Buy Now, Pay Later (BNPL)
...On Your Credit Card[*]

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Abstract

We provide the first economic research on 'buy now, pay later' (BNPL): an unregulated Fin-Tech credit product enabling consumers to defer payments into interest-free instalments. We study BNPL using UK credit card transaction data. We document consumers charging BNPL transactions to their credit card. Charging of BNPL to credit cards is most prevalent among younger consumers and those living in the most deprived geographies. Charging a 0% interest, amortizing BNPL debt to credit cards – where typical interest rates are 20% and amortization schedules decades-long – raises doubts on these consumers' ability to pay for BNPL. This prompts a regulatory question as to whether consumers should be allowed to refinance their unsecured debt.

JEL Codes: G51, G28, D04, D18, M38.

Keywords: BNPL, buy now pay later, consumer credit, consumer financial protection, credit cards, FinTech, household finance, regulation.

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1 Introduction

'Buy now, pay later' (BNPL) is an unregulated FinTech credit product enabling consumers to defer payments interest-free into one or more (often four or fewer) instalments. With £2.7bn in UK BNPL lending during 2020, the UK BNPL market is larger by volume of lending than the UK payday loan market at its peak. Rapid recent growth in consumer use of BNPL have led UK, EU, and US governments and consumer financial protection regulators to consider whether and how to regulate BNPL, while Australia recently introduced regulatory measures.[1]

Very little is known about how consumers use BNPL products, despite the market's rapid growth, and scrutiny by consumer financial protection regulators. At the time of writing, in December 2021, there were no relevant economics or finance research papers studying BNPL. 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 appearing was from other academic fields).[2]

We present the first quantitative academic research to study consumer use of BNPL. Given the lack of prior literature, we start our paper by providing institutional details on BNPL to help stimulate research on this topic.

One explanation for the lack of prior research is a lack of data: for example, most BNPL is not visible in credit files. To help fill this gap, we offer early insights into how consumers use BNPL, by analysing BNPL transactions that show in UK credit card transaction data.[3]

BNPL is often presented as a standalone credit product in the form of an interest-free loan repaid in one or more instalments. At the point of purchase, the consumer provides details of the account from which the payments will be taken, after which loan repayments occur. However, unlike other credit products, consumers can choose to repay BNPL using a credit card.

We research whether consumers charge BNPL transactions to their credit card, and the degree of heterogeneity in such behaviors across consumers. We find the existence of UK consumers charging their interest-free BNPL to their credit card. Such behavior is more common among (i)

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[1]US https://www.consumerfinance.gov/about-us/newsroom/consumer-financial-protection-bureau-opens-inquiry-into-buy-now-pay-later-credit/ & https://financialservices.house.gov/events/eventsingle.aspx?EventID=408594. UK: https://www.fca.org.uk/news/press-releases/fca-publishes-woolard-review-unsecured-credit-market & https://www.gov.uk/government/consultations/regulation-of-buy-now-pay-later-consultation.. EU: https://ec.europa.eu/info/sites/default/files/new_proposal_ccd_en_3.pdf. Australia: https://asic.gov.au/about-asic/news-centre/find-a-media-release/2020-releases/20-280mr-asic-releases-latest-data-on-buy-now-pay-later-industry/. UK payday loans: Gathergood et al. (2019a).

[2]See Online Appendix for more details including consumer surveys, blog discussions, and industry reports.

[3]See Agarwal et al., 2009 for an example of early analysis of consumer use of payday loans informing subsequent causal research (e.g. Gathergood et al., 2019a; Allcott et al., 2022)

younger consumers and (ii) consumers living in more deprived geographies. Taken together these facts raise a concern that some consumers will enter into a debt spiral. A debt spiral may occur from transforming a 0% interest BNPL debt that amortizes over a few weeks or months into credit card debt: a product that typically incurs 20% interest rates and has decades-long amortization schedules. It prompts a regulatory question as to whether consumers should be allowed to refinance their unsecured debt.

2 Institutional Details

2.1 BNPL Product Structures

Buy Now, Pay Later (BNPL) is provided at the point of sale, providing consumers the option to defer payments into one or more interest-free instalments.[4] BNPL is mainly used online with lenders typically a third party separate to the retailer. Most BNPL is unregulated. We analyze the UK BNPL market but the US market is analogous.

