

# Online Appendix for “Buy Now, Pay Later (BNPL)...On Your Credit Card”

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## 1 Other Sources of Evidence on BNPL

We conducted a literature review in December 2021 before publicly releasing the first version of our working paper on ArXiv in January 2022. At the time of writing this paper, searches for ‘Buy Now, Pay Later’ and ‘BNPL’ on ArXiv returned no results; on SSRN returned a single law working paper on the Singapore BNPL market (Sng and Tan, 2021); there were no relevant results on NBER Working Papers beyond Berg et al. (2021)’s broader review of FinTech lending, and on google scholar showed no economics or finance papers in either published or working form (the only work was from other academic fields (Xing et al. (2019), Fook et al. (2020), Gerrans et al. (2021), Johnson et al. (2021))). In terms of other sources of evidence there are a few consumer surveys, blog discussions, and industry reports.<sup>1</sup>

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<sup>1</sup>Citizens Advice UK surveys: <https://www.citizensadvice.org.uk/about-us/our-work/policy/policy-research-topics/debt-and-money-policy-research/buy-now-pay-later/> and <https://www.citizensadvice.org.uk/about-us/our-work/policy/policy-research-topics/debt-and-money-policy-research/buy-now-pay-later-what-happens-if-you-cant-pay-later/>, Which? UK surveys: <https://www.which.co.uk/policy/money/7601/buynowpaylater> and <https://www.which.co.uk/policy/money/8573/buynowpaylater2>, Money.co.uk UK survey: <https://www.money.co.uk/guides/generation-debt-trap> and Battermann (2021) qualitative study. Credit Karma US survey: <https://www.creditkarma.com/about/commentary/buy-now-pay-later-surges-throughout-pandemic-consumers-credit-takes-a-hit> & Federal Reserve surveys: <https://www.federalreserve.gov/consumerscommunities/shed.htm> & <https://www.philadelphiafed.org/-/media/frbp/assets/consumer-finance/discussion-papers/dp22-02.pdf> For examples of US blogs on BNPL see Alcazar and Bradford (2021a,b); Akeredolu et al. (2021); Lott (2021) and Equifax’s report <https://insight.equifax.com/what-to-know-about-buy-now-pay-later/> For examples of industry analysis see Accenture US BNPL market report commissioned by Afterpay: <https://afterpay-corporate.yourcreative.com.au/wp-content/uploads/2021/10/Economic-Impact-of-BNPL-in-the-US-vF.pdf> and Bain UK BNPL market report: [https://www.bain.com/globalassets/noindex/2021/bain\\_report\\_buy\\_now\\_pay\\_later-in-the-uk.pdf](https://www.bain.com/globalassets/noindex/2021/bain_report_buy_now_pay_later-in-the-uk.pdf).

## 2 Institutional Details on BNPL

Economic theory provides mixed perspectives on the consumer benefits of deferred payments such as BNPL. Through the lens of the canonical life-cycle model of consumption smoothing, opportunities to smooth consumption at zero interest cost are weakly welfare improving – especially in a high inflation environment (Ando and Modigliani, 1963). Although deferring payments allows consumption smoothing benefits, such behavior can also present the possibility for welfare losses – for example by financially unsophisticated or naïve present focused consumers mistakenly overconsuming (e.g. Allcott et al., 2022).

BNPL is a FinTech credit product offered at the point of sale providing consumers the option to pay for their purchase at a later date in one or more interest-free instalments (HMT, 2021; CFPB, 2021). BNPL is mainly used online with lenders typically a third party separate to the retailer.

Consumers are (typically) charged no interest or fees *unless* they miss BNPL payments. They may experience costs if their BNPL payment has knock-on adverse effects on their other finances (e.g. triggering overdraft fees, accumulating credit card interest, missing payments on other household bills). Such increased broader financial distress from taking on credit was previously found in the UK payday lending market (Gathergood et al., 2019).

Repayment structures vary across and within UK BNPL lenders: for example, Klarna provides an option to repay in the next thirty days as well as an option to repay in three instalments thirty days apart whereas Clearpay has four payments that are two weeks apart. UK and US BNPL product offerings are similar – often offered by the same global lenders. The CFPB (2021) defined a BNPL as having 4 or fewer instalments but some BNPL products have more (e.g. OpenPay in the UK offers a choice of 3-10 instalments).

Although leading BNPL firms operate an instalment model, FinTech product innovation means the distinction between instalments and revolving credit (e.g. credit cards and retail store cards) is not clear cut. New BNPL products are emerging (e.g. Instalments by Barclays for Amazon UK, the Affirm Card is a debit card with BNPL) which feature a credit limit and so have some similarities to historical retail (store) cards. Some credit card providers offer the option for cardholders to pay particular transactions in BNPL-esque instalments (e.g. American Express’s ‘Pay It Plan It’ and Barclaycard’s Instalment Plan) as do some bank (current / checking) account providers on their debit cards (e.g. Monzo Flex).

