Access to consumer credit in the UK

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Abstract

This paper investigates household access to consumer credit in the UK using information on 58,642 households between 2001 and 2009. Employing a treatment effects model and propensity score matching, we find that non-white households are less likely to have financing compared to white households. We also find that even if they obtain financing the intensity of borrowing is lower than for white households. Overall, non-white households seem to be in a weaker position to access consumer credit in the UK.

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1. INTRODUCTION

Access to basic financial products and services is widely regarded as an economic necessity, yet the ability of households to obtain a bank account or credit product varies dramatically across the globe (Demirguc-Kunt and Klapper, 2012a; World Bank, 2014). In the UK, policy concerns about access to finance have also been highlighted by the Deputy Prime Minister who put the banks under the spotlight by accusing them of excluding certain racial minorities from financial services (Clegg, 2011). The inability to obtain financial products and services (or 'having no access to financial products and services') is termed financial exclusion (Simpson and Buckland, 2009). Financial exclusion serves as a detriment to affected individuals because they encounter difficulties in participating fully in everyday transactions and this can act as a drag on economic and social progress (Demirguc-Kunt and Klapper, 2013). Few countries have been close to achieving universal financial inclusion (Beck and Demirgüc-Kunt, 2008) and this is a policy concern as it has been argued that there is a causal link between financial and social exclusion (Claessens, 2006; Gloukoviezoff, 2007; Carbo et al., 2007). Those who lack access to financial services may be excluded in other areas of society. Empirical studies on financial exclusion (Hogarth et al., 2005 on the US; Devlin, 2005 and Kempson and Whyley, 1999 on the UK; Simpson and Buckland, 2009 for Canada; Carbo et al., 2007 on the EU; Demirguc-Kunt and Klapper, 2013 across 148 countries) typically find that it is determined by factors such as levels of income, net worth, education, employment status, age, and ethnicity[1]. In advanced economies, the financially excluded have been found to include a disproportionate number of ethnic minority households (Kempson and Whyley, 1999; Kahn, 2008; Finney and Kempson, 2009).

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[1] A survey of research issues relating to financial exclusion is included in World Bank (2007, 2014). Also see European Commission (2008) and FITF (2009).

While households may be excluded from access to financial services because they do not fulfil minimum economic criteria (insufficient income, net worth and so on) it may also be because lenders discriminate between different types of borrowers on non-economic grounds. This behaviour has been widely investigated in the US, particularly in the context of access to housing finance. Evidence shows that ethnic minorities have less access to mortgage funding (Phillips-Patrick and Rossi, 1996; Siskin and Cupingood, 1996; Ross and Yinger, 1999) are more likely to be subject to predatory lending practices (Calem et al., 2004; Williams et al., 2005; Dymski, 2006), have higher mortgage application rejection rates and are offered less attractive terms (Black et al., 1978; Munnell et al., 1996; Ross and Yinger 1999), and pay more (Oliver and Shapiro, 1997; Black et al., 2003; Courchane and Nickerson, 1997; Rosenblatt, 1999) than whites with similar credit and other features. Outside the mortgage market, studies on consumer credit have also found that loan approval rates are lower for minorities (Duca and Rosenthal, 1993; Edelberg, 2007; Lin, 2010).

This paper aims to contribute to the aforementioned literature by investigating household access to consumer credit in the UK using a unique data sample compiled from the Living Costs and Food Survey gathered by the Office of National Statistics. Our sample consists of information on the economic, social and demographic features of 58,642 households between 2001 and 2009. Using contemporary modeling approaches and our unique sample we seek to provide a better understanding of the key determinants of household access to credit in the UK which we hope can help inform public policy.

