retail banking studies and a wider engagement with the mutual and cooperative banking sectors. His most recent work involves applying social network theory and methods to banking, including studies of interorganisational networks, credit derivatives, and currently careers in finance.

Jamie Evans is a Senior Research Associate at the Personal Finance Research Centre (PFRC) at the University of Bristol. He is a social researcher with a background in human geography. His research mainly focuses on ways in which financial services, government and debt advice organisations can best support individuals in vulnerable situations.

Sara Davies is a Senior Research Fellow at PFRC. Her interest is in the intersection between individual behaviour and structural barriers in the relationship between people and finance. Her recent research has been in understanding borrowing behaviour, and in calculating the poverty premium

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FOREWORD

In 1872, Fellows of the Royal Society of Arts, Manufactures and Commerce (the RSA) campaigned to extend Post Office savings accounts beyond the genteel classes to those of more modest means. Payment technologies and the banking system may have changed enormously in 150 years, but ensuring an inclusive financial system remains as important as ever and yet as ever beyond our grasp.

Recent reports from Which? and the Access to Cash Review have argued that we must safeguard universal access to cash as a means of payment. Similarly, the RSA's own work has highlighted the danger of a disorderly dash from cash leaving millions of citizens facing economic and social disadvantage. Yet financial inclusion has cross-party political commitment and the concept enjoys widespread support, at least in principle. How can we close the gap between rhetoric and reality? What does financial inclusion actually mean in practice? How will we know if we have achieved it?

This excellent research from the Personal Finance Research Centre and Bristol Inclusive Economy at the University of Bristol sheds light on these questions. Patterns of financial inclusion are complex and cannot be understood by examining aggregates and averages alone. To see the real picture, we need high resolution images rather than broad brush strokes.

The detailed mapping carried out by Daniel Tischer, Jamie Evans and Sara Davies reveals the stark inequalities within one of England's largest and wealthiest cities. They introduce new ways to measure and track access to cash, a keystone of financial inclusion, and conclude that there is a mismatch between the needs of citizens and current financial infrastructure.

Having read the findings of this research, I expect that all those who champion economic opportunity and fairness will wish to take steps to address these problems. This report provides the data on which to act.

Tony Greenham
Senior Associate, Inclusive Finance at the RSA;
Executive Director, South West Mutual;
Senior Fellow, Finance Innovation Lab

EXECUTIVE SUMMARY

About this report

Following years of bank branch closures, we now observe a similar trend in cash provision more generally through the disappearance of 100s of ATMs each month. As digital payments increase and cash use declines, a future without cash seems almost inevitable. However, in the years, or decades, before this future is realised, it is imperative that those who are digitally or financially excluded are able to continue to access cash.

This is an issue that has received renewed attention of late, with many organisations highlighting the urgency of the issue and the need to protect the UK's cash infrastructure. Such attention – which has predominantly focused on the aggregate number of ATMs, bank branches and other infrastructure – is much-needed. However, in this report we make the case for a greater focus on the *geography* of cash access.

To this end, we map in detail the provision of cash infrastructure for the city of Bristol, constructing a new Index – the *Availability of Cash Index* (or *'AvCash Index'*) – to provide us with a tool to measure access to cash within local neighbourhoods. We also provide some longitudinal insights into recent changes in the ATM network within the Bristol area over the past six months.

Key findings

This report explores in detail the availability of cash infrastructure across Bristol. We find that:

1. Residents ability to access cash is not evenly distributed across the city.
   Cash infrastructure is concentrated in a small number of areas of economic activity, rather than providing "blanket coverage".

2. The provision of cash is almost opposite to the geographical need for it.
   Communities most likely to depend on cash, in particular those who are older or from lower social grades, appear poorly served by current cash infrastructure. Ironically, those who are least likely to need it have best access.

3. ATMs are changing from free to fee-charging, especially in deprived areas.
   16 of the city's ATMs changed from free to fee-charging between October 2018 and March 2019. Over two-thirds of these (11 of the 16 ATMs) were in deprived areas. This appears to be a consequence of traditional banks no longer providing infrastructure in such communities.

4. Residents lack alternatives when ATMs close, malfunction or run out of cash.
   A quarter of ATMs in Bristol have no alternative within 250 metres in the event of their closure or malfunction (equivalent to a potential 500m round-trip). Nearly half (49 per

cent) of fee-charging ATMs have no free alternative within 250m. This may have negative impacts for those with mobility issues and risks creating inner-city cash deserts.

5. Post Offices remain an important component of access to financial services.
We find evidence that the Post Office network is much more evenly distributed than other types of cash infrastructure, which highlights its importance for less well-served communities.

Our research illustrates the complex story behind cash provision, and highlights two key points for future consideration:

- The importance of taking an area- and needs-based approach to ensure *fair* access to cash; it is not enough to produce blanket rules based on measurements of deprivation as this does not account for the heterogeneity of the experience of poverty, or for the different level (and type) of need for cash that various groups will have.

- The extent to which access to cash could or should be considered as a public good, as part of the financial inclusion agenda. The private, non-bank ownership of much of the ATM infrastructure is a major factor in the cost and geographical distribution of provision, which could be countered by better utilisation of institutions such as the Post Office which have a history of state-ownership or more effective regulation of ATM operators. More broadly, this report echoes calls from others – such as the recent *Access to Cash Review* – for urgent action to be taken to guarantee the future of the UK's cash infrastructure for those who still depend on it.

1.

INTRODUCTION: WHY CASH STILL MATTERS

We are heading towards a cashless future. But, for now, cash – and the physical infrastructure associated with it – remains important.

At this point in time, a cashless future seems almost inevitable. As recently as 2006, cash accounted for 62 per cent of all payments by volume, but this had fallen to 40 per cent by 2016 and is predicted to decline yet further to 21 per cent by 2026.[1] Digital payments, meanwhile, are trending strongly in the opposite direction: contactless payments in December 2018 in the UK were 28 per cent higher than the same month in the previous year (at 691 million in total), while the total number of debit and credit card transactions increased by 12 per cent over the same period (to a total of 1.6 billion).[2]

Debates about the merits of such a shift towards digital are ongoing. While there are those who see digital payments as quicker and more convenient than cash, others question what they see as the 'gentrification' of payments: a shift away from informal money practices to the 'forced' use of mainstream financial products.[3] The focus of this report, however, is not on such debates.

Rather, we start from the premise that – for better or worse – things are changing. Much of the UK's physical financial infrastructure has receded in recent decades: around two-thirds of bank branches disappeared over the past 30 years and, while this was initially balanced out by an overall increase in the number of ATMs as more non-bank providers entered the market, these too have since declined, with estimated closures at around 300 per month between November 2017 and April 2018.[4] [5] Such closures are largely driven by ATM providers' fears over profitability, with lower overall demand for cash among consumers and a proposed drop in the interchange fees paid by banks to cash machine providers representing something of a 'perfect storm' for the market.[6] [7]

Such changes may leave some consumers behind, especially if they happen too rapidly. As summarised in the Access to Cash Review's recent final report, *"Britain is not ready to go cashless, because digital payments don't yet work for everyone"*.[8] As the report cites, there are still as many as 1.3 million people in the UK who are 'unbanked' and 2.2 million who report that they only use cash.[9] [10] Such individuals may struggle to manage in a cashless society and many could experience detriment – financial or otherwise – as a result of shifting to digital payments. Indeed, in a survey of 2,000 UK consumers, the Access to Cash Review finds that 47 per cent of the population would find it personally problematic if there was no cash in society and 17 per cent are either unsure of how they would cope or would

[1] UK Finance (2017) 'UK Cash and Cash Machines 2017'. London: UK Finance. In: HM Treasury (2018) 'Cash and digital payments in the new economy: call for evidence'. London: HM Treasury.
[2] UK Finance (2019) 'Card spending'. [website] Available at: <https://www.ukfinance.org.uk/data-and-research/data/cards/card-spending>
[3] Scott, B. (2019) 'Gentrification of payments. Spreading the digital financial net'. Available at: <http://longreads.tni.org/state-of-power-2019/digital-payment-gentrification/>
[4] Kubiak, P. (2018) 'Two thirds of bank branches have closed in 30 years'. Available at: <https://www.yourmoney.com/saving-banking/two-thirds-of-bank-branches-have-closed-in-30-years/>
[5] Collinson, P. (2018) 'Hundreds of cash machines close as UK turns to contactless payments.' Available at: <https://www.theguardian.com/money/2018/jun/29/hundreds-of-cash-machines-close-as-uk-turns-to-contactless-payments>
[6] Shaw, G. (2018) 'Cash machines: Which? warns on communities hit with lack of ATMs'. Available at: <https://www.which.co.uk/news/2018/01/cash-machines-which-warns-on-communities-hit-with-lack-of-atms/>
[7] Pymnts (2018) 'UK Cash Points Close Ahead of ATM Interchange Fee Drop'. Available at: <https://www.pymnts.com/news/banking/2018/uk-cash-atms-fees-link/>
[8] Access to Cash Review (2019) 'Access to Cash review. Final report.' Available at: <https://www.accesstocash.org.uk/media/1087/final-report-final-web.pdf>
[9] Financial Conduct Authority (2018) 'The financial lives of consumers across the UK. Key findings from the FCA's Financial Lives Survey 2017'. Available at: <https://www.fca.org.uk/publication/research/financial-lives-consumers-across-uk.pdf>
[10] UK Finance (2018) 'UK Payment Markets 2018'. In: Access to Cash Review (2019) 'Access to Cash review. Final report.' Available at: <https://www.accesstocash.org.uk/media/1087/final-report-final-web.pdf>

not cope at all.[11] For such people, it is important that physical access to cash continues for as long as possible. Without this access, on current trends, many may find their ability to participate in society greatly diminished.

Such impacts may also extend beyond consumers to affect businesses as well: SMEs in particular rely on local cash-handling facilities, and bank branch closures appear to result in reduced SME lending – which may have significant knock-on effects for local communities and economic resilience.[12]

At present, financial institutions seem to primarily approach access to cash as an issue that the market can resolve. However, it is often those who do not have the purchasing power or the wherewithal to drive markets who are most in need of easy (and free) access to it. Such a 'mismatch between needs and circumstances of low-income households and the markets that serve them'[13] is at the heart of the 'Poverty Premium' – the fact that low income households pay more to access essential goods and services – and paying to access to cash is one constituent of this premium.[14] To begin to address this market imbalance, we need to understand how the availability of cash infrastructures varies across local areas and neighbourhoods.

MEASURING ACCESS: THE IMPORTANCE OF GEOGRAPHY

Understanding physical access to cash is not something that can be achieved solely through a focus on the aggregate number of ATMs, bank branches and other infrastructure. Rather, it is important that we understand the geographical distribution of such infrastructure across the spaces and places in which consumers live their lives.

Geographical approaches towards issues of financial exclusion have been taken in the past. Leyshon *et al* (2008), for example, considered the geography of bank and building society branch closures in Britain, finding that between 1995 and 2003 closures tended to be disproportionately concentrated within poorer areas of the country.[15] Other research has been concerned with the issue of fee-charging ATMs and their propensity to be located within more deprived areas.[16] [17] Such concern led to LINK[18] setting-up their 'Financial

[11] Access to Cash Review (2019) 'Access to Cash review. Final report.' Available at: <https://www.accesstocash.org.uk/media/1087/final-report-final-web.pdf>

[12] Greenham, T. and Travers-Smith, F. (2019) 'Cashing out. The hidden costs and consequences of moving to a cashless society.' London: RSA. Available at:< https://www.thersa.org/globalassets/pdfs/reports/rsa-cashing-out.pdf>

[13] Davies and Finney (2017) Making the poverty premium history; a practical guide for business and policy makers. University of Bristol. Available at: <http://www.bris.ac.uk/media-library/sites/geography/pfrc/pfrc1710_making-the-poverty-premium-history.pdf>

14 Davies, Finney and Hartfree (2016) Paying to be poor: Uncovering the scale and nature of the poverty premium. University of Bristol. Available at: <https://www.bristol.ac.uk/media-library/sites/geography/pfrc/pfrc1615-poverty-premium-report.pdf>

[15] Leyshon, A., French, S., and Signoretta, P. (2008) 'Financial exclusion and the geography of bank and building society branch closure in Britain.' *Transaction of the British Geographer*, 33, pp.447–465. Available at: <https://rgs-ibg.onlinelibrary.wiley.com/doi/pdf/10.1111/j.1475-5661.2008.00323.x>

[16] House of Commons Treasury Committee (2005) 'Cash Machine Charges'. Fifth Report of Session 2004-05. London: The Stationery Office. Available at: <https://publications.parliament.uk/pa/cm200405/cmselect/cmtreasy/191/191.pdf>

[17] Citizens Advice Bureaux (2006) 'Out of pocket. CAB evidence on the impact of fee-charging cash machines.' London: CAB. Available at: <https://www.citizensadvice.org.uk/Global/Migrated_Documents/corporate/47110-cab-out-of-pocket-p4-final.pdf>

[18] LINK is the UK's largest cash machine network to which 'effectively every cash machine in the UK is connected', according to their website at: https://www.link.co.uk/

Inclusion Programme' which aims to ensure that low income areas have at least one free ATM within 1km by subsidising ATM providers in such locations.[19]

While such programmes are welcome, there is a danger, first, that the focus solely on low income or deprived consumers misses other socio-economic groups who may depend on cash and, second, that the 1km radius is too far to expect many consumers to travel – especially in urban areas where the level of car ownership is likely to be lower. Furthermore, there may be substantial challenges in ensuring the continued delivery of such financial inclusion activities, given that the majority of ATMs are operated by private commercial interests with limited social purpose (independent operators such as Cardtronics, Notemachine and YourCash). And whilst ensuring continued access to cash is important, the ability to incentivise or regulate for continued provision may be limited and could in some instances create perverse outcomes.

This report argues that we need more detailed engagement with the geography of physical financial infrastructure – an approach which moves beyond universal geographical 'laws' to consider the lived experience of the population and the way in which it interacts with the cash system on a day-to-day basis. In particular, we hope to understand more about the experience of increasingly marginalised communities within, and on the periphery of, UK cities: those whose access to cash (and other essential services) may at first glance appear healthy due to their relative proximity to city centres and areas of key economic activity, but for whom the daily reality is actually very different.

THIS REPORT

The primary aim of this report is to map various infrastructures of cash access (including ATMs, bank branches, Post Offices and providers of cashback) and construct an index (*'The Availability of Cash Index' or 'AvCash Index'*) that provides a simple geographical overview of access to cash, thereby allowing us to understand differences in access across urban space. We then identify particularly under-served communities by also taking into account their likely reliance on cash. Finally, we identify potentially isolated ATMs – those with limited nearby alternatives – that leave communities most at-risk of being under-served in the event of their closure or malfunction.