In the BNPL market not all firms charge late fees (e.g. PayPal and Klarna UK do not). When BNPL firms do charge late fees (e.g. Afterpay/Clearpay and Klarna US) they are smaller than those on other credit products such as credit cards where the UK industry standard fee is £12 plus additional interest costs. Non-payment of BNPL debt can still have consequences: BNPL lenders may block new purchases by that consumer, pass unpaid debt to debt collectors, and missed payments may get reported in credit files, however, the prevalence and effects of such practices are unknown. US survey evidence estimates a third of BNPL users have missed payments and those consumers report their credit scores having since declined, however, this does not provide causal evidence of BNPL’s effects on credit scores – indeed Equifax FICO analysis (of the very small, selected subset of BNPL reported in credit files) indicates mixed impacts on credit scores.<sup>2</sup> The practice of unregulated BNPL lenders charging consumers fees in the US has been challenged

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<sup>2</sup><https://www.creditkarma.com/about/commentary/buy-now-pay-later-surges-throughout-pandemic-consumers-credit-takes-a-hit>    <https://www.equifax.com/resource/-/asset/webinar/market-pulse-buy-now-pay-later-credit-score-impact-analysis-webinar/>

leading to a series of lenders agreeing to refund consumers \$1.9 mn in settlements with Californian financial regulators (Alcazar and Bradford, 2021b).<sup>3</sup>

Merchant fees appear the primary source of revenue for BNPL lenders. Retailers offer BNPL in exchange for merchant fees that can be 3-6% and gaining insights about their customers from BNPL lenders to assist with targeted marketing (CFPB, 2021). It is estimated the gross profit margins of BNPL lenders is thirty basis points.<sup>4</sup> By revealed preference, BNPL is generating more net revenue in additional retail sales for these retailers than the fees they are giving up: by one estimate these increase conversation rates 20-30% and average transaction size 30-50%.<sup>5</sup> One potential way in which BNPL can increase sales is enhancing the shopping experience by enabling liquidity-constrained consumers to purchase excess amounts of clothing online – more than their cash balances allow – to try on and then return the ones they do not want: with BNPL they will typically not be charged for these returns, unlike with traditional instant payments. Another way BNPL may be profitable is by driving increased, potentially impulsive, merchant sales consumers may regret: one anecdotal example are advertisements encouraging people to purchase cake and pizzas (that only cost a few pounds) on BNPL.<sup>6</sup>

In the UK and US, most BNPL is unregulated (CFPB, 2021; FCA, 2021; HMT, 2021).<sup>7</sup> In the context of the UK market this means, unlike regulated credit, BNPL lenders are not required to provide pre-contractual information disclosures, are exempt from advertising rules on financial promotions, do not have a regulatory requirement to conduct an assessment of whether the applicant can afford such credit, and consumers are ineligible to claim redress or make complaints appealing to the financial services ombudsman.

Rapid growth is present in the US market based on limited data available: the California financial regulator reported 530.2% and 96.8% increases between 2019 and 2020 in the number and value of finance loans respectively: 91% of these loans are BNPL.<sup>8</sup>

Klarna is the BNPL lender with the highest value of UK transactions on credit cards throughout 2019 to 2021 in our data (in line with anecdotal evidence on it being the leading UK BNPL lender). Clearpay (known as Afterpay in the US) is second, with approximately a quarter of the BNPL transactions value – a third of Klarna’s – as of December 2021. The remaining other BNPL lenders (our other category includes openpay, dividebuy, laybuy and payl8r) appear small, however, as a reminder we caveat that our analysis does not include PayPal’s BNPL arm. We infer that other BNPL lenders not observed in our data are either too small to be present and/or do not have transactions on credit cards.

Beyond BNPL, our research is a proof of concept for how researchers and consumer financial protection regulators can use real-time household financial transaction data to monitor consumer use and risks of unregulated consumer financial products such as BNPL over time.

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<sup>3</sup><https://dfpi.ca.gov/2021/10/07/dfpi-report-shows-changes-in-consumer-lending-decrease-in-pace-program/>

<sup>4</sup><https://www.ft.com/content/ddb2e207-2450-4ca8-bad0-871290d80ea7>

<sup>5</sup><https://www.cnn.com/2021/09/25/why-retailers-are-embracing-buy-now-pay-later-financing-services.html>, <https://www.klarna.com/us/blog/why-use-buy-now-pay-later-klarna/>, <https://afterpay-corporate.yourcreative.com.au/wp-content/uploads/2021/10/Economic-Impact-of-BNPL-in-the-US-vF.pdf>, [https://www.bain.com/globalassets/noindex/2021/bain\\_report\\_buy\\_now\\_pay\\_later-in-the-uk.pdf](https://www.bain.com/globalassets/noindex/2021/bain_report_buy_now_pay_later-in-the-uk.pdf)