The contribution of our study is threefold. First, previous studies on financial exclusion in the UK (such as Devlin, 2005; Finney and Kempson, 2009) provide little information on access to consumer credit. As such, the issue of credit market access is worthy of

investigation because if there are households that are excluded from borrowing this could exacerbate economic disadvantage. Second, although some literature (such as Kempson and Whyley, 1999; Khan, 2008; FSA, 2009) suggests that various households may not have access to credit this inference is based on simple descriptive analysis. Our approach provides a more rigorous methodology using both treatment effects model and propensity score matching approaches which helps us to deal with endogeneity issues that are typically ignored in other studies. Our findings, therefore, are more authoritative. Finally, the bulk of the literature on access to loan markets relates to U.S. households and there is a paucity of contemporary evidence on their UK counterparts – our analysis seeks to fill this gap.

The remainder of the paper is organized as follows: The next section summarizes the literature. Section 3 describes the data sources, explains the empirical methodologies used in the analysis and provides descriptive statistics. The results of estimations are presented and discussed in Section 4. Section 5 concludes.

2. LITERATURE REVIEW

As already noted the literature covering access to financial services spans two main subject areas, namely, *financial exclusion* and *discrimination*. In the case of the former, recent policy interest has been fuelled by work undertaken by the World Bank (2014) in its Global Financial Development Report which states that, 'access to financial services has a critical role in reducing extreme poverty, boosting shared prosperity, and supporting inclusive and sustainable development. The interest also derives from a growing recognition of the large gaps in financial inclusion'. (p.1) The report documents the findings of Demirguc-Kunt and Klapper (2012a, b, 2013) among others, and uses a variety of indicators (including access to

basic bank accounts, credit products and payment media) to measure global access to financial services. The World Bank (2014) reports that half the world's adult population - some 2.5 billion individuals - have no access to basic financial services. While this work has been an impetus for the recent study of access to finance in developing economies[2], previous literature has tended to focus on advanced countries. In the U.S. for instance, Hogarth et al. (2005) and Bucks et al. (2009) report that the financially excluded (also termed as unbanked) portion of the population declined from 14.6 percent in 1989 to 8.7 percent in 2004. They characterised a typical household who had access to financial products and services as one with higher income, secure employment, being home owners with better levels of higher education and of white ethnic background. In Europe, the population of financially excluded households (those without a basic bank account) varies extensively, ranging from 1 percent in Denmark to 36 percent in Greece, with similar attributes to those as already mentioned determining exclusion (Carbo et al., 2007). In the UK around 5 percent of households lacked a financial product from a mainstream financial institution in 1996 (FITF, 2009). Employed, mortgagers and households living on high income were less likely to be excluded from banking services (Kempson and Whyley, 1999; Devlin, 2005; FITF, 2009). Households without basic bank accounts included a disproportionate number of ethnic minority households and exclusion is highest among Black, Pakistani and Bangladeshi households (Kempson and Whyley, 1999; Kahn, 2008; Finney and Kempson, 2009). Kempson and Whyley (1999) argue that Black households are more likely to be excluded due to their positioning in the labour market and income levels. Restricted access to financial services among Bangladeshi and Pakistani households is further influenced by language and culture (FSA, 2000). For example Devlin (2005) finds that lower social classes, of which ethnic

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[2] For instance, see, Anson et al. (2013), Demirguc-Kunt and Klapper (2012b), Demirguc-Kunt, Klapper and Douglas (2013) and Demirguc-Kunt, Klapper and Singer (2013) and World Bank (2013).

minorities are over-represented, face greater exclusion from access to current and savings accounts.