Repayment structures vary across and within BNPL lenders. For example, Klarna in the UK 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. In the US, the Consumer Financial Protection Bureau defines a BNPL as having 4 or fewer instalments but some products have more (e.g. OpenPay in the UK offers 3-10 instalments). While BNPL are primarily instalment loans, there is product innovation in structures. For example, Amazon features a credit limit ('Instalments by Barclays') while some debit and credit cards enable cardholders to pay particular transactions in BNPL-esque instalments (e.g. American Express's 'Pay It Plan It').

BNPL lenders primarily generate revenue through merchant fees of 3-6% rather than charging interest or fees.[5] Not all BNPL lenders charge late fees - for example PayPal does not. 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. Consumers may experience costs if their BNPL payment has knock-on adverse effects on their other finances such as triggering overdraft fees, accumulating credit card interest, missing payments on other bills (as found in the UK payday lending market by Gathergood et al., 2019a).

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[4]See Online Appendix for more institutional detail on BNPL.

[5]https://www.consumerfinance.gov/about-us/newsroom/consumer-financial-protection-bureau-opens-inquiry-into-buy-now-pay-later-credit/

2.2 Economics of BNPL

Economic theory provides mixed perspectives on the consumer benefits of deferred payments through credit products such as BNPL. The life-cycle model implies opportunities to smooth consumption at zero interest cost are weakly welfare improving – especially in a high inflation environment (Ando and Modigliani, 1963).

Deferred payments – through BNPL or other credit products – also presents the possibility for welfare losses. For example, financially unsophisticated or naïve present focused consumers mistakenly overconsuming (e.g. Allcott et al., 2022).

A key BNPL product feature is decoupling the consumption benefit today from the pain of paying later (e.g. Prelec and Loewenstein, 1998) – something especially attractive to present biased consumers (e.g. O'Donoghue and Rabin, 1999).

2.3 BNPL on Credit Cards

Lenders providing regulated credit are required to consider, at the time of credit application, the ability of a consumer to repay a debt – known as ability to pay in the US and affordability or creditworthiness in the UK – out of their income or assets *"without the customer having to borrow to meet the repayments"*.[6] This means, for example, a consumer cannot make a payment for their regulated UK mortgage with their credit card (or meet one credit card payment with another credit card). This applies irrespective of whether a consumer repays their credit card in full or revolves interest-bearing debt. These consumer protection regulations are designed to protect vulnerable consumers from harm such as cases where the incentives of lenders are misaligned with the incentives to improve consumer outcomes.

As BNPL is unregulated it is not subject to such ability to pay regulations: BNPL can be charged to debit or credit cards.[7] Transferring BNPL debt to credit cards increases the risks to the consumer and thus is a warning flag to regulators. Credit cards can be a more costly form of credit with an average interest rate of near 20% APRs unless the cardholder repays their balance in full. Credit cards also have decades long amortization schedules if the cardholder only makes the minimum payment – a costly behavior common in UK and US data (Keys and Wang, 2019; Guttman-Kenney et al., 2022). The burden of persistently carrying credit card debt may also have non-financial costs such as adverse mental health impacts. As one BNPL lender stated "there is

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[6]https://www.fca.org.uk/publication/policy/ps18-19.pdf. See Guttman-Kenney and Hunt (2017) & DeFusco et al. (2020) for research into UK and US ability to pay rules.

[7]In the UK, debit cards are the most common means of payment. 57% all UK payments are made on debit or credit cards. Cash has declined to from 45% to 15% of payments 2015 to 2021. The remainder of transactions are mainly bank transfers (e.g. Autopays/Direct Debits). Source: UK Finance, UK Payments Markets Summary, August 2022.

clearly greater risk of consumer harm from spending on credit cards" (than BNPL).[8] If a consumer repays their credit card in full and does not have binding liquidity constraints (i.e. not near their credit card limit and have liquid cash available) there is limited benefit from charging BNPL to their credit card. This is because any BNPL payments that are charged within the same credit card payment cycle (with its interest-free grace period that lasts 15-56 days) all come due at the same time. Any payments that come due in subsequent payment cycles effectively extend the grace period before payments are due. However, this comes at a cost since it is also discounting the benefits of any credit card rewards points relative to if the consumer had immediately charged the transaction to their credit card in one instant (non-BNPL) payment.[9] Finally, if a consumer is unable to meet their BNPL payments on-time, transferring BNPL debt to their credit card may be simply postponing an inevitable default and risk shifting the credit losses from the BNPL lender to the credit card lender. There is evidence of this: Capital One deemed the risks so great it has banned consumers from charging BNPL to their global credit cards.[10]