While access to cash is also an important issue in rural communities, we focus our analysis on one urban geographical case study: the city of Bristol. As the fourth largest city in the UK by population, Bristol represents a sizeable and important case study[20] – and a place in which issues of financial exclusion have previously been studied, allowing for some longitudinal comparisons to be made.[21] While overall it is a relatively wealthy and long-established city with a high quality of living and low unemployment, it also has areas with some of the highest

[19] LINK (2019) 'Financial Inclusion'. [website]. Available at: <https://www.link.co.uk/initiatives/financial-inclusion/>

[20] Office for National Statistics (2018) 'Major town and city population estimates for mid-2002 to mid-2017'. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/adhocs/009292majortownandcitypopulationestimatesformid2002tomid2017>

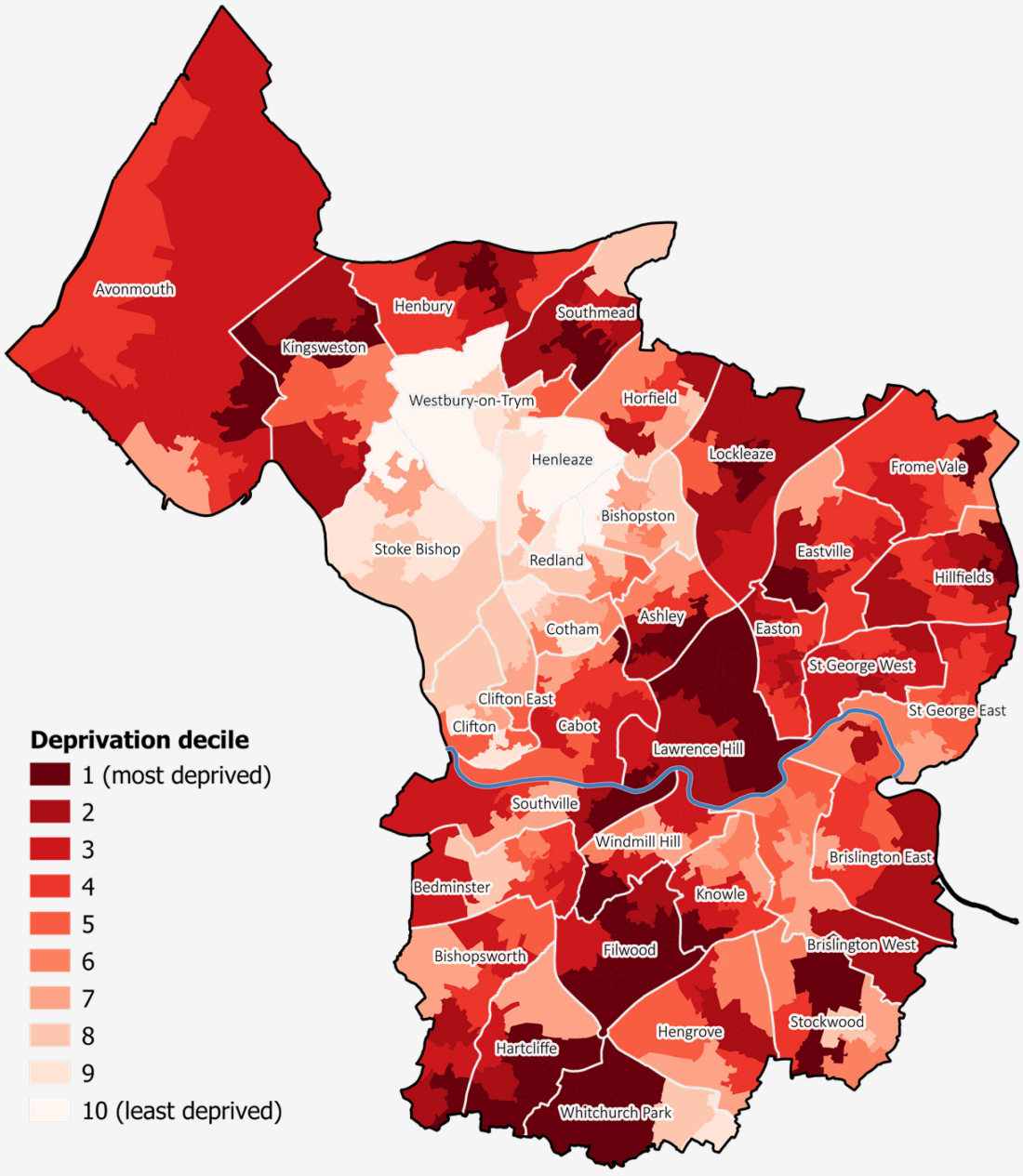
[21] Collard, S., Kempson, E., and Whyley, C. (2001) 'Tackling financial exclusion: an area-based approach.' Bristol: Personal Finance Research Centre. Available at: <http://www.bristol.ac.uk/media-library/sites/geography/migrated/documents/pfrc0104.pdf>

levels of deprivation in the UK – as evidenced by Map 1.[22] The English indices of deprivation provide us with a clear snapshot of the poverty that exists just north-east of the city centre (including parts of Lawrence Hill, St. Jude's and Easton) and towards the city's margins in both the north (Horfield and Henbury) and south of the River Avon (Hartcliffe, Withywood and Whitchurch Park). South Bristol in particular provides an interesting case study of urban social exclusion, with areas such as Hartcliffe known nationally as one of the country's worst 'food deserts', for example.[23]

[22] Ministry of Housing, Communities and Local Government (2015) 'English Indices of Deprivation 2015'. [Dataset]. Available at: <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015>

[23] Corfe, S (2018) 'What are the barriers to eating healthily in the UK?'. London: Social Market Foundation. Available at: <http://www.smf.co.uk/wp-content/uploads/2018/10/What-are-the-barriers-to-eating-healthy-in-the-UK.pdf>

Map 1 – 2015 English Indices of Deprivation deciles in Bristol, by lower-layer super output area (LSOA)



Notes: the deciles shown are *national* in nature, rather than local. Those LSOAs shown in decile 1 are therefore in the 10% most deprived LSOAs nationally.

Please see Appendix 1 for a list of GIS data sources used to produce the maps used in this document.

2.

METHODS: MEASURING ACCESS TO CASH IN BRISTOL

We have mapped different types of physical cash infrastructure and constructed an index to reflect differing provision across the city.

The central goal of this research was to map a range of different types of physical infrastructure for accessing cash and then construct an *Availability of Cash Index* (the '*AvCash Index*') that provides a simple geographical overview of cash access. In this section, we explain our methodological approach.

DATA COLLECTION

Location data was collected for each of the following types of cash infrastructure:

- Free ATMs
- Fee-charging ATMs
- Bank and building society branches
- Post Offices
- Credit union branches and outreach locations[24]
- Supermarkets that offer their customers cashback

Data were collected from the most relevant, available online source. Bank branch locations, for example, were located from the websites of the relevant bank, while the ATM data was obtained from LINK's online ATM locator tool by searching it with a grid of equally-spaced postcodes covering the entirety of the Bristol Local Authority District.[25] For a full list of data sources please see Appendix 2.

The information captured for each type of financial infrastructure differed depending on what was available. However, all included the postcode of the infrastructure, which was then converted to geographical co-ordinates for use in Geographical Information Systems (GIS). Where possible, additional information was captured on opening times and accessibility (e.g. for wheelchair-users).

This study reports findings for data collected in October 2018 for all types of infrastructure. ATM location data were also re-collected in March 2019 to enable a comparison of changes in ATM composition across the city over time, which we report on separately in Section 6.

DATA ANALYSIS

Having collected the data, we mapped the locations of all types of financial infrastructure across Bristol using Geographic Information Systems (GIS). These data were laid over a map of Lower Layer Super Output Areas (LSOAs) – a geographical unit containing between 400 and 1,200 households[26], of which there are a total of 263 in Bristol. A 500 metre radius – deemed by the research team to be the maximum that might be reasonable to expect someone to walk to access cash – was then drawn around the population weighted

[24] Bristol Credit Union operates part-time outreach offices in several community venues across the city, in addition to its main offices.
[25] Where relevant for analysis, data was also collected for financial infrastructure outside of the Local Authority District boundary. This allowed us, for example, to calculate the distance from each LSOA to the nearest bank branch, including bank branches outside of the city's official boundary.
[26] Office for National Statistics (2019) 'Census geography'. [website] Available at: <https://www.ons.gov.uk/methodology/geography/ukgeographies/censusgeography>

centroid[27] of each LSOA (the geographical centre of the LSOA weighted to better reflect the distribution of households within the area). This allowed us to count the number of each type of financial infrastructure within these radii. To construct the AvCash Index for each LSOA, these counts were then multiplied by a corresponding 'score' for each type of financial infrastructure, reflecting the cost and ease of accessing cash via this method. The values assigned to each type of infrastructure, per unit, are given in Table 1 below.

Table 1 – Assigned Availability of Cash 'scores' per unit of cash infrastructure, by type

Type of infrastructure	Scoring (per unit)	Rationale for scoring
Free ATMs	3	Free to use; most likely to be 24h access on street; withdrawals allowed for customers of any account provider
Post Offices	2	Free to use; limited opening hours; withdrawals allowed for customers of a wide range of account providers
Bank / building society branches	1	Free to use; limited opening hours; withdrawals in-branch only allowed for customers
Credit unions	1	Free to use; limited opening hours; withdrawals only allowed for customers
Cashback providers	0.5	'Free' withdrawal dependent on other purchase(s)
Fee-charging ATMs	-0.5	Charge to withdraw money

Therefore, an LSOA with two free ATMs (score of 3, multiplied by 2) and a Post Office (score of 2) would receive a total Index score of 8. Such a scoring system was designed to offer a simple and intuitive way to estimate the ability of people within each neighbourhood to access cash. The scores are based primarily on two factors: first, the cost of accessing cash (with free methods deemed considerably 'better' than those where customers are charged a fee or where access to cash is conditional on a separate purchase); and second, the availability of access. Availability was defined based on the ability to access money at any time (based on the premise that ATMS are more likely to be accessible throughout the night) and regardless of whether you are an account-holder of that particular financial institution. Post Offices therefore score more highly than bank branches because a wide range of bank customers can access funds from their account at a Post Office.

These scores were then mapped at the LSOA-level across Bristol local authority district using GIS. Bivariate and multivariate analyses – in the form of crosstabulations, chi-squared analysis, Pearson's correlations and linear regression – were also conducted so as to understand the neighbourhood characteristics associated with differences in access to cash, primarily using data from the 2011 Census as explanatory variables. All geographic analyses

[27] Office for National Statistics (2016) 'Output Areas (December 2011) Population Weighted Centroids'. [dataset]. Available at: <http://geoportal.statistics.gov.uk/datasets/ba64f679c85f4563bfff7fad79ae57b1_0>

were conducted in QGIS v3.4 (Madeira), while statistical analyses were conducted in IBM SPSS Statistics v24.0.

LIMITATIONS

The scores assigned are based on the subjective assessment of the research team as to the value of different mechanisms for accessing cash. While some residents might place higher value on the ability to access cash 24/7, others may value the greater security of being able to access their money inside a building. Some may see fees to withdraw their money as a small price for convenience, while others simply could not afford them. The scoring system presented reflects a compromise between some of these differing opinions.[28]

Second, it should be noted that the AvCash Index solely reflects people's ability to *access cash*, rather than access other financial services; clearly, branches trump ATMs in terms of their ability to provide many other banking services. Nevertheless, through the range of maps presented in this report, we are still able to comment broadly on geographical differences in access to financial services more generally.

Third, this scoring system does not allow us to consider the 'law of diminishing returns' that might apply to cash access, i.e. the fact that the first ATM in an area plays the most substantial role in improving access to cash and that each subsequent ATM is of decreasing importance. While this is not tackled in the AvCash Index itself, later in the report we do attempt to resolve this by identifying ATMs which are vulnerable – those with few or no alternatives within 250 metres.

Fourth, it was not possible to take into account the flow of residents between areas due to work, education or leisure. Highly mobile residents who live in poorly served areas are therefore likely to have considerably better access to cash than their less mobile neighbours. This means that particular attention should be given to those with mobility issues in less well-served communities – those with no access to a car, in areas with poor public transport links and those with long-term health conditions or disabilities, for example.

Finally, the Index makes no allowances for the fact that infrastructure may break-down or run out of cash, something previously identified in qualitative research as a relatively common issue, especially in places where ATMs are subject to high usage.[29]

[28] Alternative AvCash Index scoring systems were also tested, the results of which are presented in Appendix 3.
[29] Toynbee Hall (2013) 'Qualitative research on access to cash. Final report.' London: Toynbee Hall. Available at: <http://toynbeehall.brix.fatbeehive.com/data/files/Services/Financial_Inclusion/Access_to_cash_-_Qualitative_research.pdf>

3.

TAKING STOCK: CASH INFRASTRUCTURE ACROSS BRISTOL

How does cash access vary across Bristol? How evenly distributed throughout the city are different types of infrastructure?

Overall, at time of data collection (October 2018), across Bristol we find a total of:

- 334 ATMS
  - of which 257 were free-to-use (70 per cent)
  - and 77 were fee-charging (30 per cent)
- 47 bank branches
- 45 Post Offices
- 70 supermarkets known to offer cashback
- Seven outreach locations for Bristol Credit Union

These numbers may appear relatively healthy at first glance. However, Bristol is a city estimated to have a population of around 570,000 – leaving approximately one bank branch per 12,000 people – and the geographical distribution of these infrastructure is also critical. The locations of these infrastructure are given in Maps 3 to 6, but first we present the overall picture of access to cash across Bristol in Map 2. This gives the overall AvCash Index score for each LSOA in the city, based on proximity to each of the types of infrastructure described above.