Empirical analysis of discrimination in financial services is typically more rigorous than the work on financial exclusion and it focuses on two dimensions. The first, known as individual discrimination, relates to the refusal to lend to individuals due to various non-economic characteristics. The second, called 'redlining', concerns the refusal to lend to certain neighbourhoods, again, due to non-economic features. Early empirical analysis of racial discrimination predominantly focused on the mortgage market, prompted by analysis of data compiled by the Federal Reserve Bank of Boston under the requirements of the Home Mortgage Disclosure Act (HMDA) 1975 that sought to monitor minority access to mortgage finance (Munnell et al., 1992, 1996). Typically, blacks and Hispanics have higher mortgage application rejection rates and are offered less attractive terms than whites with similar credit and other features (Black et al., 1978; Munnell et al., 1996; Ross and Yinger 1999). Other evidence points to blacks paying more for their mortgages, around 0.5 percent, even when factors such as income levels, property dates and the age of buyer are controlled for (Oliver and Shapiro, 1997). Smaller, yet adverse, pricing differentials for minority mortgages are found in Black et al. (2003), Courchane and Nickerson (1997) and Crawford and Rosenblatt (1999), although these higher rates may be counteracted with more favourable terms (longer low rate lock-ins) elsewhere (Crawford and Rosenblatt 1999). Mortgage default rates may also be higher (Berkovec et al., 1996) or no different (Berkovec et al., 1998)[3]. Han (2011) develops a model of creditor learning and, using the mortgage market data of Munnell et al. (1996), finds that racial disparity in mortgage approval rates falls substantially for blacks the longer their credit history.

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[3] Also see Ladd (1998) for a review of the issues associated with mortgage discrimination.

Features of U.S. residential segregation have been widely documented (Massey and Denton, 1993) and academic interest in racial redlining increased after the passing of the 1974 Equal Credit Opportunity Act (which outlawed redlining), and the Community Reinvestment Act of 1977 (which made it illegal for lenders to have a smaller amount of mortgage funds available in minority neighbourhoods compared to similar white neighbourhoods). Early work found little evidence of redlining (Schafer and Ladd, 1981; Benston and Horsky, 1992; Munnell et al., 1996; Tootell, 1996) although the majority of later studies found that poor and minority neighbourhoods have less access to mortgage funding (Phillips-Patrick and Rossi, 1996; Siskin and Cupingood, 1996; Ross and Yinger, 1999) and are also more likely to be subject to predatory lending practices than comparable white neighbourhoods (Calem et al., 2004; Williams et al., 2005; Dymski, 2006).

Literature on discrimination in the consumer credit market is typically U.S. focused yet less developed than that on mortgage financing[4]. Early studies that use Household Survey data tend to be mixed with some finding evidence that minorities are not discriminated against in terms of access to consumer credit (Lindley et al., 1984; Hawley and Fujii, 1991) while other studies find that loan approval rates are lower for minorities (Duca and Rosenthal, 1993)[5]. A number of studies look at auto loan pricing and find no evidence of discrimination (Goldberg, 1996; Martin and Hill, 2000) although this could be because non-price terms differ for minorities compared to whites leading those discriminated against to drop out of the market (Ayres and Siegelman, 1995). Edelberg (2007) uses data from the tri-annual Surveys of Consumer Finance (SCF) to investigate consumer loan pricing and finds 'that interest rates

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[4] See Pager and Shepherd (2008) for an excellent review of the U.S. racial discrimination literature.

[5] Cavalluzo et al. (2002) also find higher rates of rejection among (otherwise equivalent) minority-owned small businesses looking to borrow.

on loans issued before the 1995 show a statistically significant degree of unexplained racial heterogeneity even after controlling for the financial costs of issuing debt'(p.2). Edberg also find that discrimination is more robust among homeowners than renters. More recently Lin (2010) uses SCF data and finds that lenders chose to discriminate against black and Hispanics because, on average, they have higher default risk[6].

As highlighted above, there is an extensive literature on financial exclusion and discrimination in the financial services sector which, overall, tends to find that higher income households typically have greater access compared to their lower income counterparts, and, all other things being equal, white households have better access than minority households. The remainder of this paper seeks to investigate these issues further by borrowing from the established exclusion and discrimination literature so as to develop a more rigorous approach to investigate access to finance in the market for consumer credit in the UK.