3   Data

We use anonymized UK credit card transactions data sourced from multiple banks and credit card issuers.[11] These data are created to be a real-time leading indicator used by industry to track spending (in aggregate and also of particular firms, sectors, and regions) and are provided to us under an academic licence.[12] Our data include approximately one million credit cards held by UK consumers between December 2018 & September 2022. For context, the median UK credit card-holder holds one credit card (Gathergood and Guttman-Kenney, 2016; Gathergood et al., 2019b). The Online Appendix contains additional descriptive analysis on these data.

Each transaction record provides details including the spending amount and tagged information on the type of spending. Each transaction has an anonymized card-account identifier to enable tracking over time. For each card-account we observe the cardholder's age range and geography ('postcode sector'). Postcode sectors are very granular geographies: there are over 11,000 postcode sectors in the UK with each sector containing approximately 3,000 addresses. As these are a dataset of credit card spending they do not include when or whether the consumer made credit card repayments, their cost of borrowing, whether they made payments via debit cards, or have unpaid BNPL payments due.

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[8]https://www.cityam.com/buy-now-pay-later-firm-klarna-claims-credit-cards-pose-the-real-risk/

[9]There is also an effort cost of the consumer having another financial intermediary to interact with.

[10]https://www.reuters.com/article/us-capital-one-fin-payments/capital-one-stops-risky-buy-now-pay-later-credit-card-transactions-idUSKBN28H0OR

[11]See Baker and Kueng (2022) for a review of household financial transaction data.

[12]These are similar to data used in the US by Chetty et al. (2020) to track the COVID-19 pandemic in real-time. See Vavra (2021) for a review of using private sector administrative micro data for tracking the COVID-19 pandemic.

BNPL transactions are tagged by us via a field that records a transaction's payment processor (e.g. Afterpay, Klarna). We do not categorize PayPal as a BNPL lender in our analysis as we cannot distinguish BNPL from its large, established non-BNPL business of processing payments. Klarna are the largest BNPL lender in the UK but they also provide some payment processing services so we may be tagging some transactions processed by them that are not BNPL. Other BNPL lenders – most notably Clearpay – are only BNPL lenders without payment processing services.[13]

Although our data is a sample and subject to potential measurement error, we feel justified using it as an informative proxy for all BNPL usage in a market that currently has very thin data and, of course, as a highly accurate reading of BNPL usage on credit cards. The latter is especially important for regulators wishing to put in place measures that help consumers avoid high costs of debt, or at the extreme, entering debt spirals. We believe our data is an informative proxy given the absence of representative, comprehensive data: a matched, transaction-level dataset of BNPL and credit cards.

4 Results

4.1 BNPL Use On Credit Cards

Our first main finding is documenting the existence of charging of BNPL transactions to credit cards. BNPL transactions are commonly present on credit cards: 19.5% of UK credit cards active (i.e. with any transaction present) in December 2021 have a transaction by a BNPL firm charged to their credit card during 2021.

Some cardholders have multiple BNPL transactions on their credit cards. This may be due to multiple BNPL purchases or BNPL purchases split into multiple instalments. While each individual BNPL transaction is typically small (a median value of £19.65 and 96% are £100 or less), the total amount of BNPL transactions per card during 2021 by credit cardholders using BNPL is non-trivial: the median value is £157 and 17.6% have spent £500 or more.[14]

What fraction of all BNPL is charged to credit cards? In the US this is estimated to be 22%.[15] For the UK, a consumer survey estimates 26% of BNPL consumers paid for BNPL using their

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[13]Square is a payment processing business that recently acquired Afterpay (known as Clearpay in the UK). As they have different names we can differentiate Afterpay/Clearpay's BNPL from Square's payment processing in our transactions data.

[14]Understanding repeated use of BNPL is an important avenue for future research. For example, repeating analyses similar to that done on payday loans to understand consumer patterns of BNPL borrowing and how commonly they ultimately end up in default or a cycle of persistent debt. https://files.consumerfinance.gov/f/201403_cfpb_report_payday-lending.pdf

[15]https://www.creditkarma.com/about/commentary/consumers-rely-on-buy-now-pay-later-amid-record-inflation-use-credit-to-pay-it-off

credit card and 42% using any type of borrowing (e.g. credit card, overdraft, payday loan).[16] The incidence of such practices may vary across BNPL lenders and over time.[17]

The patterns of transactions we observe are consistent with a variety of potential economic models of consumer behavior. One plausible model is where overconfident consumers mispredict their future ability to repay BNPL on-time and, when payments come due, defer payments by charging them to their credit card – potentially transferring them interest-bearing credit card balances or defaulting on this debt.