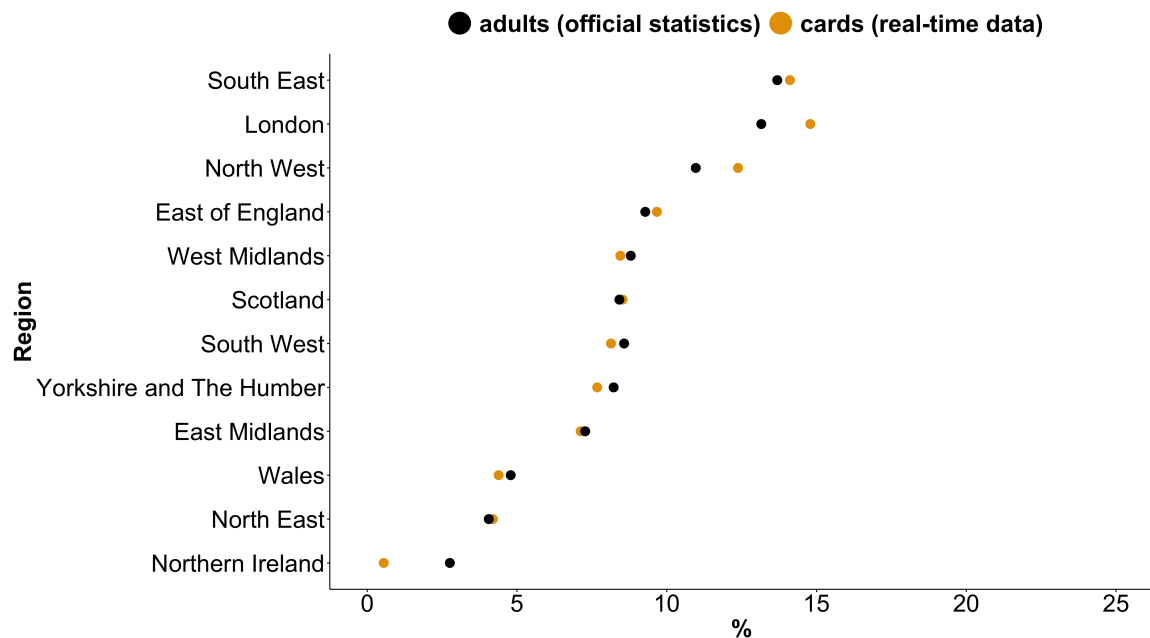
<sup>6</sup><https://www.ft.com/content/c4da9b2f-5187-4956-931d-0554d4268d4e>

<sup>7</sup>Most BNPL is not subject to the UK’s Consumer Credit Act (CCA) or Financial Services & Markets Act (FSMA).

<sup>8</sup><https://dfpi.ca.gov/2021/10/07/dfpi-report-shows-changes-in-consumer-lending-decrease-in-pace-program/>