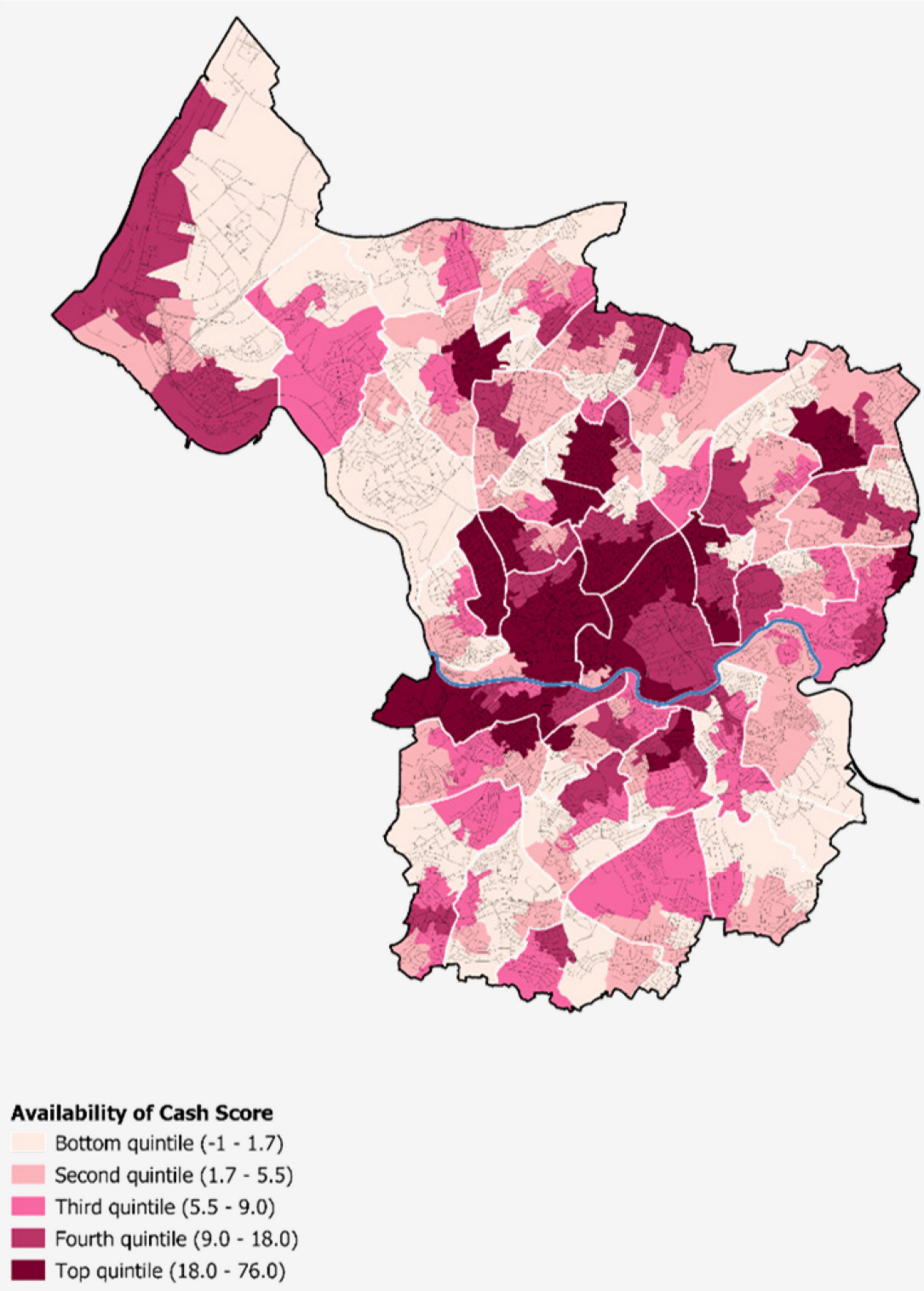
The map makes it immediately apparent that much of the financial infrastructure within the city is spatially concentrated; the centre of the city in particular – Cabot Circus, Broadmead and Bristol Harbourside – hosts a large proportion of ATMs and bank branches. That the city centre has better supply is perhaps not surprising, though the magnitude of the difference between this and surrounding areas is possibly greater than expected. Interestingly too, in this regard the 'city centre' extends slightly south of the River Avon to parts of Southville and Bedminster, which may not have traditionally been viewed as part of the economic heart of the city, but instead may demonstrate the geographic divide of the city into North and South of the River Avon.

In general, the northern half of the city has more financial infrastructure than the south. It is worth bearing in mind that the level of urbanisation beyond the city boundary differs considerably. While there are further significant urban settlements to the north, including Winterbourne and Yate, and Bath nearby to the east, to the south and west of the city border is mainly countryside. It could be argued therefore that a greater level of infrastructure is required in the north to satiate the demands of the wider urban conurbation. Nevertheless, the result is a considerably lower level of supply to the south, which may risk isolation from mainstream services for its communities.

Outside of the city centre there are several 'pockets' of infrastructure, which are located predominantly in local high streets: Westbury-on-Trym, located about three miles to the north and west of the centre, for example, has five ATMs and five bank branches, while Gloucester Road (the A38, north of the centre) and Fishponds Road (the A432, to the north-east) are also well represented. Symes Avenue in Hartcliffe, meanwhile is one of the only

Map 2 – Availability of Cash Index, across Bristol (by LSOA)

Access to cash is considerably better in the city centre, along main roads and in local economic centres



local economic centres in the south of Bristol and even then it is still not as heavily serviced as the aforementioned areas in north Bristol.

Nevertheless this suggests that two factors are of relevance in attracting and/or retaining cash infrastructures outside of the city centre: 1) distance to the city centre and 2) the amount of economic activity along key transport routes in and out of town (A38, A420, A432 and A4018) and local high streets.

GEOGRAPHICAL VARIATION IN DIFFERENT TYPES OF FINANCIAL INFRASTRUCTURE

Maps 3 to 6 give the spatial distribution across Bristol of four different types of financial infrastructure: free ATMs, fee-charging ATMs, bank branches and Post Offices. Darker areas on the maps indicate areas with higher concentrations of each type of infrastructure, which shows quite clearly that in three out of the four maps financial infrastructure is highly concentrated in the city centre. The exception, however, is Post Offices, which are evenly distributed throughout the city.

A nearest neighbour analysis (Table 2) clearly illustrates the different spreads. All infrastructures, bar Post Offices, are less equally distributed than we would expect given the overall numbers. Free ATMs are particularly clustered, not only because of their concentration in Bristol's city centre but also, as noted above, because of their clustering within local areas of economic activities. Post Offices are the only type of infrastructure that – according to their nearest neighbour index – can be interpreted as being relatively regularly spread across Bristol.

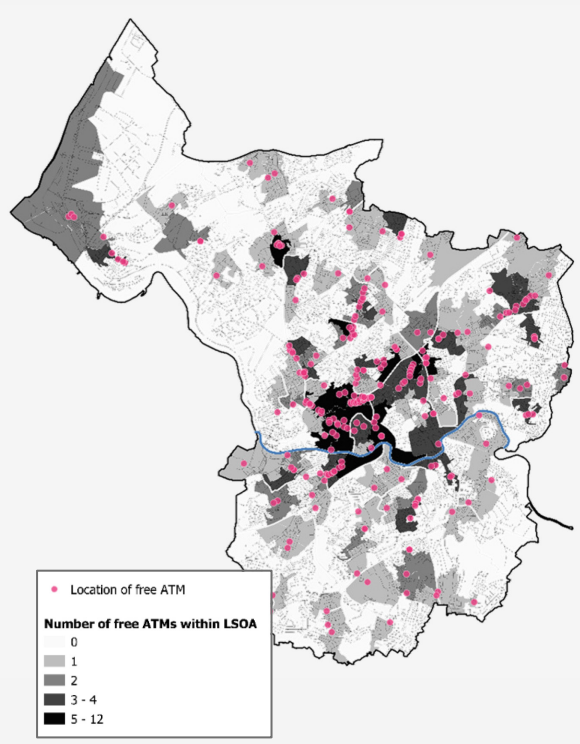
Table 2 – Nearest neighbour analysis for different types of cash infrastructure in Bristol

Type of infrastructure	No. of points	Expected mean distance (m)	Observed mean distance (m)	Nearest neighbour index	Interpretation
Free ATMs	257	381.9	181.7	0.5	Very clustered
Fee-charging ATMs	77	653.6	563.8	0.9	Quite clustered
Bank and building society branches	47	698.4	379.2	0.5	Quite clustered
Post Offices	45	887.3	1045.2	1.2	Quite regular

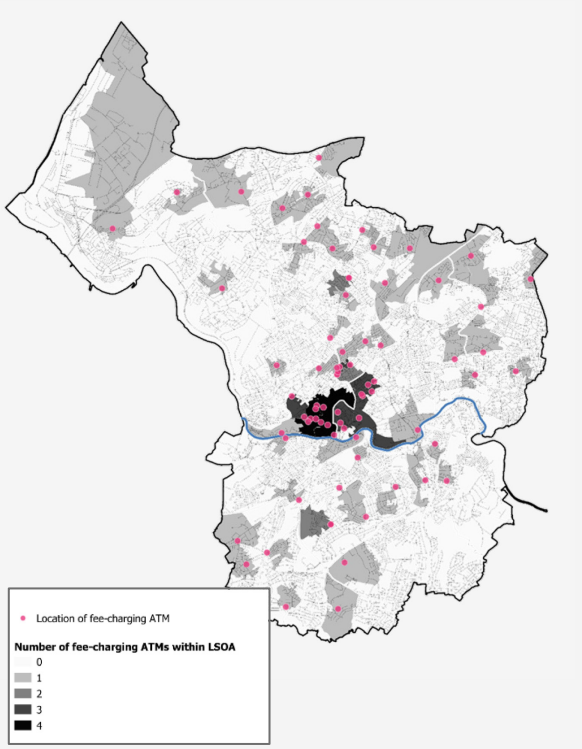
Notes: the Nearest Neighbour Index is calculated by dividing the observed mean distance by the expected mean distance for each type of infrastructure. Values below one are considered clustered, while value above one are considered regular.

Different types of infrastructure exhibit very different spatial patterns

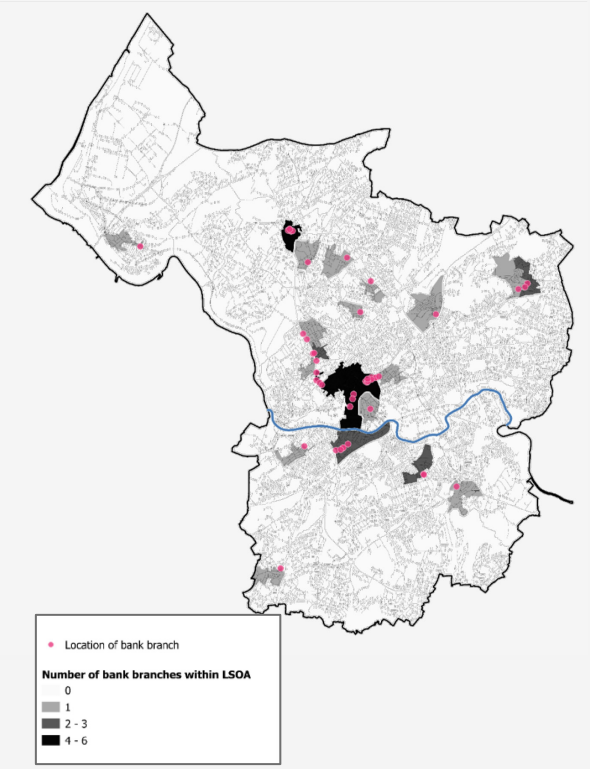
Map 3 – Free ATMs



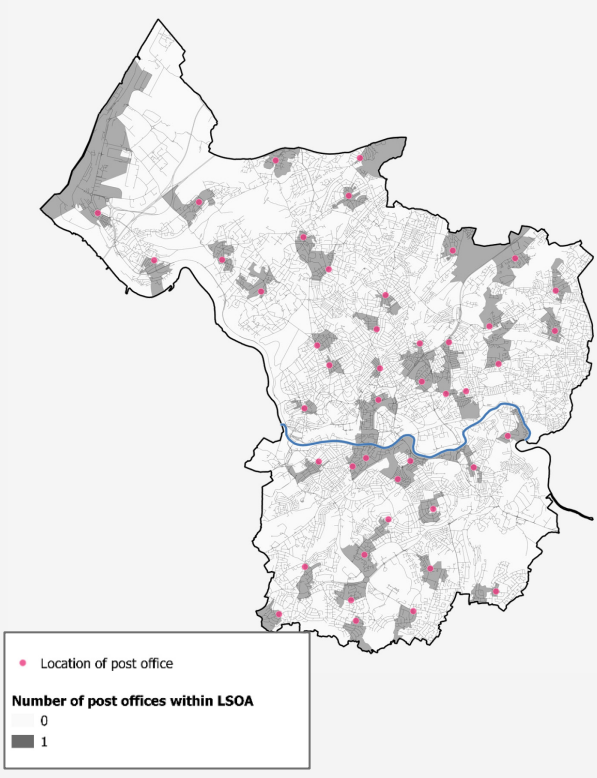
Map 4 – Fee-charging ATMs



Map 5 – Bank Branches



Map 6 – Post Offices



Free ATMs – concentrated in areas of economic activity

There are 257 free ATMs across the city (out of 334 ATMs overall). As the most numerous and most highly weighted constituent of the AvCash Index, the pattern shown in Map 3 largely matches that of Map 2 (our overall AvCash index). The city centre is generally very well catered for and there are further clusters in local suburban centres, most notably Westbury-on-Trym, Gloucester Road and Fishponds. It is also worth noting that the area to the north-east of the centre – around St. Jude's, Easton and Lawrence Hill – has a relatively high number of free ATMs. As discussed in Section 6, following the recent reduction in the interchange fees paid to ATM providers, a considerable number of ATMs in these areas have been turned into fee-charging ATMs.

Fee-Charging ATMs – city centre heavy, plugging gaps in supply elsewhere

Bristol has 77 fee-charging ATMs, representing 23 per cent of the overall number of ATMs in the city. This is a slightly higher proportion than the national average (20 per cent), though probably to be expected in more urban areas across the country.[30]

The highest concentration of fee-charging ATMs by far is in the city centre, as shown by Map 4. The remainder are relatively evenly spread out across the city, though a visual comparison with Map 3 suggests that the spatial distribution of fee-charging ATMs is often simply the inverse of free ATMs. This is particularly evident from the band of fee-charging ATMs that exists to the far north of the city. In other words, fee-charging ATMs appear often to be plugging the gaps in the provision of free ATMs. We can also identify an increased presence of fee-charging ATMs in inner-city areas with concentrations of nightlife, an issue we return to in Section 5.

It is also worth noting an apparent absence of fee-charging ATMs in more prosperous neighbourhoods, such as Westbury-on-Trym. This, at the very least, allows us to question the argument of consumer choice with regards to the use of fee-charging ATMs for added convenience. Again, it appears that fee-charging ATMs are predominantly positioned in areas in which choice is limited.

Bank and building society branches – heavily clustered

Bank branches are also heavily clustered, with the bulk of the city's 47 bank branches located in the centre, along Whiteladies Road in Clifton, in Westbury-on-Trym or in Fishponds. The south of the city meanwhile has just 10 bank branches in total (21 per cent of the overall number). Some parts of Bristol, such as Hengrove and Whitchurch Park in the south (home to more than 17,000 residents[31]), are therefore over 3.5 kilometres away from the nearest bank branch – potentially leaving some residents isolated from banking services, especially if they are also excluded from digital services.

By comparing these results with a previous audit of financial service provision in Bristol in 2001, we see a long-term decline in bank branches in some areas of the city. While residents

[30] According to LINK, at the end of 2017 there were a total of 13,938 fee-charging ATMs in the country, out of a total of 68,771 ATMs overall – representing 20.3 per cent overall. Figures available at: <https://www.link.co.uk/media/1365/constituency.pdf>

[31] Bristol City Council (2018) 'Hengrove & Whitchurch Park. Statistical Ward Profile 2018.' Available at: <https://www.bristol.gov.uk/documents/20182/436737/Hengrove+and+Whitchurch+Park.pdf/24bc4b46-509b-4db8-88a2-34efda4de0e4>

of Barton Hill – a relatively deprived area to the east of the city centre, near Lawrence Hill and Easton – had access to three bank branches nearby in 2001, this access has now vanished altogether.[32]

Opening hours too may represent a challenge for some consumers, with just under a quarter (23 per cent) of branches in the city open only from 9am-5pm Monday to Friday (or less) and 28 per cent not offering any opening hours on Saturdays. Lastly, access to some branches for people with disabilities may also be difficult: while 57 per cent of branches are described as having wheelchair/level access, that suggests nearly four in ten do not. This leaves us with questions as to the extent to which the market is currently catering for those in potentially vulnerable situations.