4.2 BNPL Usage Over Time

Figure 1 shows rapid growth in the value of BNPL spending on credit cards between January 2019 and December 2021: increasing 21.4 times. To help interpret our time series of BNPL spending on credit cards, Figure 1 also includes an index of BNPL payments on debit cards – using a separate sample from the same data provider. Both series follow similar trends.

BNPL spending on credit cards as a percent of all credit card spending averaged 1.2% and 1.6% during 2021 and December 2021. This rapid growth lines up with official estimates which size the value of all UK BNPL lending during 2020 at £2.7bn - "more than tripling in 2020": in our data the 2020 value of BNPL transactions is 3.4 times its 2019 levels.[18]

December 2021 is the peak in BNPL spending on credit cards by transactions value and the index is 5.9 times December 2019 and 2.0 times its December 2020 levels. There are local seasonal peaks aligning to the timing of payments coming due for 'Black Friday' and Christmas spending. BNPL on credit cards grew during the first wave of COVID-19 (March - April 2020). These were a period when UK consumption sharply fell. BNPL on credit cards growing during this period may be a function of consumers shifting towards spending online during this period. Our real-time data also reveals a 2022 slump in BNPL on credit cards following worsening macroeconomic conditions: a period when BNPL lenders' valuations also fell.[19]

4.3 BNPL Usage By Age

What heterogeneity by consumers' age is there in BNPL usage on credit cards? Figure 2 finds the use of BNPL on credit cards is more prevalent among younger consumers. 84% of overall

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[16]https://www.citizensadvice.org.uk/about-us/about-us1/media/press-releases/two-fifths-borrowed-to-pay-off-buy-now-pay-later/.

[17]One anonymous UK BNPL lender reported "less than 10% of its customers repay using a credit card". https://www.ukfinance.org.uk/system/files/UK-Finance-response-to-the-HMT-BNPL-consultation-FINAL-060122.pdf

[18]https://www.fca.org.uk/news/press-releases/fca-publishes-woolard-review-unsecured-credit-market & https://www.gov.uk/government/consultations/regulation-of-buy-now-pay-later-consultation.

[19]https://www.ft.com/content/483451db-9221-4ca4-83a6-b4ddc6bfcfbb

transactions by BNPL firms on credit cards is by consumers aged 18 to 49. While we do not observe credit card repayments or interest in our data, we know more generally that younger credit cardholders in the UK are least likely to repay their credit card balances in full and so are more likely to incur interest costs.[20]

Regulators may be interested in evaluating BNPL's role as gateway debt products for young consumers who are inexperienced users of financial products. BNPL may potentially be harmfully leading young consumers into a debt spiral of taking on increasingly expensive forms of debt. Or conversely, BNPL may be beneficially enabling young consumers to learn to prudently use low cost credit, improve their credit access, and avoid relying on higher cost products.

4.4   BNPL Usage by Area Deprivation

We seek to understand the vulnerability of consumers using BNPL. Regulators' risk assessments consider the vulnerability of consumers using financial products (e.g. giving higher welfare weights to more deprived consumers).[21] From a consumer welfare standpoint, a regulator may be more worried about potential consumer detriment from a (ultimately) high-interest product sold to lower income, less financially-capable consumers than a zero-interest product sold to consumers wealthy consumers. While we cannot observe income and other consumer characteristics at the individual level, we can draw upon postcode identifiers of the cardholder's address to match in measures at the local level.

To evaluate this aspect we aggregate data to the Local Authority District – areas of local government – and merge in the 2019 English Indices of Multiple Deprivation (IMD). IMD is the official government measure providing a relative ranking across districts of deprivation. IMD is constructed from 39 indicators to ensure it captures a broad range of resources.[22]

Panels in Figure 3 rank each authority by its IMD on the x-axes where a ranking of 1 is most deprived and 315 the least. Panels A and B use the sample of cards active in December 2021 and panels C and D those active in both January and December 2021 (results are consistent). We measure BNPL usage on credit cards the y-axes: Panels A and C use the percent of credit cards with *any* transaction by a BNPL firm in the last 12 months, Panels B and D use the share of the total value of spending on credit cards that by a BNPL firm in the last 12 months. The size of each dot is each district's share of population.