3. DATA AND METHODOLOGY

3.1. *Data*

We collect our data from the Living Costs and Food Survey gathered by the Office of National Statistics in the UK. This is an annual exercise to collect data on private household expenditure on goods and services. The results are multipurpose thereby serving as an instrumental source of economic and social data. The survey targets a representative UK sample of approximately 6,000 households and between 13,000 and 16,000 individuals every calendar year. Most of the questions address issues relating to household characteristics such as, race, family relations, employment details, as well as information on household spending

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[6] Becker (1971) referred to this as statistical discrimination. If lenders lent even less than was suggested by higher default rates to minorities this would suggest what Becker termed 'prejudicial discrimination'.

and income features. The anonymized version of the survey results from 2001 to 2009 is obtained from the Economic and Social Data Service (ESDS) a division of the UK Data Archive. The total sample amounts to 58,642 households. Following previous literature on the UK (Kempson and Whyley, 1999; Devlin, 2005), the household reference person is assumed to be the most influential within the household even though certain responses require that variables are aggregated for all household members.

3.2. *Methodology*

3.2.1. *The baseline model*

We use probit estimators to examine the household characteristics that influence access to consumer credit. The baseline model is as follows:

$$NF_i = \ \beta H_i + \delta R_i + \gamma X_t + \varepsilon_i \quad (1)$$

Where:

NF_i *is* a binary dependent variable, *NoFinancing*, indicating household *i*'s access to finance in the form of consumer credit. Consumer credit is defined as having a consumer loan or a credit card from a financial intermediary or similar institution (This definition does not comprise mortgages or other secured loans). A household is said to have access to finance when they are paying off a loan or have a credit card (Simpson and Buckland, 2009). Hence *NoFinancing* takes the value of 1 if the household does not have a loan or a credit card and 0 otherwise.

H_i is a vector of the head of the household and other household characteristics. The variables, explained below, are mainly drawn from earlier studies on discrimination (such as Duca and Rosenthal, 1993; Munnell et al., 1996; Goldberg, 1996; Tootell, 1996; Han, 2011)

and financial exclusion (such as Kempson and Whyley, 1999; Finney and Kempson, 2009; Devlin, 2005; Hogarth and O'Donnell, 2000).

Explanatory variables relating to the household's head are non-white, age, employment, occupational classification, education, gender and marital status. The variable *non-white* takes the value of 1 if the household's head is of a racial origin other than white and 0 otherwise. *Age* represents the age of the household head. In line with previous studies, we categorize *age* into ten year bands prior to the creation of relevant indicator variables for each of the bands ranging from 16 to 65+. *Employment* status of the household's head is categorized as employed, unemployed, retired or unoccupied. *Occupational classification* indicates the skill level and content of the head of household's employment. There are six categories as i) higher managerial, professional or large employer, ii) lower managerial, iii) clerical and intermediate, iv) small employers or self owned business, v) lower supervisory or technical and vi) routine and semi-routine manual or service[7]. *Education* indicates the educational attainment of the household's head. We use three levels as GSCE (UK school qualifications typically at 16 years of age), A-levels (UK school or college qualifications typically at 18 years of age) and higher education (post-school qualifications including further and higher university education). *Gender* indicates the sex of the household reference person. *Marital Status* indicates the marital status of the household reference person categorized as married, co-habiting or single[8].

Explanatory variables relating to the household in general include household size, income, benefits, tenure and region (where they are geographically located). *Household Size* indicates the number of persons in a household. *Income* indicates the total weekly income of the

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[7] It would also be ideal to control for industry of household head's employment and work experience, however, we are unable to control for this factor due to data unavailability.
[8] The category *single* includes household heads that are widowed, divorced and separated.

household. *Benefits* represent those households receiving any form of benefit payments from the Department for Work and Pensions or the Social Security Agency. *Tenure* represents the housing tenure of the respondent. Based on responses from the survey, this variable has been coded into owner occupiers, those paying off mortgages, those living in rented homes and those living in rent-free accommodation. R_i is a set of dummy variables indicates the region where the household is located[9]. X_t is a set of time dummies, representing years between 2001 and 2009, to capture the effect of the macroeconomic environment on bank lending practices.