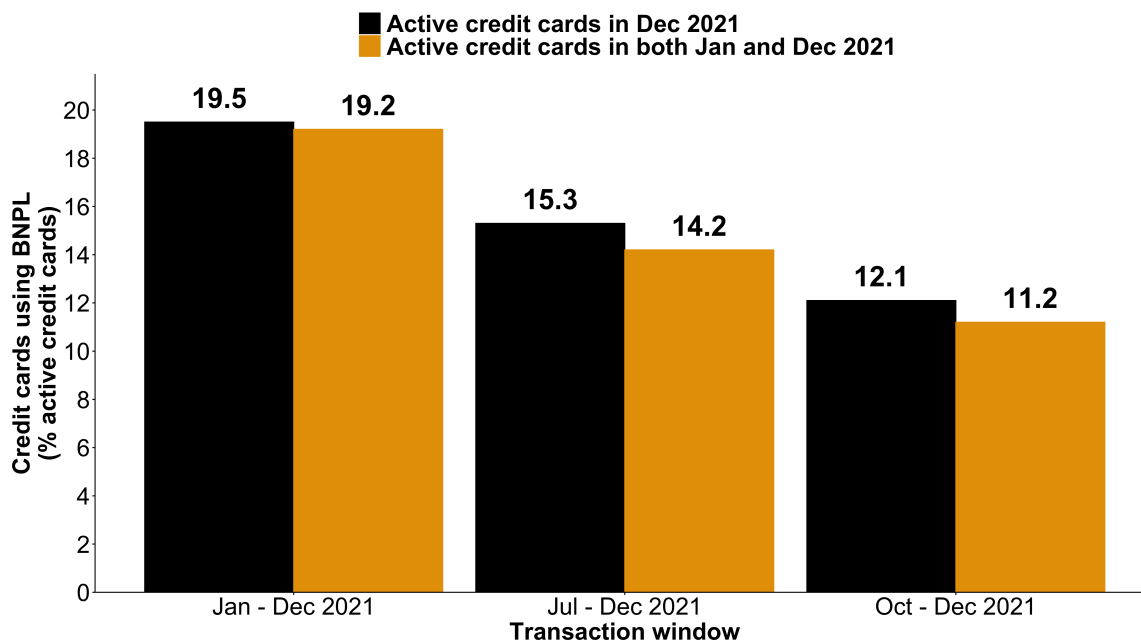
### 3 Supplementary Figures

**Figure A1. Active credit cards during 2021 by region in real-time data compared to shares of adult population**



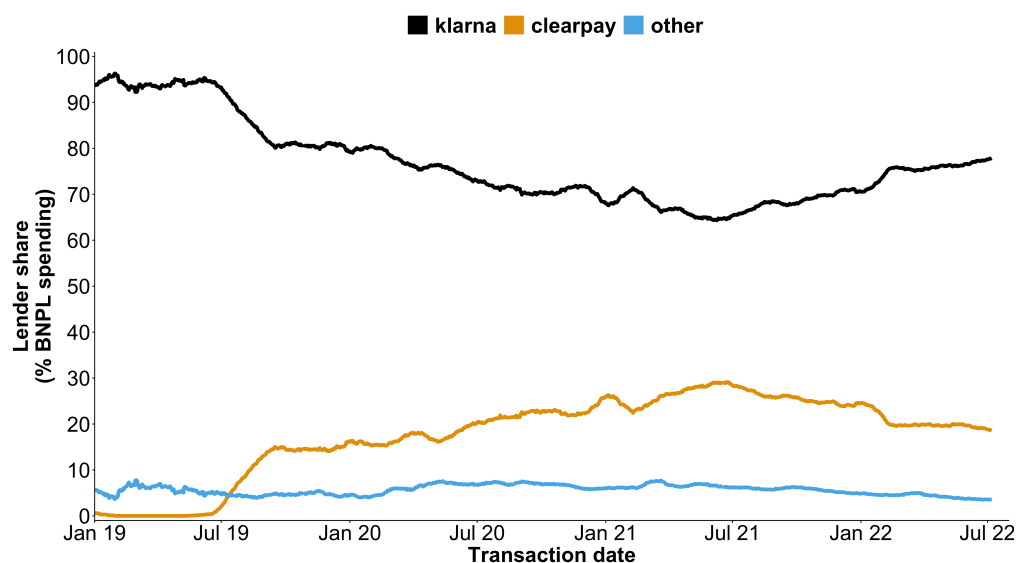
*Notes: Cards (real-time data) is percent of active cards by region in 2021 observed in UK credit card transactions data. Adults (official statistics) is percent of adults by region from Office for National Statistics (ONS) mid-year population estimates for 2019 - 2020.*

**Figure A2. Active credit cards with any BNPL transactions during 2021**



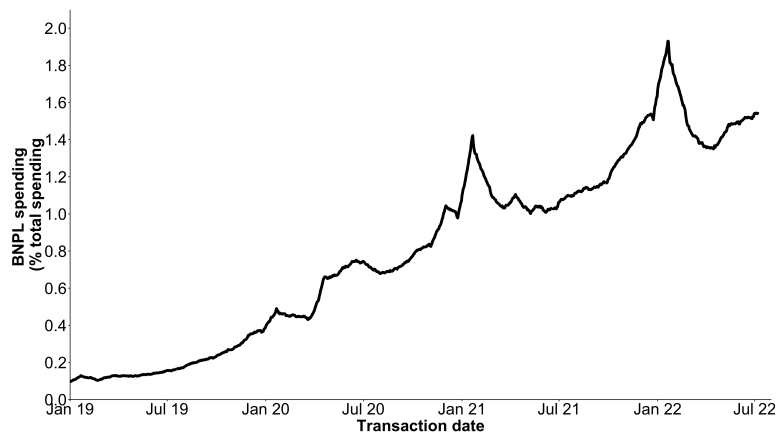
Notes: UK credit card transactions data. BNPL is buy now, pay later. The sample of active credit cards are defined as those with any BNPL or non-BNPL transactions in December 2021 (black) or in both January and December 2021 (orange).

**Figure A3. BNPL lender shares of BNPL transactions on active credit cards, 2019 - 2022**



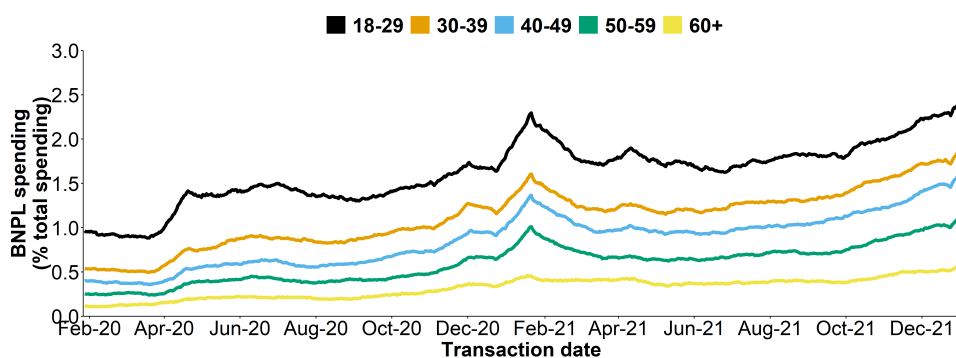
Notes: UK credit card transactions (repeated cross-section) data. BNPL is buy now, pay later. 28 day moving averages for each BNPL lender's share of the total value of BNPL spending on credit cards.

