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**Racial Disparities in Credit Constraints
in the Great Recession: Evidence from
the UK**

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Racial Disparities in Credit Constraints in the Great Recession: Evidence from the UK

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Abstract

This paper investigates racial disparities in household credit constraints using U.K. survey data. We find a widening disparity in the proportion of racial minority households reporting they face credit constraints compared with non-minority households over the period 2006-2009. By 2009 three times as many racial minority households faced credit constraints compared with White households. The difference in credit constraints across racial minority and non-minority households is not explained by a broad set of covariates. While cross-section variation in reported credit constraints might most likely reflect unobservables, we argue this time series variation is very unlikely to arise due to unobservables and is evidence of growing perceived disparity in credit access between racial groups over the period.

Keywords: credit constraints, race

JEL codes: J15, G21, D14

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The recent recession experienced in the UK and across many OECD nations has been characterised as a ‘credit crunch’ in which the supply of credit was heavily curtailed to firms and households. Aggregate lending data reveals a sharp fall in lending growth around the time of the onset of the recession, consistent with a tightening of household credit constraints. Figure 1 illustrates the decline in consumer credit and mortgage lending growth over the period from annual growth rates of close to 15% for both series in the early 2000s to approximately 0% for the period 2007 onwards. Over the same period the value of housing mortgage equity withdrawal – the extraction of housing equity via remortgaging which is not re-invested in housing – fell sharply, also illustrated in Figure 1.

Of course, aggregate lending data reflect changes in both credit demand and supply and these data in themselves cannot be interpreted as evidence of tightening credit constraints: there might be good reasons to think that household demand for credit changes in periods of recession as households adjust to fluctuations in their incomes and expectations about future productivity. The identification problem inherent in interpreting aggregate lending data as evidence of movements in credit constraints, which cannot be resolved by aggregate data alone, is to dissect to what extent the reduction in observed lending to households is attributable to lender credit supply versus household credit demand.

The central goal of this study is to investigate what proportion of households have experienced, at least in their perception, binding credit constraints during the recent recession and, in particular, whether there is any differential pattern in credit constraints across households defined by a range of characteristics, most notably their racial minority status. Understanding the evolution of household credit constraints in a recession is crucial for household economic activity, most obviously the ability of households to smooth-out their consumption through a period of reduced income. Unemployment insurance and other forms of income replacement insurance exist in part due to the perceived restriction of credit to

households who face periods of unemployment or reduced income. Furthermore, the key argument for the effectiveness of a debt-financed fiscal stimulus policy is the existence of household credit constraints.

To answer this question, the paper uses a newly-available household survey dataset which includes questions on credit constraints and household finances. The analysis adopts the approach pioneered by Jappelli (1990) and Fissel and Jappelli (1990) in which a household survey instrument is used to identify whether households face binding credit constraints. The analysis presented is based on successive waves of a household survey which included a question on whether respondents were unable to borrow due to the cost of credit or difficulty obtaining credit, plus a second question on whether respondents had been discouraged from spending due to concerns over future availability of credit.

The attraction of this approach is that the survey question identifies individuals who wanted to borrow but faced a binding borrowing constraint and so identifies a supply-side restriction of credit. The second question was designed to capture the negative impact of future potentially binding constraints on current consumption as described in Zeldes (1989). To the author's knowledge, this second effect arising due to credit constraints has not previously been examined empirically using household survey data. This second question focuses on perceived credit constraints and therefore does not necessarily reflect actual credit constraints, and also relies on households being willing to report facing such constraints. However, for the purposes of understanding individual behaviour, perceived constraints might be as important as actual constraints. Responses to both survey questions are then examined alongside household characteristics. The most notable pattern found in the data is the widening racial disparity in credit constraints over the period considered.

The key element in our identification strategy is to examine the disparity in reported credit constraints among racial minority compared with non-minority racial households over time. We do not rely solely on a cross-section comparison of reported constraints across households: in a cross-section comparison greater reported credit constraints among minority households might arise due to unobservables not controlled for in a regression analysis (such as historical differences in past credit use or employment history, or willingness to report facing a credit constraint). Instead, we exploit the time-variation in reported credit constraints which would not be explained by these time-invariant unobservable factors – for example we have no reason to believe the onset of the recession impacted racial groups differently in their willingness of respondents to self-reported a constraint. To our knowledge, this is the first study to present evidence on racial disparities in credit constraints over time and, in particular, in a period covering the onset of a severe recession.