In addition to the main dependent variable, *NoFinancing*, we also employ two alternative dependent variables, *NoLoan* and *NoCreditcard,* to examine the determinants of borrowing in relation to specific credit instruments. Hence, *NoLoan* takes the value of 1 if the household is not paying off a consumer loan and 0 otherwise and *NoCreditcard* equals 1 if the household does not own a credit card and 0 otherwise. Furthermore, we use the total number of loans (*numberofloans*) that the household is paying off as another indicator to measure households' ability to access to finance.

3.2.2. *Treatment effects model*

From the sample we can identify households that have financing in the form of consumer loan or a credit card. However, it is challenging to identify whether a household is excluded from the market voluntarily or involuntary. One could argue that certain households loathe the whole idea of borrowing from a financial institution and do not use any form of formal credit by choice. This type of household could be balancing their budget and may not require financing. On the other hand, households that need financing may be rejected by the banks.

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[9] The regions considered in the study include thirteen government office regions: North East, North West, Merseyside, Yorkshire and the Humber, East Midlands, West Midlands, Eastern, London, South East, South West, Wales, Scotland and Northern Ireland.

This type of household would be excluded from the market involuntarily[10]. Evidently there is a need to identify and control for those households that may require consumer finance. We hypothesize that households facing a budget deficit, those who spend more than their income, would apply for loans or credit cards. We proxy the budget deficit using an *income gap* variable: a dummy variable that takes the value 1 if household expenditure is more than its income and 0 otherwise[11]. However, *income gap* is itself an endogenous variable as such we introduce a treatment effects model to deal with this potential bias. The treatment model is defined in two equations below:

$$NF_i = \beta H_i + \theta I_i + \delta R_i + \gamma X_t + \varepsilon_i \quad (2)$$

$$I_i^* = \alpha Z_i + \mu_i, \, I_i = 1 \text{ if } I_i^* > 0, \text{and } I_i = 0 \text{ otherwise} \quad (3)$$

Where, I_i is the *income gap* and Z_i a vector of household characteristics that may influence the budget deficit. We identify *age* (continuous), *household size*, *income, expenditure*, existence of savings, life insurance, and private pension plan as the main determinants of *income gap* and use a two-step procedure to estimate the coefficients. As in all such studies, it is difficult to identify variables affecting selection but not the outcome (see Sartori 2003). We utilize four variables - existence of savings, life insurance or a private pension and expenditure - as instruments for our exclusion restrictions. We base our assumptions on the idea that people who plan and act about their future are less likely to face budget deficits as they will be more disciplined in their spending. Hence, together with other control variables, an individual's probability of facing a budget deficit can be manipulated without affecting the potential outcomes. Additionally, *expenditure* captures weekly household current outgoings on goods and services thus, both consumption and non-consumption expenditure. Firstly we

[10]A third option may be informal form of finance provided by family and friends. We cannot identify these observations in the database.
[11] Please note that due to data limitation income and expenditures are measured for a particular week and does not capture the possible inter-temporal substitution affect that can be observed within a year (such as saving up to pay for heating during the winter).

use a probit estimator for equation (3) and compute the Inverse Mill Ratio (IMR). At the second stage we estimate equation (2) by including the IMR term from step one.

3.2.3. *Propensity score matching*

The above regression approach estimates the correct treatment effect if the "selection on observables" hypothesis is true, namely, if all variables correlated both with the treatment and outcome variables are observed and included in the model. We also assume that the true model is a linear and additive one. As an alternative methodology and robustness check, we use matching propensity scores (Rosenbaum and Rubin, 1983) to compare white and non-white household and household head which are ex-ante very close in terms of all the observable characteristics. While the propensity score matching procedure also relies on the "selection on observables" assumption, it does not depend on the assumption of functional forms. Compared to the regression approach, it has the additional advantage of restricting inference to the sample of white and non-white households that are actually comparable in their observable characteristics.