**Figure A4. BNPL spending as % of all spending, 2020 - 2022 (28 day moving average)**



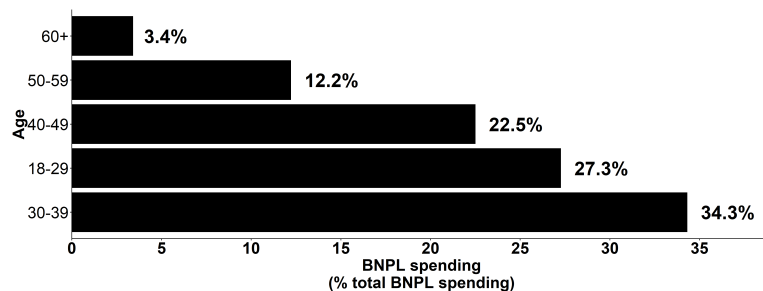
Notes: UK credit card transactions data (repeated cross section) data. BNPL is buy now, pay later. 28 day moving averages.

**Figure A5. BNPL spending as % of all spending by age, 2020 - 2021**



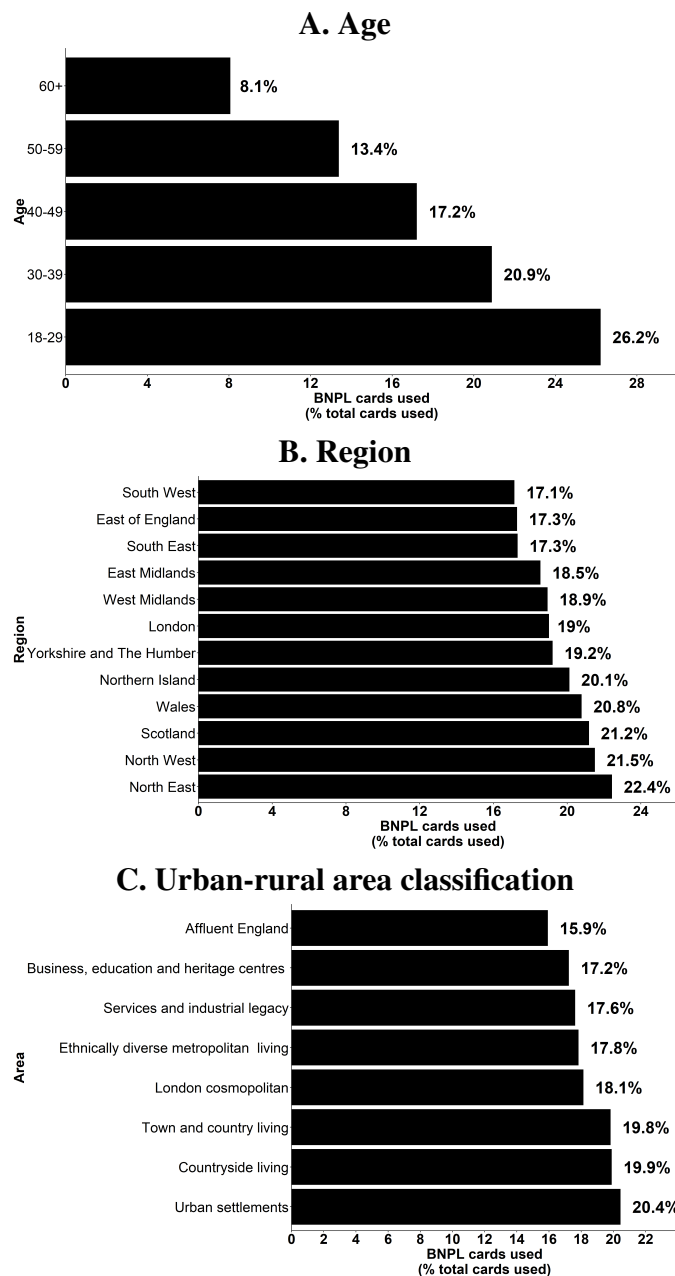
Notes: UK credit card transactions (repeated cross-section) and Office for National Statistics (ONS) data. BNPL is buy now, pay later.