Results show the prevalence credit constraints trebled over the period, from affecting 9% of households in 2006 to affecting 27% of households by 2010. Results further show that, by 2009 racial minority households were two to three times more likely to report facing a credit constraint. Econometric analysis suggests this difference across racial groups is not explained by demographics, education, income or detailed financial characteristics. That is, conditional on a broad set of covariates which to a large extent capture determinants of credit supply and demand; racial minority status has become a strong predictor of facing a credit constraint. Our results do not provide direct evidence of racial discrimination on the part of lenders – for example, we do not have data on how credit application outcomes vary by racial background for a given credit score. However, we argue our results show evidence of a growing (at least perceived) disparity in access to credit between racial minority and non-minority households over the period which affected the behaviour of the two groups.

Literature Review

A key theme in the empirical consumption literature has been the development of empirical tests for the existence of liquidity constraints using data at the aggregate, international and individual level (Jappelli and Pagano 1989, 1994; Campbell and Mankiw, 1989, 1991; Attanasio, 1995, 1999). Within this literature, a subset of studies has focused in particular on quantifying the proportion of households facing credit constraints and understanding how household behaviour differs among constrained compared with unconstrained households. Standard household surveys used by economists contain data on the household's financial position including assets and debts, but it is difficult to infer whether the household faces a binding credit constraint from such data alone.

For example, households may hold low balances on their credit cards because they cannot access additional credit, or alternatively they may have substantial additional borrowing capacity but hold low balances because they do not wish to borrow at the current time. Although balances are typically observed in household data, the borrowing limits which apply to the lines of credit on which the balance is held (whether unsecured or secured) typically are not. Creditor-provided data can allow the researcher to obtain a measure of the credit limit facing a borrower on credit products held with that provider, but not other providers. Some studies exploit restrictions in loan-to-value ratios lenders will permit on mortgage borrowing to instrument for an unobserved mortgage lending constraint (as in Bridges et al. 2009; Hurst and Stafford, 2004), or similarly restrictions on loan-to-value ratios for car loans (Attanasio et al, 2008).

Consequently, economists have attempted to infer the existence of liquidity constraints via such as via observed consumption behaviour in response to predictable income changes (Parker, 1999; Johnson et al., 2006) or borrowing behaviour in proximity to

credit limits (Gross and Souleles, 2002). Parker (1999) and Johnson et al. (2006) exploit a predictable change in household income arising from the timing of tax rebates in the US to test for the excess sensitivity of consumption and explores the consumption response of households across the income and wealth distributions. Gross and Souleles (2002) obtain credit card lender data in which credit limits are observed and exploit a timing convention on the timing of credit limit increases to identify consumer utilisation rates in response to exogenous increases in limits. These studies typically find that credit constraints are more prevalent among the young and those with lower incomes and low assets. However, interpreting these correlations as indicative of a role for credit constraints is potentially misleading as low income and low assets may be poor proxies for being credit constrained (Crossley and Low, 2011).

An alternative approach to the problem is to use survey questions which ask households whether they have been refused credit or discouraged from applying for credit on the basis of likely rejection. Jappelli (1990) uses survey questions incorporated into the 1983 Survey of Consumer Finances on whether respondents had recently been applied for credit and had their application denied or whether respondents had been discouraged from applying for credit on the basis that they would most likely be rejected. The advantage of this approach is that a respondent answers on the basis of private information about their credit application history across a range of lenders, which is otherwise unobservable in household data. The main disadvantage of this approach is that it depends on respondents being willing to report their recent credit application history and it is difficult on the basis of respondent answers to quantify the magnitude of the constraint facing an individual household.

One finding from the literature on credit constraints is the pattern in credit constraints across households classed by racial type. Existing studies find racial disparities in credit use, credit refusals and credit 'red-lining'. Jappelli (1990) found that individuals from racial

minorities were less likely to report being denied credit or discouraged from applying for credit. However, subsequent studies have found that individuals from racial minority groups are less likely to hold consumer credit, even controlling for a broad range of characteristics (Bertraut and Haliassos, 2007) and, furthermore, are more likely to be refused mortgage credit conditional on application (Munnell et al, 2006). The identification problem is to establish the counterfactual credit supply facing a household with identical characteristics other than racial minority status. As this is not possible experimentally, studies rely on econometric analysis of household borrowing data and credit application outcomes.