If we assume that there are no significant differences in unobservable variables between the matched groups of households, the observed differential in obtaining financing can be attributed to the effect having received the treatment − in this case being a non-white household. Following Dehejia and Wahba (2002), we match the households based on the nearest-neighbour with the replacement propensity score methodology and compare the probability of having *no financing* in the two groups. Propensity scores, defined in this case as the probability of being a non-white household, given a set of observable covariates, is estimated by means of a probit model as shown below:

$$NW_i = \beta H_i + \delta R_i + \gamma X_t + e_i \quad (4)$$

where NW_i is the probability of being a non-white household. H_i, R_i and X_t are as defined above in (1). Here, we are interested in estimating the effect of this treatment variable in the outcomes variables *NoFinancing, NoLoan, NoCreditcard* and *numberofloans* controlling for the set of covariates described above. While we control for a rich set of covariates, it cannot be completely ruled out the existence of unobservable characteristics that may still bias the treatment effect.

3.3. *Descriptive statistics*

Table 1 provides summary statistics of the general features of households and source of financing. As mentioned earlier, the household is represented by the characteristics of a reference person and he/she is assumed to be the most influential within the household to make decisions. Variables represented by the household reference person cover *racial origin, age, employment status, occupational classification, educational attainment, gender* and *marital status*. Other variables reflect the attributes of the household. The percentage of white households neither paying off a loan nor owning a credit card is 31.7 while this figure is 35.4 percent for non-white households. Compared to non-white households, a larger percentage of white households are paying of loans (25.4 and 28.6, respectively) and own a credit card (57.8 and 60.7, respectively). A majority of households are either mortgagors or outright owners of the homes they live in. Average weekly household income is £419 while average expenditure is £359. Average household size is 2.4 members with the most common category being 2 members per household. Average age for the household reference person is 51.6 and 59.2 percent of all household heads are employed. 50.6 percent of all household

reference persons are married. In terms of gender, 62.1 percent of all household reference

persons are male.

4. EMPIRICAL RESULTS

4.1. *Baseline model*

At the outset, we estimate the probability of households having a source of consumer credit

using probit estimators following the previous discrimination and financial exclusion

literature (such as Duca and Rosenthal, 1993; Munnell, et al., 1996; Tootell, 1996; Devlin,

2005; Kempson, 2009; Finney and Kempson, 2009; Han, 2011). Results of the baseline

model are presented in Table 2 in the first three columns employing the dependent variables

(*NoFinancing*, *NoLoan* and *NoCreditcard*) one at a time. Controlling for other household

characteristics the variable of interest, *non-white*, is significant with positive coefficients in

all models. We find that non-white households are less likely to have one of the sources (or

both) of financing when compared to white households. We also examine a narrower sample

of households that experience a budget deficit and, therefore, are more likely to look for

financing. Results, presented in the latter three columns of Table 2, are similar to those

above. Overall, the results show households of non-white origin are less likely to have

consumer credit[12]. We expand our analysis in Section 4.2 using the treatment effects model.

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[12] Commenting on the other socio-demographic determinants of household access to consumer finance we find
that compared to the benchmark group households headed by persons aged between 16 and 24 and 65 and above
are likely to have financing in general. Employment is a strong predictor of financial exclusion. Households
that are not employed are less likely to obtain financing from financial institutions. There is some evidence that
households whose heads leave full-time education at or below GSCE level were more likely to be without
financial products (Kempson and Whyley, 1999). Our findings support this assertion with reference to financing
in general. In terms of gender, similar to Munnell et al.'s (1996) findings, we show that females are less likely
to be without either credit cards or loans. Using married household heads as the reference category we find that
single households are more likely to have limited access to consumer credit. Similar findings are reported by
Duca and Rosenthal (1993), Munnell et al. (1996) and Tootell (1996). We find that household size is not a
significant determinant of access to finance in general. Only large households, with over 5 members, are less
likely to have financing. We also observe that, compared to single occupants, larger households are more likely
to have a loan rather than a credit card. We find that households within higher income brackets are more likely

4.2. *Treatment effects model*

In Table 3, we present the results of the treatment effect model with *income gap* used as the treatment condition. Here we aim to establish a stronger link between the need for financing and the possibility of not having it. We find that the coefficient and significance of the variable *non-white* does not change. Hence, we still observe that non-white households are less likely to have consumer credit. We observe a negative and significant relationship between *income gap* and the dependent variables in all models. The finding is not surprising as it is reasonable to expect that households are more likely to use consumer finance if they face budget constraints. We also observe that IMR is significant, indicating the presence of selection bias. In any case, the main results outlined above on other household's characteristics impact on financing still hold[13].