Post Offices – infrastructure evenly distributed, less so for some banking services

Post Offices are an important part of the financial services system, although often forgotten by consumers, according to research by Citizens Advice, which shows that two in five people are unaware of the banking services offered by the Post Office network.[33] They offer access to a variety of financial services similar to high street banks (cash withdrawals, current accounts, savings, loans, mortgages, insurance etc.).

Looking at Map 6, unlike other financial infrastructure in Bristol, the Post Office network is not spatially clustered; rather, Post Offices are spread out across the city in a much more regular fashion – with no more than one Post Office in any given LSOA. This is the result of the Government's national access criteria for the Post Office network – which stipulate that 99 per cent of the UK population should live within three miles (4.8km) of a Post Office and 95 per cent of the total urban population should be within one mile (1.6km)[34] – and of the fact that the Government contributes a grant in the form of the Network Payment Subsidy to help achieve this goal. This implies that, unlike the current distribution of bank and building society branches, there exists the infrastructure within the Post Office network to provide financial services in a more geographically-even manner across Bristol – and more broadly across the UK. This is something that the Labour Party recently announced they would capitalise on in order to create a national 'Post Bank' utilising the Post Office network.[35] A recent survey of Post Office workers, however, suggests that one-in-five Post Office branches are likely to close or downsize in the next year, due to financial and time pressures.[36]

There is evidence that while all Post Office branches provide access to 'everyday' banking services, not all Post Offices offer the full range of financial services to their customers, as shown in Table 3. Indeed, in the more affluent neighbourhoods to the north of the city centre, Post Offices appear to provide considerably better access to a range of financial

[32] Collard, S., Kempson, E., and Whyley, C. (2001) 'Tackling financial exclusion: an area-based approach.' Bristol: Personal Finance Research Centre. Available at: <http://www.bristol.ac.uk/media-library/sites/geography/migrated/documents/pfrc0104.pdf>

[33] Citizens Advice (2018) 'The Government needs to find out why people aren't banking at Post Offices'. Available at: <https://wearecitizensadvice.org.uk/the-government-needs-to-find-out-why-people-arent-banking-at-post-offices-80d3aa158970>

[34] Post Office (2018) 'The Post Office Network Report 2018'. Available at: <http://corporate.postoffice.co.uk/sites/default/files/Network%20Report%202018%20FINAL.pdf>

[35] The Labour Party (2019) 'Labour sets out plans for radical shake-up of UK banking system'. Available at: <https://labour.org.uk/press/labour-sets-plans-radical-shake-uk-banking-system/>

[36] Monaghan, A. (2019) 'One in five UK post offices could close in next year, survey finds.' [online news article] The Guardian, 15th Apr 2019. Available at: <https://www.theguardian.com/business/2019/apr/15/one-in-five-uk-post-offices-could-close-in-next-year-survey-finds>

services, including current account servicing, savings account ID verification and 24-hour ATM withdrawals.

Table 3 – Different financial services offered by Post Office branches in more affluent parts of Bristol, compared with those in relatively more deprived areas.
Some differences in services offered in affluent and deprived communities.

Deprived / affluent example	Post Office Branch	'Everyday' banking services*	Savings Account ID verification	24H ATM	PO Current Account Servicing
More affluent wards	Clifton Village	Yes	Yes	No	Yes
	Cotham Hill	Yes	Yes	Yes	Yes
	Gloucester Road	Yes	No	Yes	Yes
	Henleaze	Yes	No	No	Yes
	Horfield	Yes	Yes	Yes	Yes
	Westbury-on-Trym	Yes	Yes	No	Yes
	Whiteladies Road	Yes	Yes	No	Yes
More deprived wards	Belland Drive	Yes	No	No	Yes
	Bishopsworth	Yes	No	No	Yes
	Fulford Road	Yes	No	Yes	Yes
	Inns Court Green	Yes	No	No	No
	Knowle Park	Yes	No	No	No
	Loxton Square	Yes	No	No	No
	Melvin Square	Yes	No	No	No
	Symes Avenue	Yes	No	Yes	Yes
	Withywood	Yes	No	No	Yes

*Notes: Post Offices were selected by ward. Wards included in the affluent example were: Bishopston & Ashley Down, Clifton Down, Clifton, Redland and Westbury-on-Trym. Wards included in the more deprived example were: Bishopsworth, Filwood, Hartcliffe & Withywood, Hengrove & Whitchurch Park, and Knowle. *'Everyday' banking services include cash withdrawals, balance checking & ability to pay in money*

Cashback providers & credit unions

Our AvCash Index is also based on the availability of cashback at supermarkets and the location of local credit union outreach centres. Maps of these are given in Appendix 4. A total of seven credit union venues were identified, spread throughout north and south Bristol, although it should be noted that opening hours in four of these centres is very limited; the Barton Hill Settlement outreach centre for Bristol Credit Union, for example, opens only on Thursdays from 1-2pm. Meanwhile, a total of 70 supermarkets that provide cashback were identified across Bristol. The spatial pattern of these largely matches that of free ATMs shown in Map 3 – occurring generally in areas of greater economic activity. We therefore note more venues in the north of Bristol, compared with the south – a finding which matches previous research identifying south Bristol as having a high number of 'food deserts'.[37]

[37] Corfe, S (2018) 'What are the barriers to eating healthily in the UK?'. London: Social Market Foundation. Available at: <http://www.smf.co.uk/wp-content/uploads/2018/10/What-are-the-barriers-to-eating-healthy-in-the-UK.pdf>

4.

THE LOCATION OF ‘LONELY’ ATMS ACROSS BRISTOL

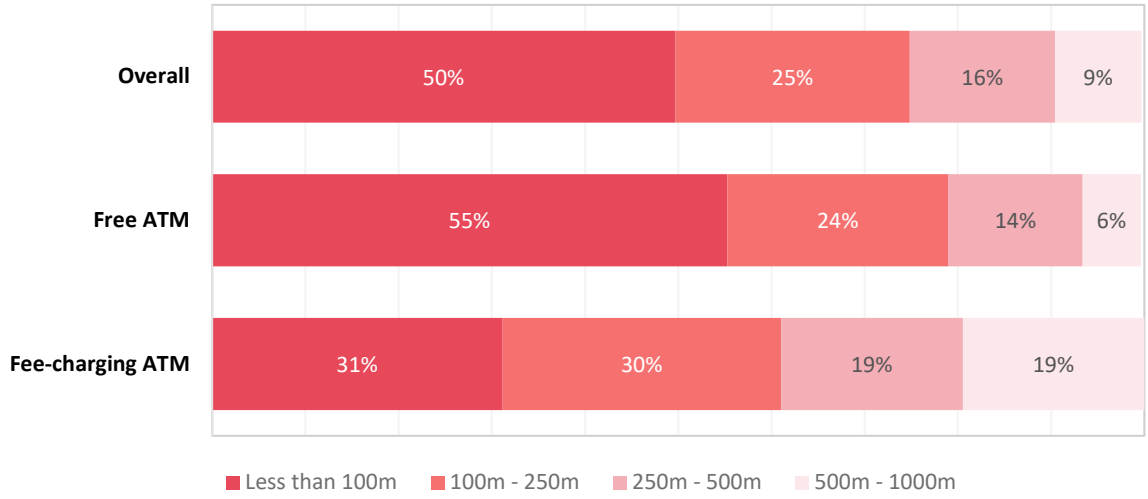
Are certain areas vulnerable to losing their access to cash if cash points with no close alternative either malfunction or close?

We now turn our attention to those parts of the city which are at-risk of losing their access to cash – whether temporarily, in the event of an ATM breaking-down or running out of cash, or permanently, if a machine is removed. ATM malfunction is an issue that has previously been identified as a challenge for financial inclusion,[38] and while LINK protect certain ATMs via their financial inclusion programme, this only applies to those in low income areas which have no alternative within 1000 metres – a distance shown by previous research to be too far for many, especially where health issues, caring responsibilities and crime issues are particularly prevalent.[39]

In this section, we use GIS to measure the distance (as the crow flies) between ATMs throughout Bristol, both free and fee-charging. This allows us to identify those ATMs that are 'lonely' – those which have no alternative within 250 metres – and which are therefore likely to cause considerable inconvenience to consumers in the event of their removal or closure.

Figure 1 – Distance from ATMs to the nearest alternative, by ATM type

A quarter of ATMs in Bristol have no alternative within 250 metres, rising to 38 per cent of fee-charging machines.



'LONELY' ATMS IN BRISTOL

As shown in Figure 1, analysis of the location of all ATMs in and around Bristol shows that while 50 per cent do have an alternative within a radius of 100 metres, a quarter (25 per cent) have no alternative within 250 metres. In theory, this means that many ATM users may be forced to travel more than half a kilometre there and back if their nearest one is not

[38] Toynbee Hall (2013) 'Qualitative research on access to cash. Final report.' London: Toynbee Hall. Available at: <http://toynbeehall.brix.fatbeehive.com/data/files/Services/Financial_Inclusion/Access_to_cash_-_Qualitative_research.pdf>

[39] Sliced Bread Consulting, Collaborate Research & Toynbee Hall (2015) 'How far is too far? Is there low income consumer detriment from gaps in free-to-use ATM provision?'. Available at: <https://financialhealthexchange.org.uk/wp-content/uploads/2015/11/How-far-is-too-far.pdf>

functioning. This may be especially difficult for those travelling on foot, those with mobility problems or those for whom transport is prohibitively expensive.

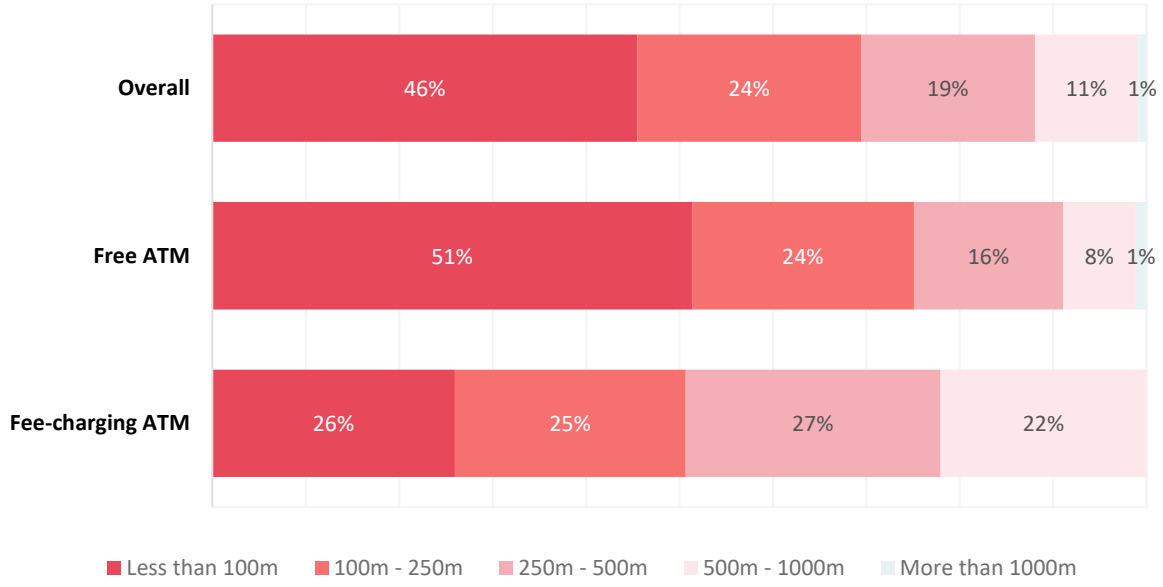
When breaking this down by ATM type, we find that fee-charging ATMs are less likely than free ones to have a nearby alternative, with 38 per cent of such machines having no other option within 250 metres (compared to 21 per cent of free ATMs).

HOW FAR TO THE NEAREST *FREE* ALTERNATIVE?

As shown in Figure 2, the situation becomes slightly more challenging for consumers when one considers only the nearest free alternative. In this case, 31 per cent of all ATMs across Bristol have no access to an alternative free ATM within a 250-metre radius, rising to 49 per cent of fee-charging ATMs. This finding illustrates the strategic placement of fee-charging ATMs in areas where there is limited choice. Having to travel up to a kilometre may pose significant difficulties to those with mobility issues and those without access to private transport.

Figure 2 – Distance from ATMs to the nearest free alternative, by ATM type

Nearly half (49 per cent) of fee-charging machines have no alternative within 250 metres.



5.

WHO IS BEST SERVED BY THE MARKET?

How does access to cash vary between different socio-economic groups in Bristol?

Analyses of the socio-economic and demographic make-up of neighbourhoods across Bristol allows us to determine whether certain types of households/communities are generally being better or worse served by the financial infrastructure network. This is achieved by adding census and other data to our maps at LSOA-level and then taking the average availability of cash score for areas with different characteristics; for example, comparing the average score for LSOAs north of the River Avon with those south of it.[40] Where relevant, we also control for various factors using regression analyses.

DIFFERENCES BY NEIGHBOURHOOD 'TYPE'

We begin by considering differences between six distinct neighbourhood 'types' across Bristol, produced using a statistical technique called cluster analysis – which groups neighbourhoods based on a range of census and other data about their socio-economic and demographic characteristics.[41] In brief, the six neighbourhood types and their population tendencies are:

- 'Squeezed suburbs' – relatively deprived, suburban, largely white population
- 'Deprived and diverse' – very deprived, ethnically diverse, slightly younger
- 'Academic centres' – high proportion of students and educated individuals
- 'Economic heart' – rented housing, many work here relative to number who live here
- 'Middling professional' – quite educated, average in most characteristics
- 'Mature and secure' – older, owner occupiers, low population density, least deprived

Figure 3 gives more information about each of the different types of neighbourhood and shows the mean access to cash scores for each. Map 7, meanwhile, displays the geographical location of the various types of neighbourhood across Bristol.

The 'economic heart' of the city, unsurprisingly, is shown to have very good access to cash on average, although it is important to note that such neighbourhoods are not solely confined to the centre of the city. These are predominantly areas in which a much larger number of people work than the total number of residents who live in the area, i.e. areas into which people commute for work.[42] As such, they are highly commercial areas, likely to have a large number of office blocks, shops and entertainment venues.

Second highest – perhaps more surprisingly – are areas classified as 'deprived and diverse', which have both high rates of deprivation and a high proportion of residents from a non-white ethnic background. This categorisation primarily includes the areas of Easton, St. Jude's and Lawrence Hill, which are located just north-east of the city centre but are in many ways quite distinct from it.