**Figure A6. Share of total BNPL spending in 2021 by age**



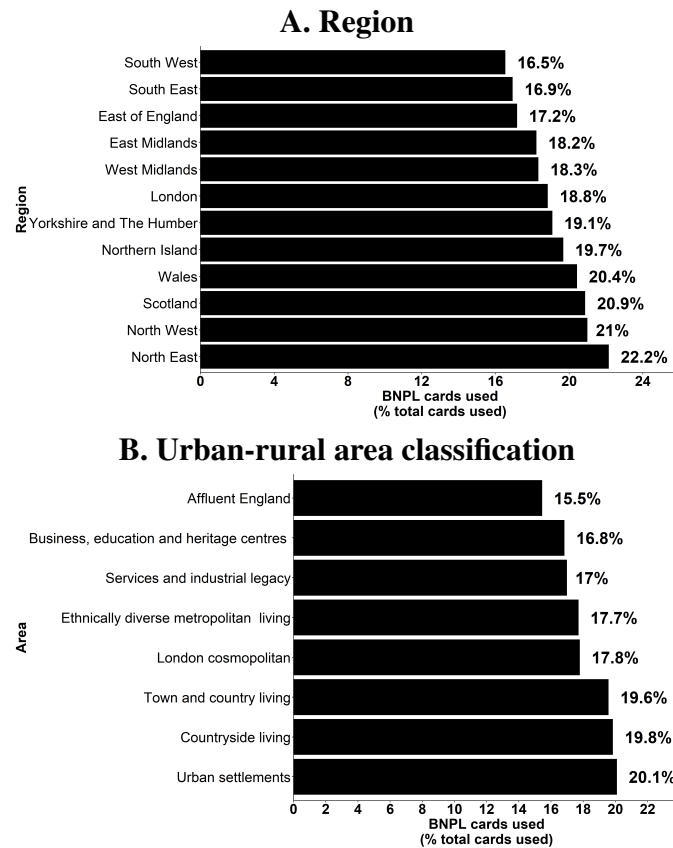
Notes: UK credit card transactions (repeated cross-section) data. BNPL is buy now, pay later. Numbers do not sum to 100% due to rounding.

**Figure A7. Active credit cards (in December 2021) with any BNPL transactions during 2021, by age (A), region (B), and area (C)**



*Notes: UK credit card transactions and Office for National Statistics (ONS) data. BNPL is buy now, pay later. Actively-used credit cards defined as any BNPL or non-BNPL transactions in December 2021. Panels B-C allocate cards based on cardholder postcode sector to use ONS NUTS1 regions (Panel B) and ONS supergroup (2011) area classifications (Panel C). Maps in Figure A8.*

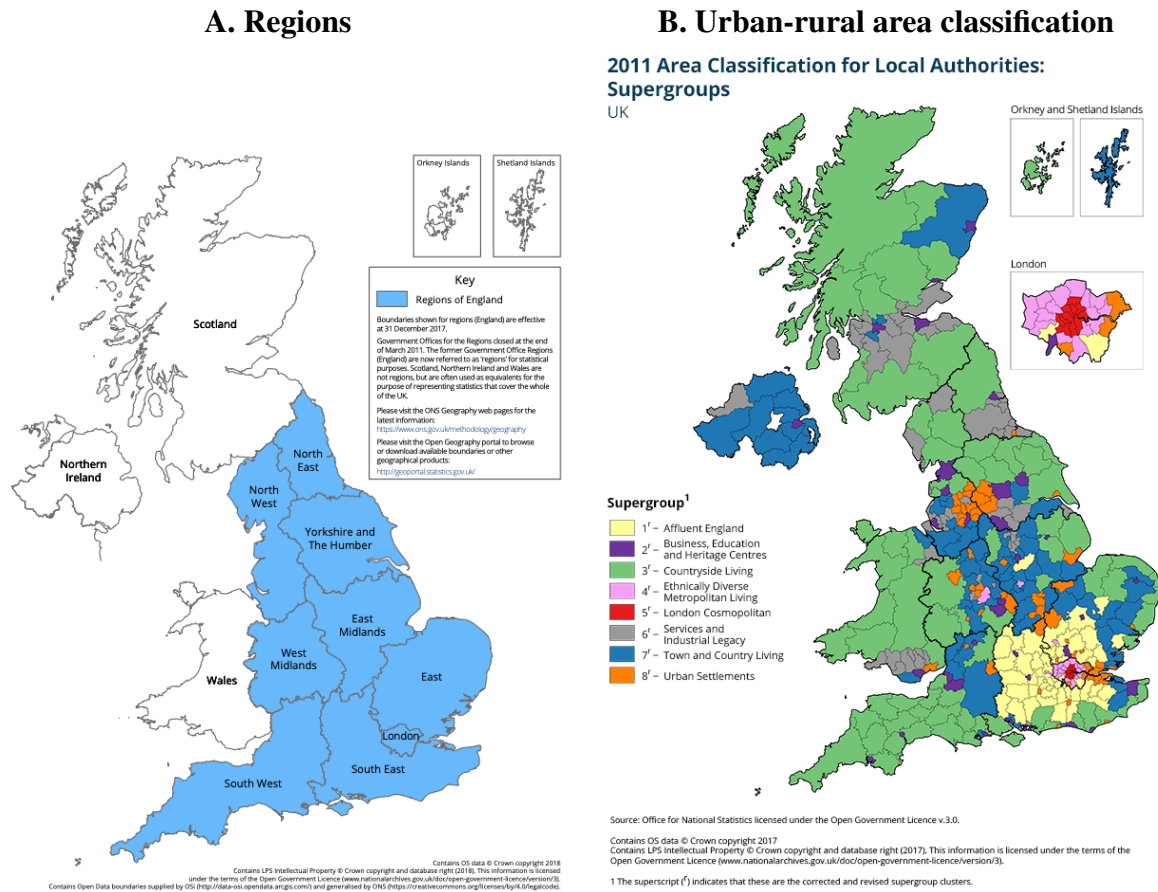
**Figure A8. Active credit cards (in both January and December 2021) with any BNPL transactions during 2021, by region (A), and area (B)**