4.3. *Results from sub-groups*

Here we examine the sample further by comparing sub-group of households where we are interested to see whether not having financing is prevalent in sub-groups that have similar income levels, employment status and home ownership[14]. In Table 4 we present selected results of our probit estimations only for the main variable of interest – *non-white*[15]. Firstly we divide the sample into two by level of income and estimate the models for two subgroups above and below median income. We find that the coefficient for *non-white* remains

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to have credit. Regarding the benefits, the results suggest that recipients were more likely to have no consumer credit. Similar to Duca and Rosenthal (1993), we find that mortgagors are least likely to be without a consumer loan or a credit card as compared to both owner occupiers and renters and within the tenure variable, renting households are most likely to have credit access.

[13] We present the results of the selection model for *income gap* in Appendix 1 Panel A.

[14] We recognize that income, employment and housing are all endogenous. While this is an important caveat to keep in mind for results presented in this section, we think it is nonetheless interesting to see the results for subgroups.

[15] As pointed out by the Editor probit models can lead to biased predictions of probability that are less than zero or greater than one. In order to check whether this is the case in our models, we examine all our probit estimates, reported in Appendix 2 to see whether we observe predictions of probability in these extremities. The results show that we do not observe any out of range [0,1] predictions for any of our models.

positively related to *NoFinancing* and statistically significant for households below the median income level. In contrast, we observe that the coefficient of *non-white* loses its significance for households above median income. This suggests that at higher levels of income the likelihood of having financing as a non-white household increases, especially for loans.

Looking at the households with an employed head, we still find significant and positive coefficient for *non-white*. On the other hand, the coefficient of *non-white* is not significant for the loan model for unemployed. We hypothesize that having a mortgage is a factor that may signal credit-worthiness of the household. Especially in the UK having a mortgage eases access to further credit sources. Therefore, it is of interest to examine the likelihood of borrowing by non-white households within these sub-groups. Results show that within the group of households that have a mortgage non-white households are still less likely to have credit.

Self-exclusion may also be a determining factor of credit exclusion. In simple terms some households may refrain from banking services at all. For robustness and to test whether this is the case for non-white households, we identify households without a bank account and drop these from the sample. This leaves us with a sample of households which are certainly in connection with the banking system. We find that results do not change and non-white households are still less likely to have credit.

4.4. *Intensity of financing*

So far we have used dummy variables to proxy access to consumer finance. Financial exclusion may also take the form of limiting the amount of finance that these households can

obtain. In this section we employ an alternative variable that measures the *intensity* of financing by households. We measure the intensity of financing by aggregating the number of loans that households have[16]. This gives us the opportunity to examine the circumstances of non-white households after they have accessed finance. We present results in Table 5 for the baseline and treatment effects models as well as for sub-groups. In general we find a significant and a negative relationship between *non-white* and the total number of loans. Exceptions are observed in the sub-group with above median income, household heads who are employed and mortgager households. For these sub-groups we do not find a significant coefficient for *non-white*. Overall, results show that non-white households have a lower number of loans when compared to white households. These findings indicate that even if non-white households may obtain financing, the intensity of borrowing is low compared to white households. Non-white households seem to be in a weaker position to access consumer credit.

4.5. *Propensity Score Matching*

One may argue that it is often difficult to control for the entire household and household head characteristics and other factors that may influence the dependent variable. As an alternative methodology and to check for robustness we utilize a propensity score matching approach. This technique avails us to match the observable characteristics of a white household to a non-white household[17]. We can then measure the impact of racial origin on having a source of financing on a matched sample.