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[20]Financial Conduct Authority's (FCA) nationally-representative UK Financial Lives survey reports the proportion of UK consumers who revolve credit card debt (conditional on holding any credit card) by age: 30% of 18-24, 46% of 25-34, 46% of 35-44 to 37% of 45-55, 22% of 55-64, 10% of 65+. This survey does not contain any information on BNPL usage or the number of credit cards held preventing a like-for-like comparison. See Fulford and Schuh (2015) for estimates of revolving behavior across the life cycle for US consumers.

[21]https://www.fca.org.uk/publication/consultation/cp21-13.pdf   &   https://www.fca.org.uk/publication/finalised-guidance/fg21-1.pdf

[22]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/833951/IoD2019_Technical_Rep

We plot a linear regression (Equation 2) to describe the unconditional (non-causal) relationship between IMD and BNPL usage. There is one observation (d) per district in England (315 in total) where Y_d are our measures of BNPL usage (0-100) and IMD_d is the ranking of IMD (1-315 where a higher value is *less* deprived). We weight each observation by its district's ONS population and cluster standard errors by regions of the UK to allow for spatial correlation across districts.

$$Y_d = \alpha + \beta \, IMD_d + \varepsilon_d \tag{1}$$

By both measures of BNPL usage we find the most deprived areas have statistical significantly (p-values < 0.001), higher charging of BNPL to credit cards in more deprived areas. The β co-efficients can be interpreted as follows: moving from the least to most deprived local authority is associated, on average, with *higher* BNPL use: 28 to 30% (4.4 to 4.6 pp) as measured by fraction of cards, and 58 to 66% (0.5 pp) measured by the fraction of spending.[23] Given this relationship it is unclear how much BNPL lenders restrict credit supply - something visible in regulated credit (e.g. Agarwal et al., 2018). While we do not observe whether these credit cards are repaid in full or accumulate fees or interest (or at what rate), we know more generally that credit cards in the most deprived areas of England are those least likely to repay in full, be eligible for 0% credit card deals, and instead have higher interest rates. [24]

While this relationship indicates BNPL's potential risks for regulators to consider, its welfare effects are unclear. BNPL may be welfare improving enabling consumption smoothing for liquidity-constrained consumers in poorer areas with high MPCs to increase their consumption or use BNPL to save money instead of borrowing on higher cost credit (e.g. overdrafts, payday loans). However, BNPL may be welfare decreasing if BNPL leads to increased borrowing on higher cost credit or consumers in poorer areas are less financially sophisticated or making naïve mistakes (e.g. overoptimism and/or present focused in their ability to repay BNPL debt). The effects of such naïvete has previously been evaluated in credit cards (e.g. Meier and Sprenger, 2010) and payday loans (e.g. Allcott et al., 2022). By increasing indebtedness, BNPL may cause broader distress (e.g. adverse mental health, missing other bills) that may outweigh consumption benefits.

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[23]Results robust to using income instead of IMD: BNPL use is 30% higher as measured by fraction of cards, and 68% higher as measured by the fraction of spending moving from the highest to lowest income local authority.

[24]Financial Conduct Authority's nationally-representative Financial Lives survey reports the proportion of UK consumers who revolve credit card debt (conditional on holding any credit card) is 52% for the most deprived decile of IMD compared to 20% in the least deprived decile of IMD. This survey does not contain any information on BNPL usage or the number of credit cards held preventing a like-for-like comparison.

5 Conclusions

We document that a large minority of UK consumers charge BNPL to credit cards, especially younger consumers and those living in in more deprived areas. This raises doubts on these consumers' ability to pay for BNPL and prompts a regulatory question as to whether consumers should be allowed to refinance their unsecured debt. Further research is required to measure how binding liquidity constraints are for consumers using BNPL, the effects of BNPL on consumers, whether BNPL is substituting for other payment mechanisms or forms of lending, and BNPL's competitive effects on these established products. Given the current interest by policymakers in the BNPL market, further research could fruitfully evaluate the effects of potential BNPL regulations.