[40] For presentational purposes here, where variables giving area characteristics were continuous/numerical in nature (e.g. distance from the city centre; population density) we have divided them into quartiles and presented the average for each quartile.
[41] Please see Appendix 5 for a description of the cluster analysis used to construct the neighbourhood 'types' and the averages for each neighbourhood type.
[42] Based on University of Bristol analysis of the Business Register and Employment Survey (2017) in combination with 2011 Census data. BRES data available at: <https://www.nomisweb.co.uk/datasets/newbres6pub>

Figure 3 – The six neighbourhood 'types' in Bristol and their average characteristics and availability of cash (higher scores indicate better access)

Squeezed suburbs

(40% of LSOAs)

Mean AvCash Index score: 7.1

Deprivation Rank:	6,346
Pop. density:	48
Median age:	35
No. of people who work here per adult resident:	0.39
Students:	4%
White:	87%
Owner-occupier:	51%

Deprived and diverse

(8% of LSOAs)

Mean AvCash Index score: 22.2

Deprivation Rank:	1,940
Pop. density:	97
Median age:	29
No. of people who work here per adult resident:	0.66
Students:	8%
White:	49%
Owner-occupier:	25%

Academic centres

(8% of LSOAs)

Mean AvCash Index score: 18.4

Deprivation Rank:	21,113
Pop. density:	107
Median age:	27
No. of people who work here per adult resident:	0.52
Students:	24%
White:	89%
Owner-occupier:	40%

Economic heart

(5% of LSOAs)

Mean AvCash Index score: 29.0

Deprivation Rank:	11,294
Pop. density:	43
Median age:	27
No. of people who work here per adult resident:	6.79
Students:	24%
White:	74%
Owner-occupier:	30%

Middling professional

(20% of LSOAs)

Mean AvCash Index score: 11.6

Deprivation Rank:	20,131
Pop. density:	83
Median age:	33
No. of people who work here per adult resident:	0.33
Students:	7%
White:	88%
Owner-occupier:	62%

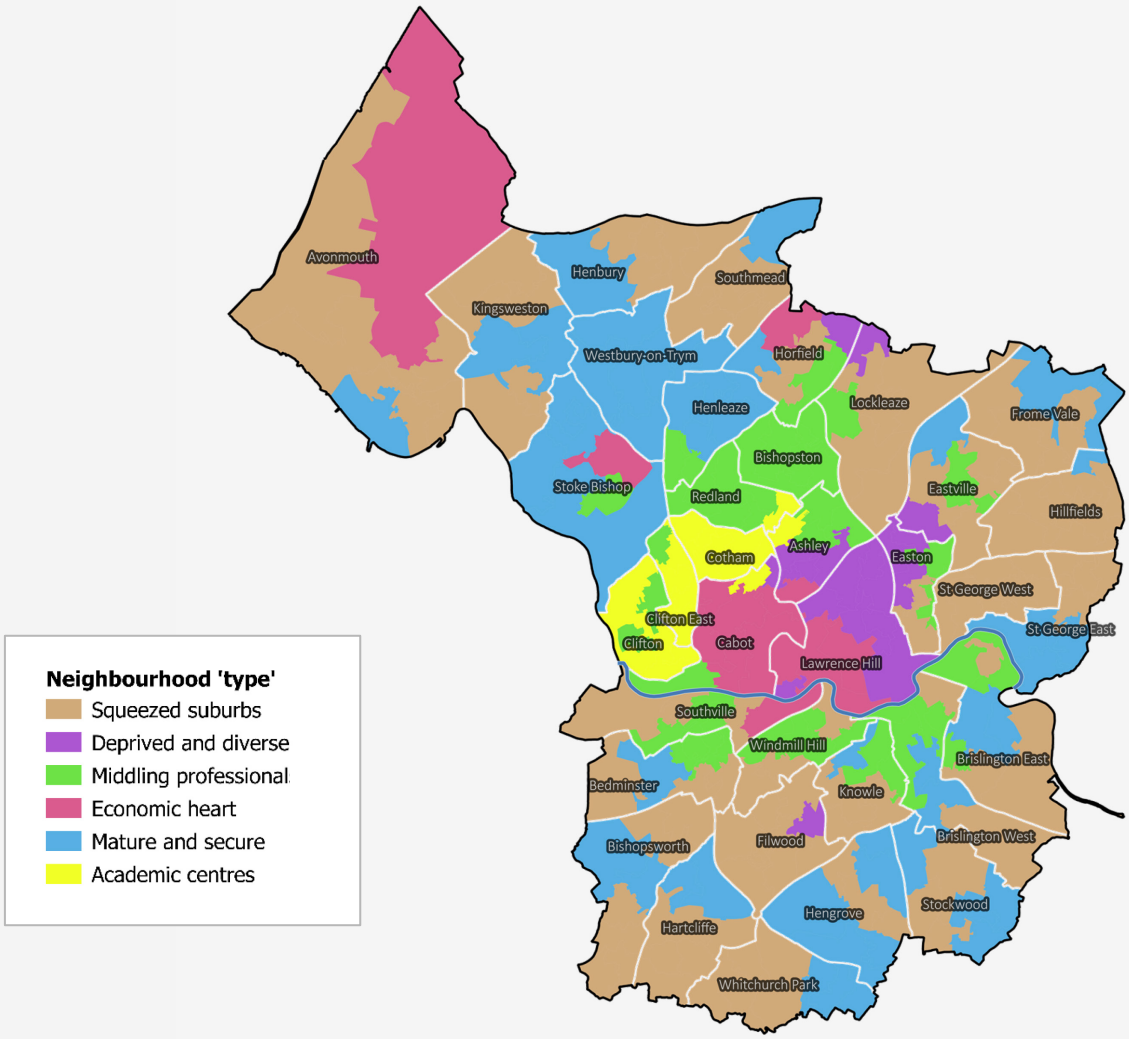
Mature and secure

(20% of LSOAs)

Mean AvCash Index score: 5.4

Deprivation Rank:	21,681
Pop. density:	37
Median age:	43
No. of people who work here per adult resident:	0.35
Students:	3%
White:	93%
Owner-occupier:	81%

Map 7 – Geographical distribution of the six neighbourhood 'types' across Bristol



It is interesting to note that 'deprived and diverse' neighbourhoods on average have far better access to cash than neighbourhoods in the 'squeezed suburbs' category, which are also generally deprived but have much lower numbers of non-white households. This raises an interesting question about the nature of services being provided within different types of communities. The more ethnically diverse communities bordering the city centre to the north-east are well serviced for cash access, yet there is a general absence of financial infrastructure provided by banks. Most ATMs in this area, whether free or fee-charging, are based within or outside of local, independent convenience stores and generally run by private non-bank ATM operators. In this type of area, there are a relatively high number of these stores, leading to a higher than expected number of ATMs. The 'squeezed suburbs', meanwhile, are more often served by mainstream supermarkets but at considerably less frequent intervals, leading to a generally lower level of access to cash in such areas.

Areas classified as 'academic centres' – with high levels of students and people educated to degree-level – and those neighbourhoods with 'middling professional' both score reasonably well, with the former slightly outperforming the latter. Those in the 'academic centres' category primarily comprise the areas around Clifton and Cotham, while the 'middling professional' areas are slightly further out from the centre and include places like Redland, Bishopston, Southville and Windmill Hill.

The neighbourhood types with the lowest access to cash are the 'secure and mature' and 'squeezed suburbs' categories. The first generally comprises relatively well-off, slightly older residents and the second includes relatively deprived, largely white neighbourhoods. These areas are generally suburban and distributed randomly; however, there is a cluster of 'secure and mature' neighbourhoods towards the northwest of the city centre spanning the relatively affluent neighbourhoods of Stoke Bishop, Westbury and Henleaze. In contrast, south of the river and to the east of the city neighbourhoods are more likely to be characterised as 'squeezed suburbs'. While both 'types' have relatively poor access to cash, there is a question of who is most likely to be negatively affected. On average, those in 'secure and mature' areas seem better able to handle this: for example, while just 14 per cent of households in such areas have no access to a car, this rises to 31 per cent in the 'squeezed suburbs'. Public transport links, too, are likely to be more of an issue in some areas than others. Such issues clearly need to be taken into account when examining access to cash.

DIFFERENCES BY DETAILED SOCIO-ECONOMIC CHARACTERISTICS OF NEIGHBOURHOODS

Looking in more detail at the characteristics associated with differences in the availability of cash infrastructure within LSOAs across Bristol in Tables 4-6, we find that most high-scoring characteristics are all largely associated with being at the heart of the city's economic and cultural centre as highlighted in the score for 'City Centre' at 30.4 (Table 4). Neighbourhoods with small distance to the city centre, low median age and high population density also score highly, as do areas with high proportions of private renters, low car ownership, diverse background, students and singles. We also note considerable differences in average AvCash Index scores between the north and south of the city, with those north of the River Avon scoring almost twice as high. It is also particularly concerning that areas with the highest level of long-term health conditions and disability among residents tend to have poor access to cash.

Even when the city centre itself is removed from analysis these patterns persist strongly (see Appendix 6). Nevertheless, when controlling for all of these various factors in a regression model, we find that the two strongest predictors of the availability of cash are population density and the proportion of households with no car – both of which might be seen as characteristics associated with city centre, high-rise living (see Appendix 7).

Table 4 – Mean Availability of Cash score, by LSOA characteristics

City centre living associated with highest ability to access cash

LSOA characteristics		Mean Availability of Cash score
North or south of the River Avon?	North	12.5
	South	7.6
City centre or not?	Not city centre	10.1
	City centre	30.4
Distance from centre of the LSOA to the city centre	Less than 2.27km	21.5
	2.27 - 3.79km	10.0
	3.79 - 5.10km	5.5
	More than 5.10km	6.3
Population density	Less than 36.7	5.1
	36.7 - 53.8	9.0
	53.8 - 77.4	9.5
	More than 77.4	19.6
Indices of Deprivation decile (where 1 is most deprived)	1 - 2	10.9
	3 - 4	11.3
	5 - 6	10.7
	7 - 10	10.3
Ratio between the number of employees who work in the LSOA and usual adult population	Less than 11.5%	6.9
	11.5 - 23.7%	9.6
	23.7 - 57.4%	9.5
	More than 57.4%	17.2
Median age of population	Less than 31	21.0
	31 - 34	10.7
	34 - 39	6.7
	More than 39	5.4
Overall average		10.8
N (number of LSOAs)		263

Table 5 – Mean Availability of Cash score, by characteristics of households in LSOAs

Proportion of households within LSOA that:		Mean Availability of Cash score
…are owner-occupied	Less than 42%	19.8
	42 - 57%	7.7
	57 - 70%	9.5
	More than 70%	6.3
…are socially rented	Less than 5%	10.3
	5 - 15%	12.0
	15 - 31%	10.6
	More than 31%	10.5
…are private rented	Less than 10%	4.4
	10 - 18%	5.8
	18 - 31%	11.6
	More than 31%	21.6
…have no car	Less than 19%	6.2
	19 - 26%	9.7
	26 - 35%	10.0
	More than 35%	17.4
Overall average		10.8
N (number of LSOAs)		263

Table 6 – Mean Availability of Cash score, by characteristics of residents in LSOAs

Proportion of population within LSOA that are:		Mean Availability of Cash score
… from a white ethnic background	Less than 81%	16.4
	81 - 90%	10.9
	90 - 93%	9.4
	More than 93%	6.1
…students	Less than 3%	7.1
	3 - 4%	7.5
	4 - 8%	10.4
	More than 8%	19.2
…educated to degree level or above	Less than 16%	6.1
	16 - 28%	8.2
	28 - 49%	16.1
	More than 49%	13.1
…single or have never married	Less than 35%	5.5
	35 - 42%	5.7
	42 - 56%	11.8
	More than 56%	20.3
…living with a long-term health condition or disability	Less than 13%	17.7
	13 - 17%	11.1
	17 - 21%	7.9
	More than 21%	6.6
Overall average		10.8
N (number of LSOAs)		263

THE RELATIONSHIP BETWEEN ATM AVAILABILITY AND DEPRIVATION

As shown in Table 4, there appears to be no significant difference in the mean score for areas in different deciles of the indices of deprivation: while those in the bottom quartile of deprivation in Bristol have an average AvCash Index score of 10.9, this actually falls very slightly to 10.3 among those in the top, least deprived quartile. This is encouraging, at first glance, as it suggests that deprived areas have equivalent access to cash on average to more affluent areas. Some of this may well be the result of LINK's financial inclusion programme, which subsidises operators of protected ATMs in low income areas.

As suggested earlier by our comparison of neighbourhood 'types', however, there appear to be qualitatively different experiences of accessing cash in areas that are similarly deprived but with slightly different population compositions. As noted, neighbourhoods that are 'deprived and diverse' score relatively well (22.2), whereas the 'squeezed suburbs' score very poorly (7.1). Given that areas in the former category tend to be more central, this reflects the idea that experiences of deprivation are not homogeneous across all spaces – geographic location matters substantially. The interaction therefore between deprivation and living far from the city centre is an important one, with the suburban deprived being considerably less likely to have sufficient access to the services they require.

When looking at specific types of cash infrastructure, we do find some evidence that deprived areas tend to have a higher number of fee-charging ATMs than less deprived neighbourhoods (correlation of -.144 (p=0.02) between the number of fee-charging ATMs in an LSOA and the deprivation rank, where less deprived LSOAs are ranked higher). Furthermore the strength of this correlation increases slightly when removing the city centre from the analysis (-.154, p=0.01). A similar pattern, however, is also found for free ATMs, with more deprived neighbourhoods tending to have marginally higher numbers of cashpoints than less deprived ones (-.128, p=0.04 or -.142, p=0.02 when excluding the city centre).

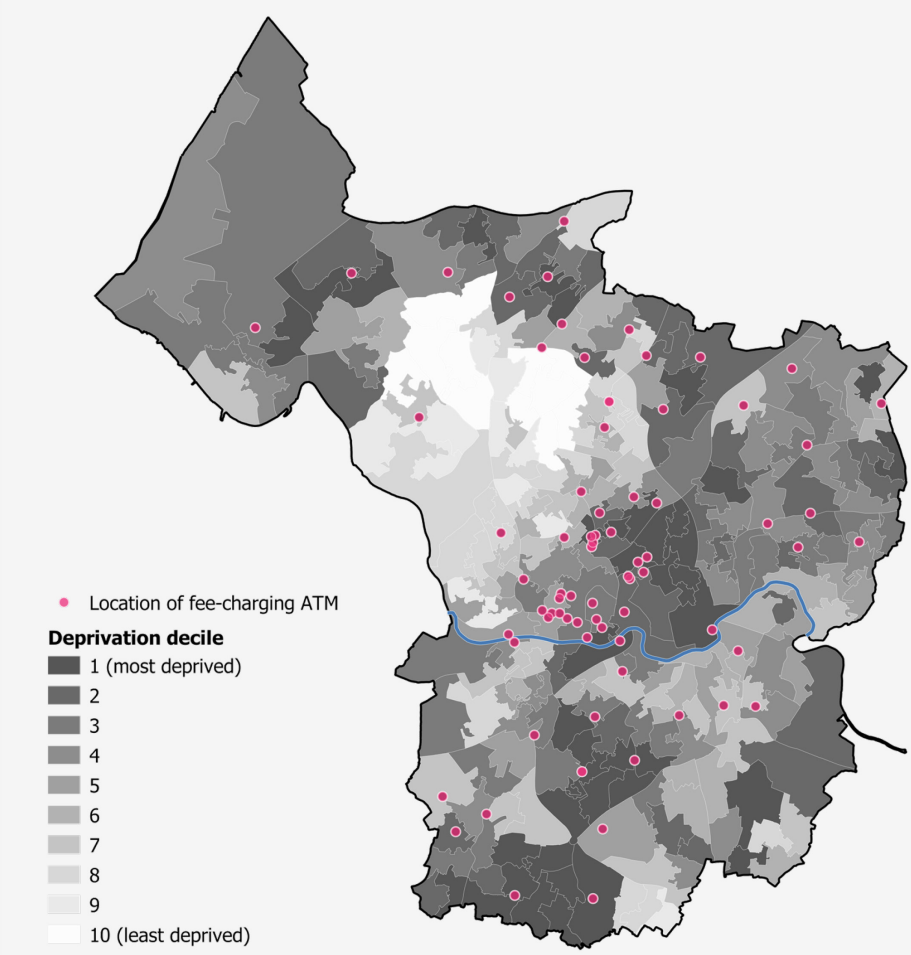
In Map 8, we give the location of fee-charging ATMs overlaid on a map of deprivation. This reveals two particular geographical patterns:

1. Fee-charging ATMs, unlike free cashpoints, are almost non-existent in affluent neighbourhoods. This suggests that high streets in less deprived areas are already sufficiently catered for by free infrastructure. It means that, while fee-charging ATMs aren't necessarily confined to the *most* deprived neighbourhoods, they are largely confined to the more deprived half or so of neighbourhoods.
2. Particularly in the city centre, fee-charging ATMs cluster around areas with heightened presence of bars and clubs – in particular, the areas surrounding Queen and Millennium Square, Stokes Croft and Old Market.