We present the average treatment effect on the treated (ATT) for the whole sample and sub-groups in Table 6 where we match treated households with one, two and four corresponding

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[16] Although we have information on the number of loans each household has, the value of the outstanding loans are not available.

[17] We present the results of the models estimating the propensity score in Appendix 1 Panel B.

non-treated households. In almost all specifications the results show that for a household, on average, the effect of being non-white increases the likelihood of not having any source of financing (*NoFinancing*). One exception is the income level where we do not report a statistically significant difference between the treated and non-treated for the sub-group above median income level[18]. We also find that, on average, the effect of being non-white reduces the *number of loans* borrowed by a household. Results are more consistent with the two and four matched controls where we report statistically significant average treatment effects for *NoLoan* and *NoCreditcard* almost in all specifications and sub-samples. For results where one non-treated control is used, we report similar findings as above across different models; however, the results are not consistently significant. For example, for *NoCreditcard* we report insignificant coefficients for the first four models.

Overall, our results from propensity score matching confirms our main findings reported in the treatment effects model section. Primarily, we find that *non-white* households are less likely to have financing compared to white households. They also have a lower number of loans than white households. However, we report that these affects are not observed for non-white households at higher income levels.

4.6. *Limitations of the study*

Overall, our results suggest a degree of credit exclusion faced by non-white households in the UK. However, we need to bear in mind the (typical) limitations of the above analysis. While doing our best to control for a wide range of factors that explain access to credit services, it could be that our analysis is subject to the criticism of omitted variable bias (Berkovec et al., 1998; Pager and Shepherd, 2008; Han, 2011). This is because a large number of social,

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[18] We only report a significant variable for NoCreditcard in the model with four matched controls.

economic, and cultural differences may be correlated with racial differences and their omission could bias our results. Data sources used to investigate discrimination may also have their limitations (Horne 1994) and there can be potential endogeneity issues (Ross and Yinger, 1999) that statistical approaches (including propensity score matching) cannot entirely eradicate. We cannot claim that the modelling approach presented in this paper eliminates all such biases although we argue that potential for such bias are minimised due to wide array of variables and alternative modelling approaches undertaken. Another limitation relates to data availability. Knowing whether a household's loan or credit card application is rejected by the bank would lead to more robust analysis. However, the Living Costs and Food Survey do not ask a question relating to consumer loan applications and rejections.

5. CONCLUSION

Over recent years policy interest in access to finance has grown due to the view that barriers to basic financial services can inhibit both social and economic development. Globally, initiatives by the World Bank (2014) have sought to bring financial exclusion to the top of the development agenda, and even in advanced economies like the UK, senior policymakers have voiced their concerns about the barriers faced by ethnic groups in accessing credit. The issue is deemed of particular importance for the general welfare of society as in the modern world the inability of households to access basic consumer credit can exacerbate economic disadvantage that may lead to social exclusion. This paper seeks to investigate access to credit in the UK consumer credit market (loans and credit cards) utilizing a unique sample that documents the social, economic and demographic features of 58,642 households over 2001 and 2009.

Using a variety of modeling approaches and robustness tests we find that non-white households are less likely to have access to consumer credit compared to white households. We also find that even if they obtain financing, the intensity of borrowing is lower than for comparable white households. These outcomes are particularly prevalent for low income households. Other factors, such as being employed or having a mortgage, do not seem to have a lessening effect on the ability of non-white households to access credit. Our main results are confirmed by complementary methodologies and remain robust to alternative specifications.

The possible reasons why lower income non-white households have less access to consumer credit in the UK is unclear and beyond the scope of this paper. However, being aware of the link between access to credit and social exclusion, policy makers should seek to develop policies and mechanism aimed at reducing the barriers that appear to inhibit non-white households to access the consumer credit market. We suggest that there is a strong case for UK policymakers to consider U.S. style legislation to monitor the lending behavior of banks so as to ensure that any non-economic barriers to obtaining household credit are removed.

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