6 Figures

Figure 1: Value of BNPL transactions on active credit cards (black line) and active debit cards (yellow line), 2019 - 2022
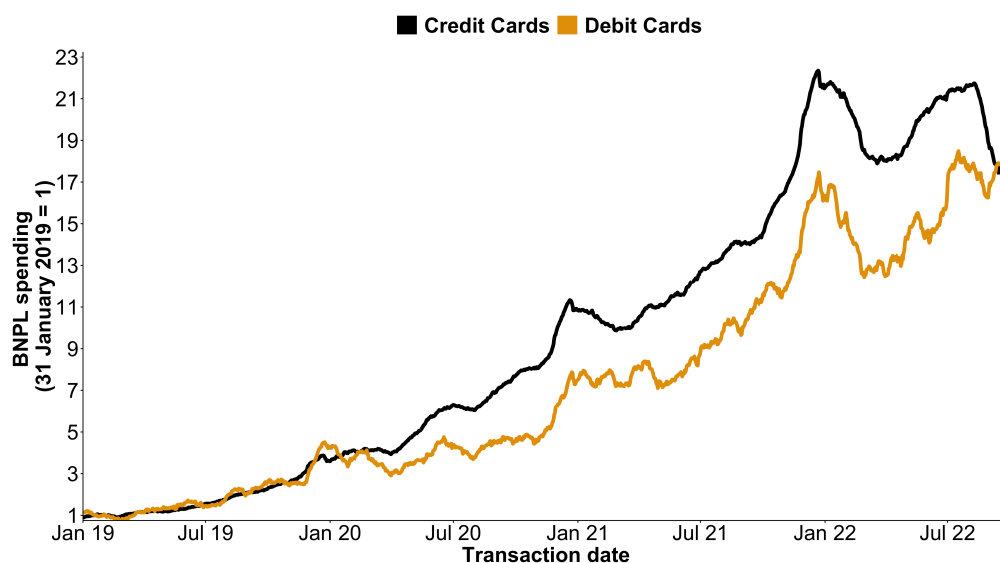
Notes: UK credit and debit card transactions. BNPL is buy now, pay later. Each series is 28 day moving averages of value of BNPL spending on those cards indexed to 1 in January 2019. 19.5% of UK credit cards active (i.e. with any transaction present) in December 2021 have a transaction by a BNPL firm charged to their credit card during 2021, while 15.3% and 12.1% have charged in the last six and three months leading up to December 2021.

Figure 2: BNPL usage on active credit cards by age, 2021

A. BNPL usage (% credit cards)

Age	BNPL cards used (% total cards used)
60+	7.9%
50-59	13.3%
40-49	17.4%
30-39	21%
18-29	26.7%