Whilst the presence of fee-charging ATMs in entertainment spaces may be little cause for concern, their presence in more remote locations which also happen to be deprived is more worrying. It suggests that such areas risk being forgotten in terms of the provision of free infrastructure, representing the possibility of a 'poverty premium' for more deprived communities.

Map 8 – Fee-charging ATMs and deprivation across Bristol

Fee-charging ATMs are almost non-existent in least deprived areas



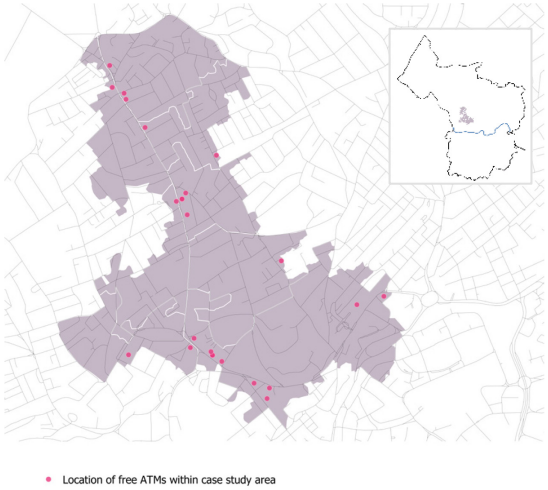
ATM OWNERSHIP AND DEPRIVATION

Much as there are different constituent parts of the market for providing people access to cash (ATMs, bank branches, post offices, etc.), it is also wrong to treat the ATM market itself as a single entity. Indeed, since the early 2000s, there has been dramatic growth in private non-bank providers of ATMs – which operate in different ways to the banks, often ending up in very different types of area to bank-owned ATMs. This is evident from Figure 4, which compares ATMs in two parts of the city which have similar levels of access to cash overall but which are quite different in terms of their level of deprivation: 1) Whiteladies Road and Queens Road, Clifton; and 2) Stapleton Road, Easton.

Figure 4 – Comparing ATM access, ownership and services in two parts of Bristol

Non-bank ATM providers more likely in deprived areas

Whiteladies Road and Queens Road, Clifton



AvCash Index score:	32
Average LSOA deprivation rank:	21,262
No. of ATMs:	24
% of ATMs that charge:	0%
% of ATMs non-bank owned:	29%
% of ATMs dispense £5 notes:	25%
No. of bank branches:	9

Stapleton Road, Easton

AvCash Index score:	30
Average LSOA deprivation rank:	2,638
No. of ATMs:	19
% of ATMs that charge:	0%
% of ATMs non-bank owned:	89%
% of ATMs dispense £5 notes:	0%
No. of bank branches:	0

As already mentioned, both areas score similarly in terms of access to cash on our AvCash Index; however, when looking at ATM provision in more detail, striking differences between the two emerge:

- Ownership of ATMs in the Stapleton Road area is mainly through private non-bank providers – dominated by Cardtronics and NoteMachine. 17 of the 19 ATMs in this area are owned by non-bank providers, while the remaining two are run by the Bank of Ireland at Post Offices.
- This is in stark contrast to the Whiteladies Road and Queens Road area, where 17 of 24 ATMs are owned by traditional banks (including one Bank of Ireland ATM at a Post Office).

- Furthermore, this area in Clifton has a total of 9 bank branches, compared with none in the Stapleton Road area.
- In terms of services provided at ATMs, none of the ATMs in Stapleton Road dispense £5 notes – despite its higher level of deprivation potentially indicating greater need for smaller withdrawals – whereas six do in the Whiteladies Road and Queens Road area.

As there is no marked difference in overall AvCash Index scores for these two areas, it may appear that there is little difference between the two cases and that ATM ownership is an irrelevant factor to be considered here; however, as we shall see in the next section, different types of owners are liable to react very differently to market conditions – a fact which may detrimentally affect some consumers.

6.

RECENT CHANGES IN ATM PROVISION

How has ATM provision in Bristol changed in the last six months? Are changes to interchange fees having an effect on communities?

In order to test the extent to which ATM provision in Bristol is stable over time, in addition to the data collected in October 2018 we also re-collected ATM location data in March 2019. Worryingly, comparison of this data shows some significant changes, whereby – in a fairly short space of time – a significant number of free-to-use ATMs have been replaced by fee-charging ones. This is shown by Figure 5, which also highlights a net loss of four ATMs across Bristol over this time period.

Figure 5 – Changes in ATM provision between Oct 2018 and Mar 2019
A net loss of cash points, with a trend from free to fee-charging ATMs

	No. of ATMs
Have closed:	14
Have opened:	10
Net change:	-4
Changed from free to fee-charging:	16
(Cardtronics)	(14)
(Omnicash)	(2)
Changed from fee-charging to free:	0

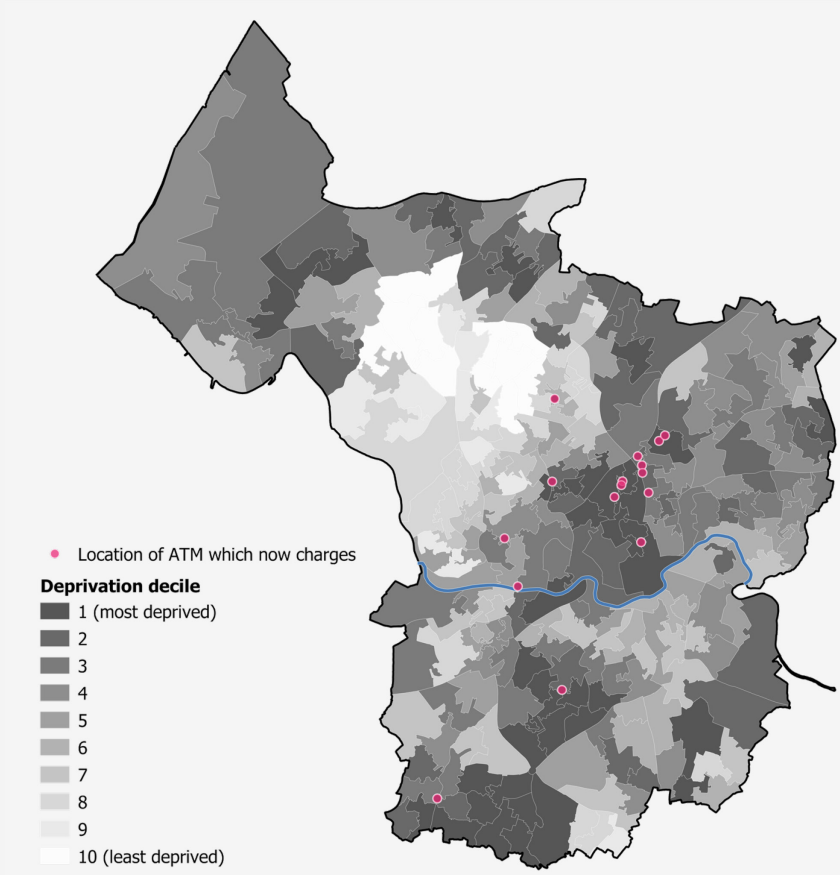
Overall, between October 2018 and November 2019, across Bristol 16 ATMs changed from being free to charging a fee (generally £0.95). As can be seen from Map 9, this change seems to have disproportionately affected more deprived communities. Indeed, we find that 11 of the 16 ATMs (two-thirds) that switched to fee-charging are within areas that are among the 20 per cent most deprived areas nationally.

A total of nine cashpoints in the Easton/Eastville area (focusing in particular on the Stapleton Road area shown previously in Figure 4) have become fee-charging – a change which would have a considerable impact on overall access to cash in this area. These changes are likely connected to LINK's decision to reduce the interchange fee – the amount that banks pay when cardholders withdraw money from an ATM not owned by that bank – by five per cent per annum until 2021 thereby reducing the revenue for ATM operators. Indeed, this change has already been credited for a similar loss of free ATMs in other UK towns and cities, including Rotherham and Dundee.[43] [44]

[43] Upton, M. (2019) 'Six "free" cash machines in Rotherham set for charges.' Rotherham Advertiser, 19th Feb 2019. Available at: <https://www.rotherhamadvertiser.co.uk/news/view,six-free-cash-machines-in-rotherham-set-for-charges_30800.htm>

[44] Healey, D. (2019) 'City councillors hit out as more Dundee cash machines begin charging for withdrawals.' TheCourier.co.uk, 9th March 2019. Available at: <https://www.thecourier.co.uk/fp/news/local/dundee/844569/city-councillors-hit-out-as-more-dundee-cash-machines-begin-charging-for-withdrawals/>

Map 9 – location of ATMs in Bristol that have changed from free to fee-charging.
Deprived areas appear disproportionately affected by these changes.



This shift is concerning, not just because of its impact on communities, but because of what it may tell us about the wider strategic direction taken by private non-bank ATM providers. These charges – introduced first by Cardtronics, but which will also be adopted by NoteMachine and potentially other providers[45] – demonstrate the possible risks of the shift away from banks as the sole operators of ATMs towards other non-bank operators.

Cardtronics is now the largest provider of ATM services in the UK and, following their takeover of DC Payments in 2017, owns approximately 29 per cent of ATMs in the country.[46] As of December 2018, nearly a third (32 per cent) of the Cardtronics / DC Payments network was fee-charging; however, this percentage is likely to have increased given the evidence presented here of their recent change in policy. The 95p withdrawal charge adopted by the

[45] Burton, J. (2019) 'Thousands more ATMs will charge 95p to take out cash in a brutal blow to the elderly and those on low incomes.' [online news article] *Daily Mail,* 13th April 2019. Available at: <https://www.dailymail.co.uk/news/article-6917655/Thousands-ATMs-charge-95p-cash.html>

[46] LINK (2019) 'Statistics and trends'. Available at: <https://www.link.co.uk/about/statistics-and-trends/>

company was brought in with limited notice to its customers – primarily local convenience stores – and many of these customers are apparently unable to switch to a different provider due to long-term contracts.[47] This leads to questions about the extent to which competition in the ATM market is possible and the knock-on effects for consumers.

Overall, the evidence suggests that the provision of cash infrastructure in the UK is at a pivotal moment. Given the trends shown here – albeit for one case study – there is a significant risk that large numbers of ATMs nationwide become fee-charging with a disproportionate effect on deprived communities, many of which may be more likely to depend on cash (as we discuss in Section 7). Recent recommendations from the *Access to Cash Review* to protect ATM provision in the UK therefore need to be, at the very least, heeded and, preferably, exceeded. Otherwise, financial exclusion and the poverty premium faced by lower-income households is likely to be further exacerbated.

[47] Mannering, R. (2019) 'ATM operator Cardtronics under fire for new charges.' *Convenience Store,* 5th March 2019. Available at: <https://www.conveniencestore.co.uk/retail/atm-operator-cardtronics-under-fire-for-new-charges/590894.article>

7.

MAPPING THE NEED FOR CASH

Does the geographical supply of cash match estimated need for it in different parts of the city?

So far, we have focused solely on the geographic supply of cash and whether it is likely to disproportionately benefit certain socio-economic and demographic groups. Economists may argue that traditional demand and supply rules should apply to the market for cash, with supply changing to meet demand; however, there is little evidence on demand to either prove or disprove this notion. In part, this is because data on cash use is somewhat problematic, not least because people consume cash in many ways at different times and in different places across the city.

In this section, we attempt to answer the question of whether the supply of cash infrastructure matches the geographical need for it. To do this, we map estimated reliance on cash based on the population structure of neighbourhoods across Bristol using data from the 2011 Census on two socio-demographic characteristics known to be correlated with differences in cash use: age and social grade.

ESTIMATING THE GEOGRAPHICAL DEMAND FOR CASH

In order to predict which neighbourhoods are likely to have the highest number of residents who rely on cash, we first consider the socio-demographic factors known to be associated with higher use of cash. For this purpose, we use data from a survey conducted by Optimisa Research in 2017 on behalf of Cash Services UK, in which face-to-face interviews were undertaken with a nationally representative sample of 1,945 individuals across the UK.[48] Participants were asked a range of questions about their attitudes to cash and card payments, but for the purposes of estimating demand for cash we use the percentage of respondents who agreed with the statement 'I will always use cash'.

The survey results for this question were broken-down separately by respondent age and social grade. As shown in Figures 6 and 7, while overall around one-in-five (19 per cent) say they will always use cash, reliance on it appears to increase in older age groups and those in lower social grades. This matches other literature, such as research from Age Concern that found that over 70 per cent of those aged 80 plus use cash to pay for their food, compared to just over half of people in their 50s.[49] Other factors not included in the breakdowns are likely to also influence demand for cash; however, age and social grade appear to be two of the most important factors.

Using these results, we were able to produce a matrix estimating the demand for cash by both age and social grade (e.g. the percentage of 35-44 year olds in the DE social grade who say they will always use cash). It was necessary to assume that the pattern of reliance on cash by age group persists across all social grades, and vice versa, which in reality may not be entirely the case. This was all that was possible given the level of information available to us from the data tables.

[48] The data tables were kindly provided to the research team by Cash Services UK.
[49] Age Concern (2008) An Inclusive Approach to Financial Products, Annex 1.

Figure 6 – Agreement with statement 'I will always use cash', by age group.
Older consumers tend to have a greater reliance on cash.