*Notes: UK credit card transactions and Office for National Statistics (ONS) data. BNPL is buy now, pay later. Actively-used credit cards defined as any BNPL or non-BNPL transactions in both January and December 2021. Panels allocate cards based on cardholder postcode sector to use ONS NUTS1 regions (Panel A) and ONS supergroup (2011) area classifications (Panel B). Maps in Figure A8.*

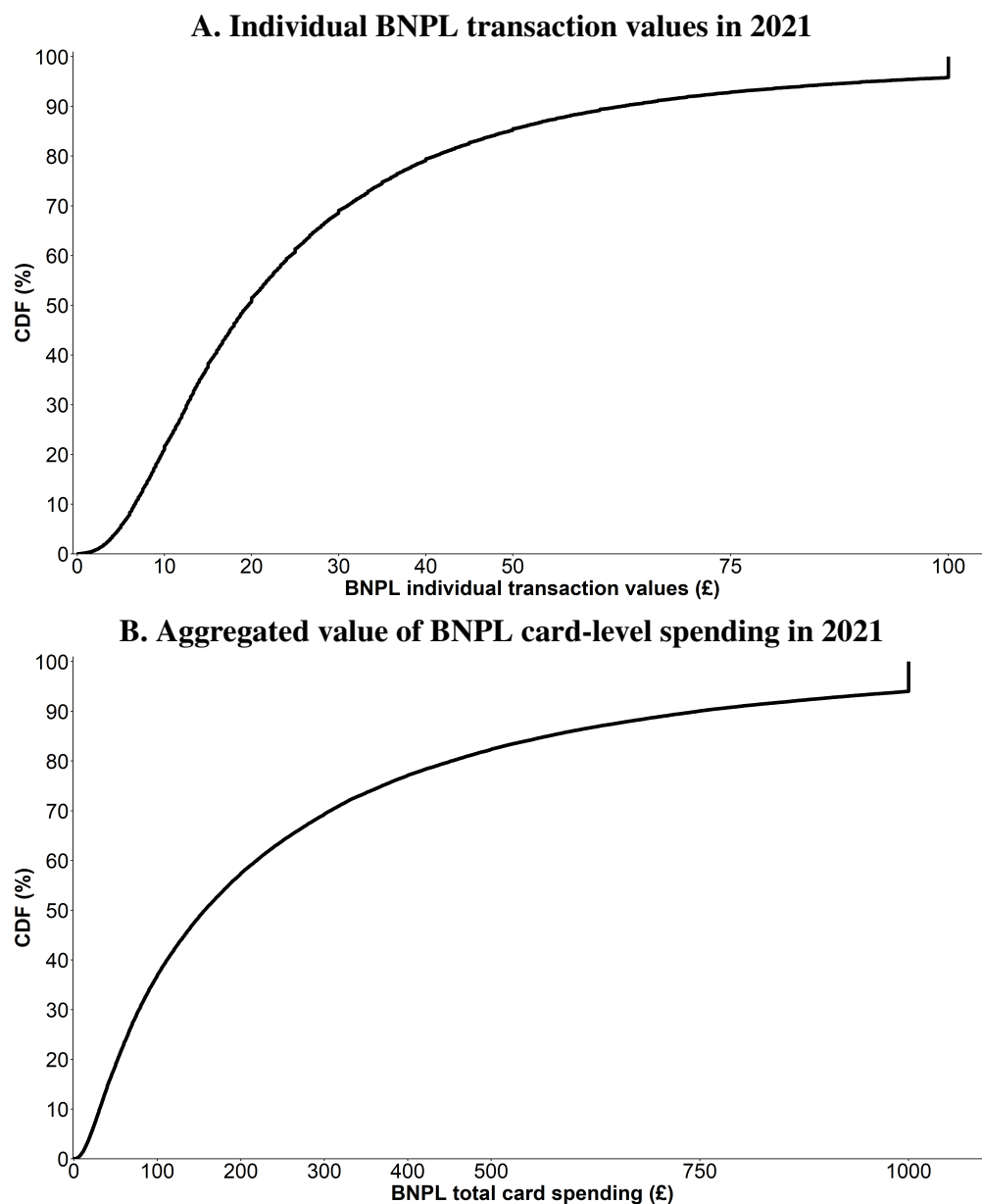


**Figure A9. Maps of UK regions (A) and area classifications (B)**



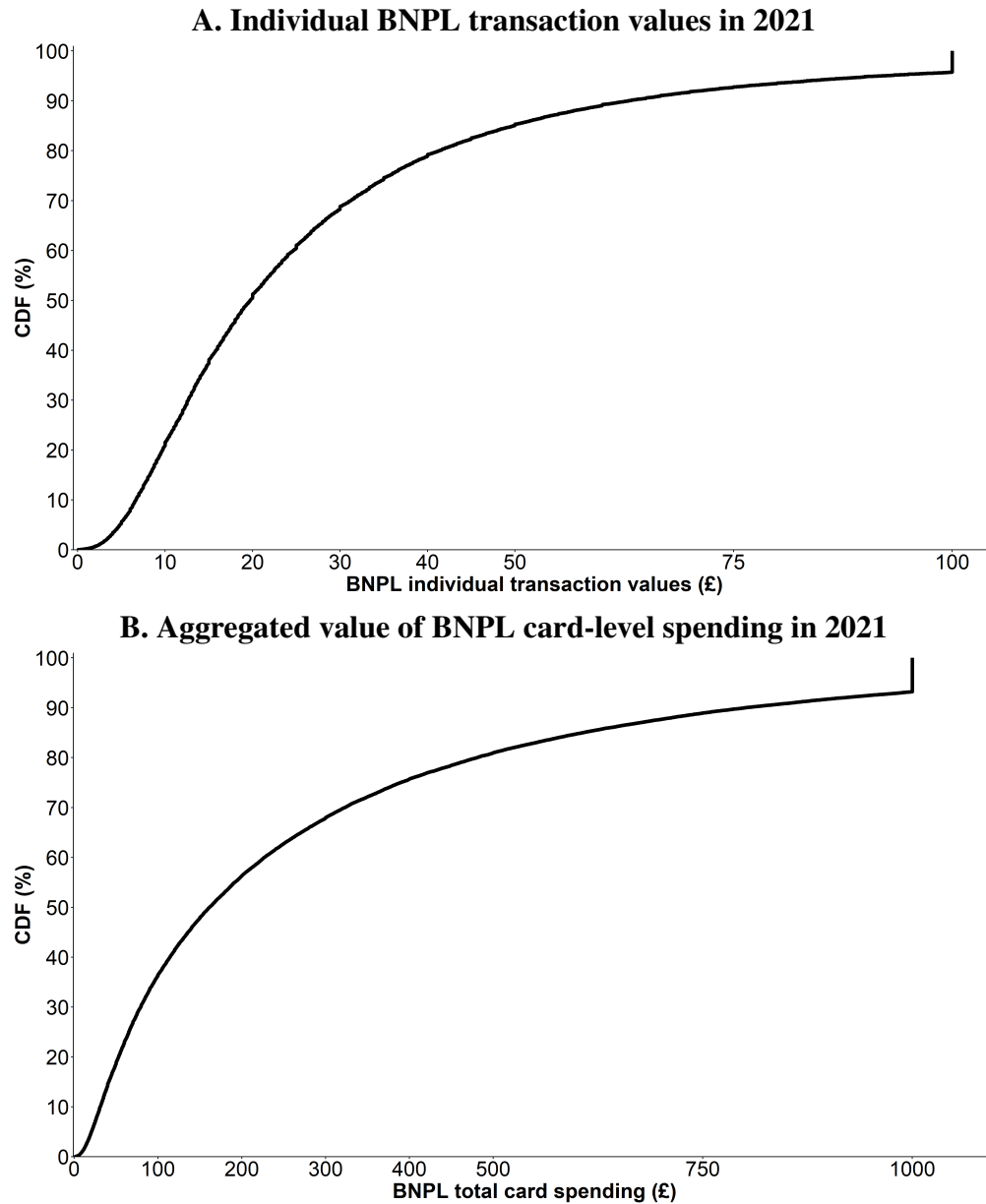
*Notes: Office for National Statistics (ONS) data. Definitions of ONS area classifications:*  
[www.ons.gov.uk/methodology/geography/geographicalproducts/areaclassifications/2011areaclassifications](http://www.ons.gov.uk/methodology/geography/geographicalproducts/areaclassifications/2011areaclassifications)

**Figure A10. Distribution of BNPL spending for individual BNPL transactions (A) and aggregated across BNPL transactions (B) on active credit cards**



*Notes: UK credit card transactions data. Panel A and Panel B top-coded at £100 and £1,000 respectively. BNPL is buy now, pay later. Panels A and B include all BNPL transactions on credit cards that were active: defined as any BNPL or non-BNPL transactions in December 2021.*

**Figure A11. Robustness of distribution of BNPL spending for individual BNPL transactions (A) and aggregated across BNPL transactions on credit card (B) when active cards defined as transactions in both January and December 2021**



*Notes: UK credit card transactions data. Panel A and Panel B top-coded at £100 and £1,000 respectively. BNPL is buy now, pay later. Panels A and B include all BNPL transactions on credit cards that were active: defined as any BNPL or non-BNPL transactions in both January and December 2021.*

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