B. BNPL usage (% credit card spending)

Age	BNPL spending (% total spending)
60+	0.4%
50-59	0.8%
40-49	1.1%
30-39	1.4%
18-29	1.9%
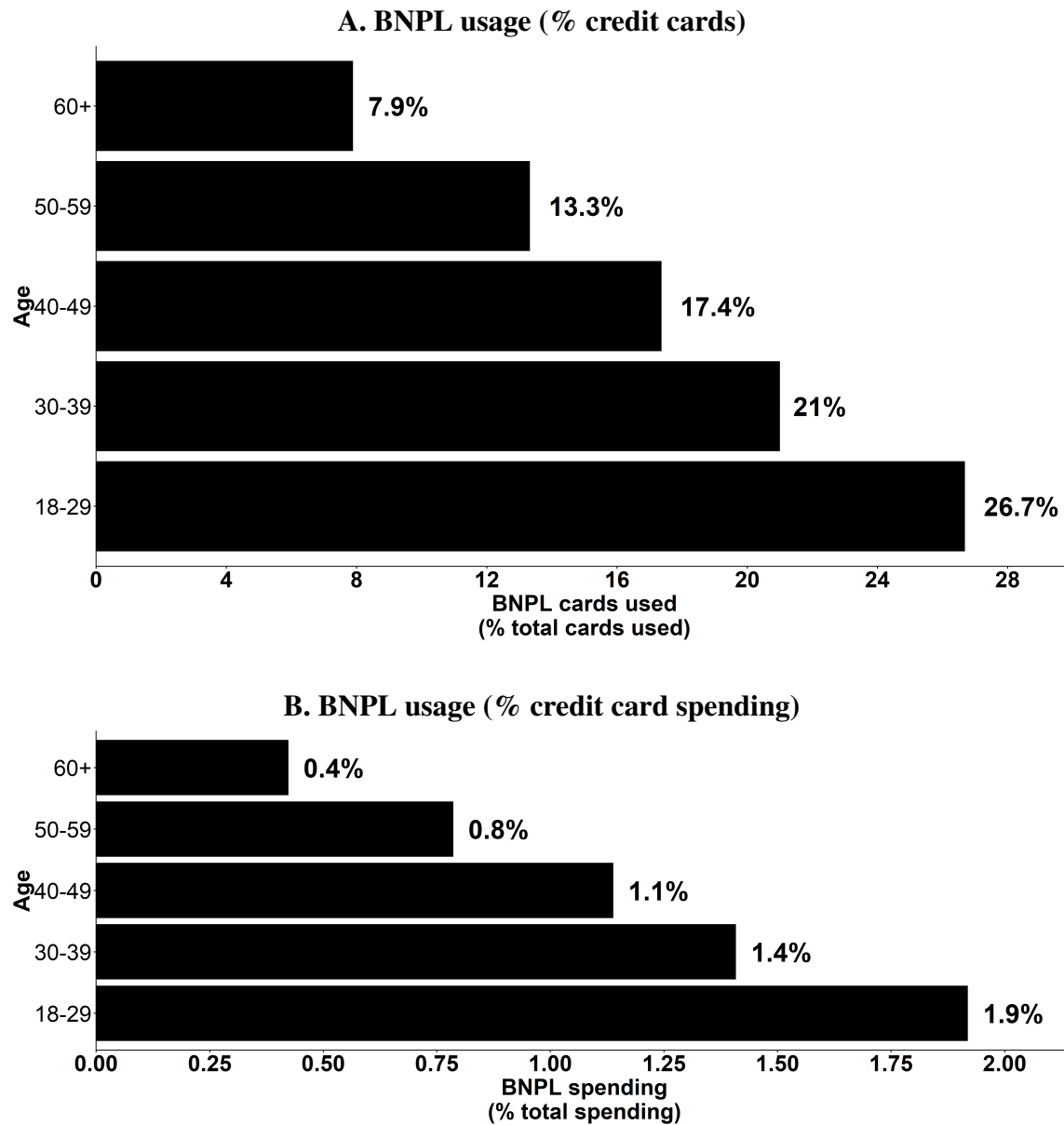
Notes: UK credit card transactions. BNPL is buy now, pay later. The sample of active credit cards are defined as those with any BNPL or non-BNPL transactions in both January and December 2021. Panel A shows whether any BNPL spending is recorded on an active credit card as a percent of all active credit cards. Panel B shows the value of BNPL spending recorded on active credit cards as a percent of the total value of spending on active credit cards.

Figure 3: BNPL usage on active credit cards by local area deprivation, 2021

I. BNPL usage on credit cards active in December 2021

A. BNPL usage (% credit cards)

Slope: -0.0139 (S.E. 0.0024)
Intercept:20.2100
R2: 0.2872

B. BNPL usage (% credit card spending)

Slope: -0.0016 (S.E. 0.0002)
Intercept:1.3772
R2: 0.3271

II. BNPL usage on credit cards active in both January and December 2021

C. BNPL usage (% credit cards)

Slope: -0.0145 (S.E. 0.0024)
Intercept:19.9065
R2: 0.2781

D. BNPL usage (% credit card spending)

Slope: -0.0017 (S.E. 0.0002)
Intercept:1.3456
R2: 0.3097

Notes: Credit card transactions in England, Ministry of Housing, Communities & Local Government (MHCLG), Office for National Statistics (ONS) data. BNPL is buy now, pay later. Data aggregated to Local Authority District (LAD) level based on cardholder postcode sector. Cardholders in England across 315 LADs since there is no official standardized UK-wide index of multiple deprivation. Due to small populations, City of London is merged with Westminster and Isles of Scilly merged with Cornwall. Size of dot is share of ONS England population estimates and the linear regression is weighted by these shares with standard errors clustered by UK region. Active credit cards are those with any BNPL or non-BNPL spending. Panels A and C are percent of the number of active credit cards in a LAD which have any BNPL spending. Panels B and D are percent of the value of credit card spending in a LAD on BNPL. Deprivation ranks by English Indices of Multiple Deprivation (2019) - more details: www.gov.uk/government/statistics/english-indices-of-deprivation-2019

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