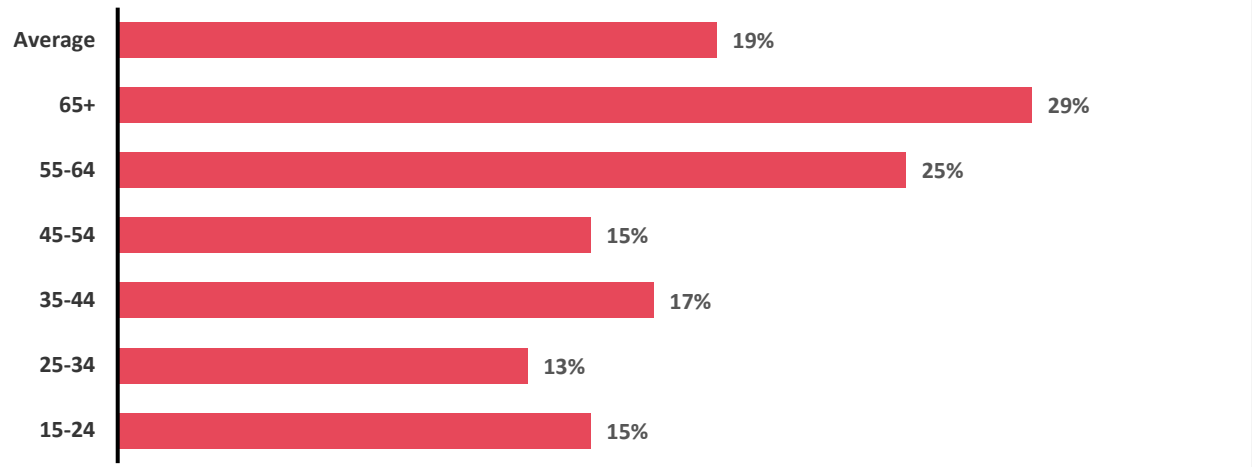
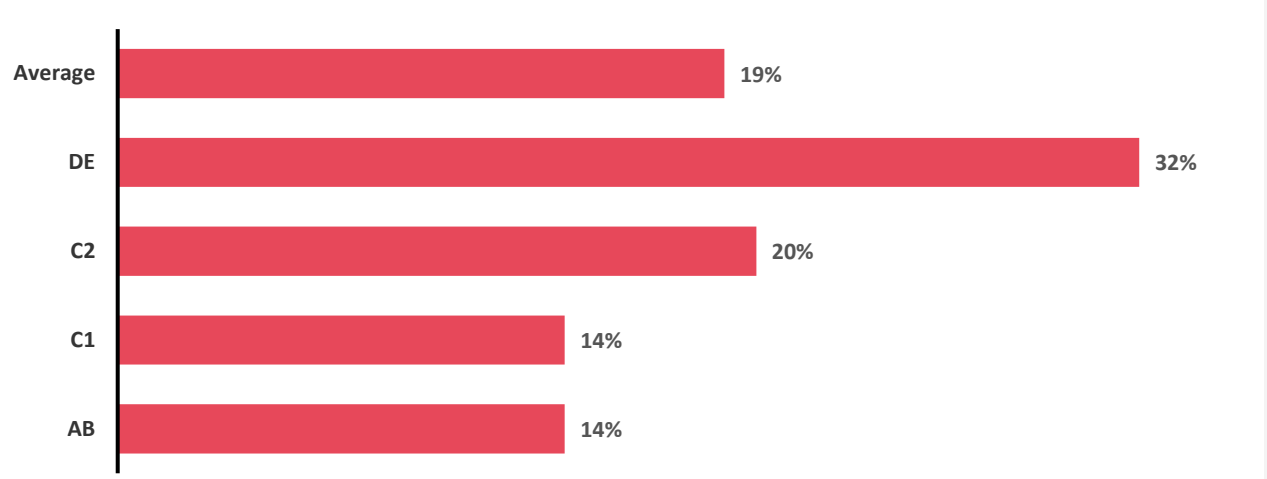


Figure 7 – Agreement with statement 'I will always use cash', by social grade.
Greater need for cash among those in lower social grades.



Detailed Census breakdowns for Middle-Layer Super Output Areas (MSOAs) across Bristol were then obtained, to which this matrix could be applied. These breakdowns gave the number of individuals within each MSOA who fall into different age and social grade categories (e.g. the number of 35-44 year olds in the DE social grade). Given these numbers and our matrix of demand for cash, we were able to estimate the total number, and then percentage, of adults within each MSOA in Bristol who would be likely to say that they would 'always use cash'.

THE GEOGRAPHICAL NEED FOR CASH IN BRISTOL

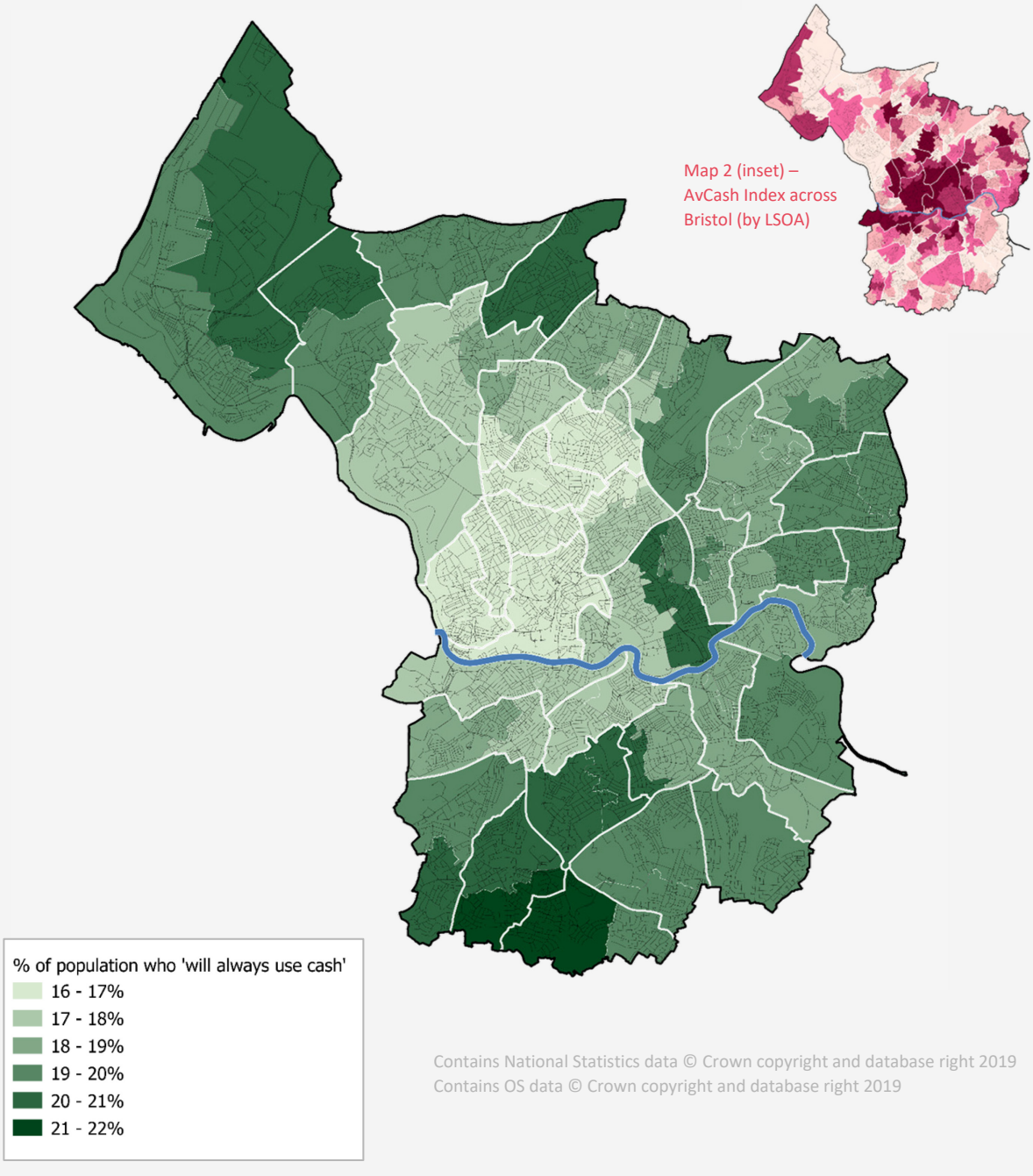
Map 10 estimates the proportion of the population in MSOAs across Bristol who are likely to agree with the statement that they will always use cash. As it is based on data showing that

older age groups and those from lower social grades are more likely to rely on cash, the map effectively highlights where these populations are particularly concentrated.

Interestingly, a visual comparison between Map 10 and Map 2 (giving the overall AvCash Index scores provided as inset map) suggests a mismatch between the geographical distribution of the provision of cash and the need for it. Indeed, analysing this statistically we find a negative correlation (of -0.38) between the two, suggesting that areas with higher need for cash actually tend to have fewer facilities to enable residents to access it.

Map 10 – Estimated geographical distribution of population who would say that they will 'always use cash', based on population characteristics of MSOAs in Bristol.

Pattern of need for cash is almost opposite to the provision of cash infrastructure.



This represents a significant challenge to the way in which access to cash is provided in the UK. It means that many of those most likely to depend on cash are actually those most likely to have reduced local access to cash in future. This raises significant questions about the ability of the market to cater for these consumers in the long-term, an issue partly caused by the fact that such consumers represent a relatively small minority when compared with those who are more comfortable with digital payments. In other words, there is a danger that the minority of people who depend on cash do not represent sufficient 'demand' to make the market profitable for commercial companies, thereby leading either to the collapse of the market or to its continuation but at a very high price – representing a 'poverty premium' to access cash.

There are two caveats to this mapping of need. First, the need reflected here is based solely on where people live, rather than where they work or socialise. As large numbers of people travel into certain parts of the city for work, education or leisure, one would expect demand for cash in these areas to increase, thereby skewing the map towards areas of economic activity, such as the city centre. Further research would be necessary to model this more fully. However, those who tend to depend on cash – older people from lower social grades – are actually less likely to be geographically mobile across the city. For this reason, it can be argued that the map accurately portrays where those who are most vulnerable to a shift away from cash are likely to live.

The second caveat is that the range between the highest and lowest levels of demand for cash is relatively small: in the MSOA with least demand, 16 per cent say they will always use cash, rising to 22 per cent in the MSOA with the highest demand. This is largely a function of the geographical scale of the data on population structure that is available. Detailed breakdowns by both age and social grade are only available at MSOA-level, which contain a relatively large number of households overall and are therefore likely to contain a wide mix of households – essentially averaging out the demand over a wider area. If mapped at a more detailed scale, one would most likely find higher concentrations of people who rely on cash, thereby increasing the difference between the highest and lowest areas.

8.
CONCLUSIONS

This report has provided a complex empirical account of cash infrastructure provision for different populations within the urban area of Bristol, UK. The development of the AvCash Index for measuring residents' ability to access cash provides us with a simple comparison tool to trace provision of cash infrastructures across neighbourhoods, allowing us to identify those areas at risk of becoming urban cash deserts should ATMs be closed or temporarily out of service. Moreover, by focusing in detail on a specific locality, the report offers a more nuanced picture of the impact on communities than accounts elsewhere which focus predominantly on aggregate data and trends.

Several key findings emerge from this analysis:

1. Access to cash is not evenly distributed across the city. The concentration and duplication of ATMs and bank branches in a small number of areas of economic activity requires serious attention. While ATM numbers overall remain high compared to the early 2000s, there is little evidence that the increase over that period has produced whole coverage. We collectively need to find new ways of ensuring more uniform access to cash infrastructure across the city. Shared bank branches, such as the business branch currently being trialled by Natwest, Lloyds and Barclays in Bedminster,[50] may help – but only if this leads to a redistribution of resources away from central areas to less well-resourced suburban areas;
2. Even in localities where coverage is relatively even, there are still areas that are very vulnerable to losing access because they have just one 'lonely' ATM. In the event of the malfunction or closure of such ATMs, communities may be left without the necessary cash infrastructure.
3. Post Offices remain important providers of financial services and access to cash for communities across the city, being far more evenly spread than other types of cash infrastructure. They therefore have potential to ensure their continued provision of face-to-face banking services into the future; however, this needs to be resourced properly.
4. Recent changes to interchange payments and the long-term rise of private non-bank ATM providers have let to previously free-to-use ATMs now incurring a charge for customers. Affected machines are particularly prevalent in deprived communities, highlighting the 'poverty premium' borne by the most vulnerable.
5. Lastly, but no less relevant, we find that the provision of cash infrastructure appears not to reflect the geographical need for it – the location of those who are most likely to depend on cash to be able to participate in society. Future policy should seek to understand the needs of such groups and take these more fully into account.

If we consider access to one's money as a right to be protected and cash infrastructure as an important component of such access, it is necessary to find new ways in which we as a society protect and ensure sufficient physical financial infrastructure into the future.

[50] Baker, H. (2019) 'First ever shared bank for Natwest, Lloyds and Barclays to open in Bristol.' Bristol Post, 13th Mar 2019. Available at: <https://www.bristolpost.co.uk/news/business/first-ever-shared-bank-natwest-2639593>

The challenges for such an approach are not insignificant, given that the infrastructure for accessing cash in the UK is almost exclusively run by private operators with commercial interests. Our research raises questions about the extent to which cash provision, like bank branch provision, has been driven not by the needs of consumers but by the needs of financial services organisations, with 'profitability' ultimately coming at the detriment of those who still depend on cash.

Furthermore, those who depend on cash are not just individuals; small businesses who wish to allow their customers to pay as they want will also be affected by the withdrawal of free cash. Indeed, national figures from the Association of Convenience Stores 2018 Local Shop Report show that over three quarters (76 per cent) of convenience store customers pay by cash, and just under half (46 per cent) of convenience stores currently offer a free to use cash machine.[51] This cash provision also benefits local cash-based businesses, such as taxi drivers, or window cleaners.

We have in a short space of time already identified an ongoing and swift change from free ATMs to fee-charging happening in relatively deprived areas in Bristol, that are nonetheless important economic hubs within the local community. Without intervention, such changes are likely to continue and even accelerate, as the profitability of the ATM market declines further and more commercial firms decide to either exit the market or push prices up.

[51] Association of Convenience Stores (2018) 'The Local Shop Report 2018'. Available at: <https://www.acs.org.uk/sites/default/files/local_shop_report_2018.pdf>

APPENDICES

APPENDIX 1 – GIS DATA SOURCES

Boundary shapefiles at Local Authority District, Ward, MSOA & LSOA scale:

> *Office for National Statistics (2011). 2011 Census: boundary data (England and Wales) [data collection]. UK Data Service. SN:5819 UKBORDERS: Digitised Boundary Data, 1840- and Postcode Directories, 1980-.*
>
> *See: <http://discover.ukdataservice.ac.uk/catalogue/?sn=5819&type=Data%20catalogue>,*
>
> *Retrieved from <http://census.ukdataservice.ac.uk/get-data/boundary-data.aspx>.*
>
> *Contains public sector information licensed under the Open Government Licence v3.*

Bristol LSOA Population Weighted Centroids:

> *Office for National Statistics (2016) 'Output Areas (December 2011) Population Weighted Centroids'. [dataset]. Available at: <http://geoportal.statistics.gov.uk/datasets/ba64f679c85f4563bfff7fad79ae57b1_0>*

OS MasterMap© Integrated Transport Network Layer:

> *OS MasterMap® Integrated Transport Network Layer [GML2 geospatial data], Scale 1:1250, Tiles: GB, Updated: 11 July 2018, Ordnance Survey (GB), Using: EDINA Digimap Ordnance Survey Service, <https://digimap.edina.ac.uk>, Downloaded: 2018-11-23 15:11:37.663*

QGIS Software:

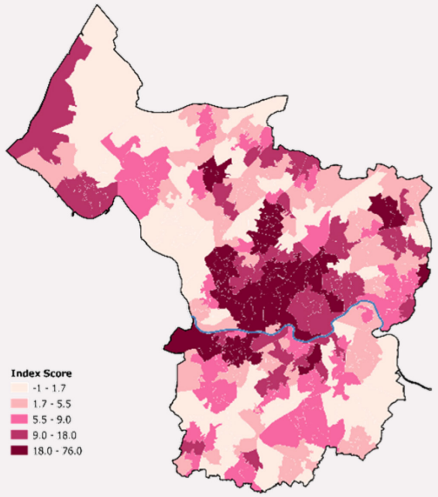
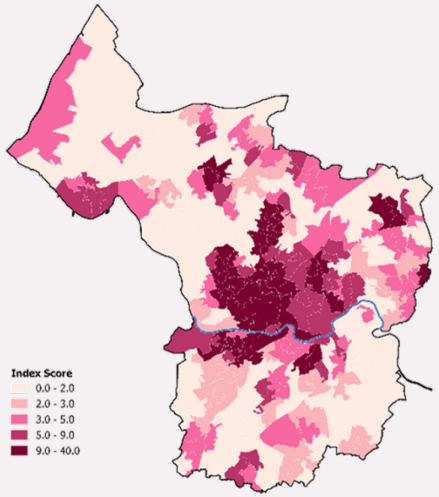
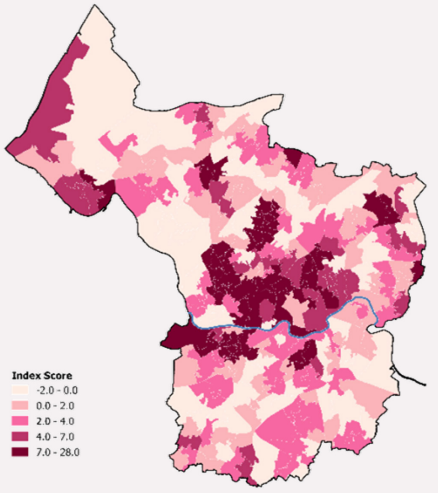
> *QGIS Development Team (2019). QGIS Geographic Information System. Open Source Geospatial Foundation Project. See: <http://qgis.osgeo.org>*

APPENDIX 2 – DATA SOURCES USED TO CONSTRUCT AVAILABILITY OF CASH INDEX

Infrastructure type	Data source	Notes
ATMs	LINK	Both free and fee-charging ATMs listed
Bank branches[52]	Allied Irish Bank	
	Barclays	
	Co-operative Bank	
	Danske Bank	
	Halifax	
	HSBC	
	Lloyds Bank	
	Metro Bank	
	Nationwide	
	NatWest	
	RBS	
	Santander	
	Tesco Bank	Current account servicing available at Tesco Extra branches
	TSB	
Credit Unions	Bristol Credit Union	Outreach locations also included
Post Office	Post Office	
Supermarkets that provide cashback[53]	Aldi	Offer cashback in all stores (£5 to £75)
	Asda	Offer cashback in all stores
	Co-op	Offer cashback in all stores
	Iceland	Offer cashback in all stores
	Lidl	Offer cashback in all stores (up to £50)
	Morrisons	Offer cashback in all stores
	Sainsburys	Branch-dependent (treated as cashback provider unless ATM already there)
	SPAR	Offer cashback in all stores
	Tesco	Branch-dependent (treated as cashback provider unless ATM already there)
	Waitrose	Branch-dependent (treated as cashback provider unless ATM already there)

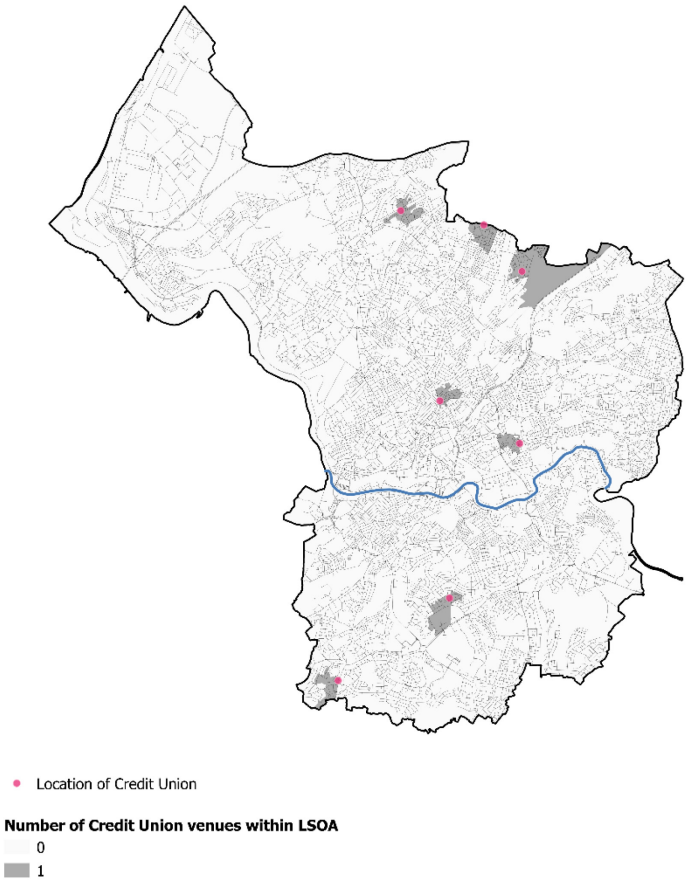
[52] Data collected for largest current account providers who participate in the Current Account Switch Service (CASS), as per BACS July 2018 dashboard: https://www.bacs.co.uk/DocumentLibrary/CASS_dashboard_-_published_25_Jul_18.pdf.
[53] The research team phoned the central customer service team of each supermarket to find out whether they offered cashback to their customers.

APPENDIX 3 – ALTERNATIVE SCORING SYSTEMS FOR AVAILABILITY OF CASH INDEX

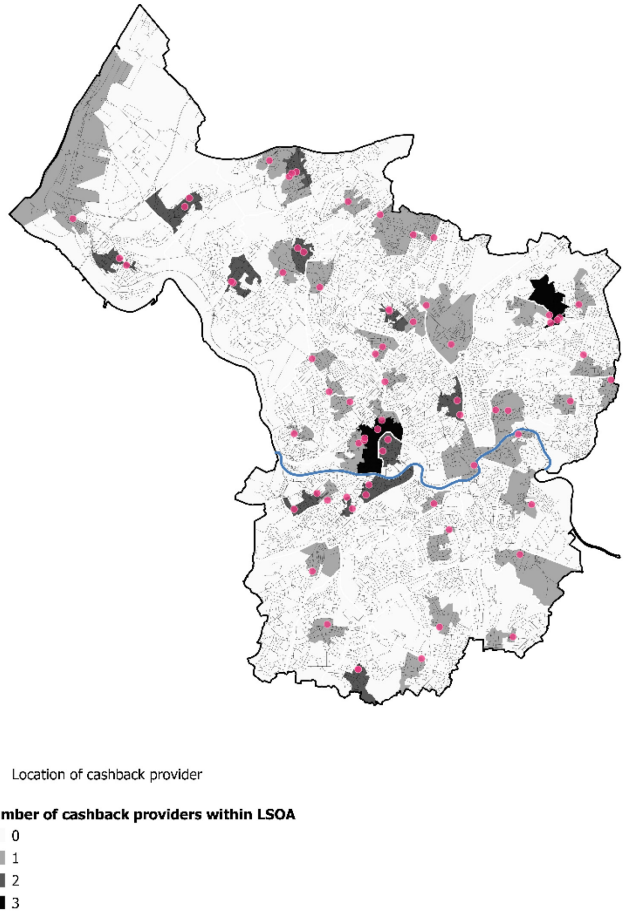
Type of infrastructure	Scoring (per unit)		
	Version used in the report	Equal weighting for all	Equal weightings for all but fee-charging ATMs
Free ATMs	3	1	1
Post Offices	2	1	1
Bank / building society branches	1	1	1
Credit unions	1	1	1
Cashback providers	0.5	1	1
Fee-charging ATMs	-0.5	1	-1
Map:			

APPENDIX 4 – MAPS OF CREDIT UNION VENUES AND CASHBACK PROVIDERS

Credit Union outreach locations



Supermarkets that offer cashback



APPENDIX 5 – CLUSTER ANALYSIS USED TO CONSTRUCT THE SIX NEIGHBOURHOOD 'TYPES'

'TwoStep Cluster Analysis' was used to identify six distinct neighbourhood 'types' across Bristol. This is an analytical procedure designed to identify natural groupings (or clusters) within a dataset that would otherwise not be apparent.

Initially, the procedure was set to automatically determine the 'best' number of clusters itself. This revealed four distinct neighbourhood 'types'; however, these clusters were deemed insufficiently detailed to be able to make useful comparisons. The model was therefore then constrained so that it produced six clusters. The variables used in this analysis and their means for each cluster are shown below:

Average LSOA socio-economic characteristics		Squeezed suburbs	Deprived and diverse	Middling professional	Economic heart	Secure and mature	Academic centres	Average for Bristol
Indices of Deprivation rank		6346	2612	20131	11294	21681	21113	13206
LSOA population		1613	1940	1642	1668	1469	1745	1628
Population density (no. of people per hectare)		48	97	83	43	37	107	61
Median age of population		35	29	33	27	43	27	35
Number of employees who work in the LSOA as % of usual adult population		39%	66%	33%	679%	35%	52%	74%
Proportion of population within LSOA that are…	Students	4%	8%	7%	24%	3%	24%	7%
	Single or never married	41%	55%	52%	71%	29%	70%	46%
	Educated to degree-level	18%	27%	50%	40%	32%	54%	32%
	From a white ethnic background	87%	49%	88%	74%	93%	89%	85%
	Living with a long-term health condition/disability	21%	17%	12%	11%	18%	9%	17%
Proportion of households within LSOA that…	Have no car	31%	50%	22%	46%	14%	29%	28%
	Own their own house	51%	25%	62%	30%	81%	40%	55%
Number of LSOAs of each neighbourhood type		*105*	*20*	*52*	*14*	*52*	*20*	*263*

APPENDIX 6 – DESCRIPTIVE STATISTICS WITH LSOAS IN THE CITY CENTRE (THE 'CABOT' WARD) REMOVED.

Mean Availability of Cash Index score, by LSOA characteristics

LSOA characteristics		Mean Availability of Cash Score (within 500m)
North or south of the River Avon?	North	11.5
	South	7.6
Distance from centre of the LSOA to the city centre	Less than 2.27km	20.0
	2.27 - 3.79km	10.0
	3.79 - 5.10km	5.5
	More than 5.10km	6.3
Population density	Less than 36.7	5.1
	36.7 - 53.8	7.4
	53.8 - 77.4	9.3
	More than 77.4	18.9
Indices of Deprivation decile (where 1 is most deprived)	1 - 2	10.8
	3 - 4	9.2
	5 - 6	10.0
	7 - 10	10.2
Ratio between the number of employees who work in the LSOA and the usual adult population of the LSOA (higher number indicates an area with a lot of jobs)	Less than 11.5%	6.8
	11.5 - 23.7%	9.6
	23.7 - 57.4%	9.3
	More than 57.4%	15.2
Median age of population	Less than 31	19.1
	31 - 34	10.7
	34 - 39	6.8
	More than 39	5.4
Area cluster	Squeezed suburbs	7.1
	Deprived and diverse	22.3
	Middling professional	11.8
	Economic heart	21.5
	Secure and mature	5.4
	Academic centres	18.4
Overall average		10.1
N (number of LSOAs)		254

Mean Availability of Cash Index score, by characteristics of households in LSOAs

Proportion of households within LSOA that:		Mean Availability of Cash Score (within 500m)
...are owner-occupied	Less than 42%	17.8
	42 - 57%	7.6
	57 - 70%	9.5
	More than 70%	6.3
...are socially rented	Less than 5%	10.3
	5 - 15%	11.0
	15 - 31%	8.9
	More than 31%	10.3
...are private rented	Less than 10%	4.4
	10 - 18%	5.8
	18 - 31%	11.6
	More than 31%	20.2
...have no car	Less than 19%	6.2
	19 - 26%	9.7
	26 - 35%	10.0
	More than 35%	15.2
Overall average		10.1
N (number of LSOAs)		254

Mean Availability of Cash Index score, by characteristics of residents in LSOAs

Proportion of population within LSOA that are:		Mean Availability of Cash Score (within 500m)
... from a white ethnic background	Less than 81%	14.1
	81 - 90%	10.8
	90 - 93%	9.5
	More than 93%	6.1
...students	Less than 3%	7.1
	3 - 4%	7.5
	4 - 8%	10.5
	More than 8%	17.1
...educated to degree level or above	Less than 16%	6.1
	16 - 28%	8.2
	28 - 49%	14.0
	More than 49%	12.7
...single or have never married	Less than 35%	5.5
	35 - 42%	5.7
	42 - 56%	11.8
	More than 56%	18.8
...living with a long-term health condition or disability	Less than 13%	15.5
	13 - 17%	11.0
	17 - 21%	7.9
	More than 21%	6.6
Overall average		10.1
N (number of LSOAs)		254

APPENDIX 7 – REGRESSION ANALYSIS

Multiple linear regression showing LSOA characteristics associated with changes in Availability of Cash Index scores at LSOA-level.

Variable	B	SE	Sig.
Adult Population (No. of usual residents aged 16+)	0.00	0.00	0.21
Population Density (No. of persons per hectare)	**0.01**	**0.00**	**0.00**
Median Age	0.03	0.02	0.17
Deprivation Decile	0.05	0.05	0.27
White ethnic background (% of population)	-0.01	0.01	0.26
Educated to degree-level or above (% of population)	0.00	0.01	0.53
Long-term health problem or disability (% of population)	-0.04	0.02	0.10
No car or van in the household (% of households)	**0.04**	**0.01**	**0.00**
High percentage of students? (Ref=No)			
Yes (more than 10% of population)	0.12	0.20	0.56
More employees working in area than usual adult population? (Ref=No)			
Yes	0.16	0.18	0.38
Distance to city centre in KM	0.07	0.06	0.27
Part of Bristol (Ref=North)			
South	0.08	0.16	0.60
(Constant)	-0.25	0.92	0.79

Statistically significant variables (where p<0.05) given in **bold.**
Dependent Variable: Base-e logarithm of (Availability of Cash Index + 2). Logarithmic transformation used due to non-normality of dependent variable.
The following independent variables were omitted from the model due to multicollinearity: % of population that is single or never married; and % of households that are owner-occupied.
R-Square = 0.377.

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