Bertraut and Haliassos (2006) examine credit card holding and balances using US Survey of Consumer Finances data and estimate cross-section models for credit card holding. They find that racial minority households are less likely to hold credit cards conditional on education, income and financial wealth. They offer a demand-side explanation that racial minority households typically exhibit lower income growth and are so less likely to want to borrow. However, studies based on credit applications suggest this is not the case. Munnell et al (1996) exploited data on proprietary individual mortgage transactions matched with census data and credit rating agency data to create a dataset in which a measure of creditworthiness, race and demographic characteristics and the outcome of mortgage applications could be observed together. The authors found that racial minority status was a statistically significant and negative predictor of being granted a mortgage. Similar results on comparable data are found by Holloway and Wyley (2001) and Tootell (1996).

As further evidence of racial differences in credit application acceptance rates, a recent study by Cohen-Cole (2011) finds that individuals living in localities with higher proportions of racial minority households are less likely to be offered credit compared with similar individuals living in non-racial minority dominated areas. This finding is similar to that of an earlier study using urban data by Duca and Rosenthal (1993). However, the

findings of Cohen-Cole have been disputed by Brevoort (2011) who shows that Cohen-Cole's result is attributable to errors in data construction and the omission of neighbourhood income from estimation. In addition to studies which consider discrimination in mortgage or consumer credit lending, other studies also have found evidence of racial disparities in insurance premiums (Squires, 1997), lending to businesses (Blanchard et al., 2008; Alesina et al., 2008) and car loans (Edelberg, 2007).

Data and Survey Instrument

The Dataset

The dataset used in this paper is five waves of a cross-sectional household survey commissioned by the Bank of England and undertaken by a U.K. market research company, NMG, over the period 2006-2010. The 'Bank of England / NMG Survey' is an annual survey of a representative sample of U.K. households conducted in late September or early October each year. Broad results from the survey are documented in an annual feature article in the Bank's *Quarterly Bulletin* publication.

The respondent is a self-identified household head who answers on behalf of the household / family unit. The dataset includes a broad range of data on household finances including household incomes and debts, as well as demographic data, including educational background, and labour market status, identified from the respondent. For financial data, the respondent is first asked to provide a point estimate for the value. If the respondent answers that they do not know the point value, they are then asked to identify the range within which the value most likely falls from a menu of banded values. In cases where banded values are provided, we take the mid-range of the band as a point value for use in the analysis.

The respondent is also asked to identify himself/herself as either ‘White’ or one of a list of ‘non-White’ racial backgrounds (Black-Caribbean, Black-African, Black-Other, Indian, Pakistani, Bangladeshi, Chinese, or ‘Other ethnic group’). However, this question on racial background was not asked in the 2010 wave of the survey. We do not have any information on the racial background of other members of the household unit: so we cannot distinguish between couples who are both from a racial minority group and couples where one of the couple is from a racial minority group. So we designate ‘racial majority’ as the non-minority racial group and ‘racial minority’ as the minority racial group on the basis of respondent racial status only. On this basis, 10% of households in the sample have respondents are classed in the racial minority group.

Survey Instrument

In addition, in each wave respondents were asked the following two questions:

1. Borrowing Constraints Question: *‘Would you like to borrow any more at the moment but find it too expensive or difficult to do so?’ (Yes / No)*
2. Discouraged Spending Question: *‘Have you been put off spending because you are concerned that you will not be able to get credit when you need it?’ (Yes / No)*

All respondents were asked both questions. The first question aims to detect individuals who desire to borrow at the current time but have either been denied credit or discouraged from applying for credit on the grounds of cost. It identifies demand for credit on the part of the household by asking ‘Would you like to borrow’ and identifies a binding credit constraint through the term ‘find it too expensive or difficult to do so?’ and this separation is the main attraction of this question format. The question design contrasts slightly with Jappelli (1990), who used responses to a series of questions on whether individuals had been refused credit or discouraged from applying for credit which were included in the 1983

Survey of Consumer Finances. The question used here is designed to identify both those who have been refused credit and those who have been discouraged from applying for credit.

The second question aims to detect households who have cut their current consumption spending because of concern that credit will not be available in future. Zeldes (1989) shows that households who do not currently face a binding borrowing constraint but might face a binding constraint in future will cut their current consumption and save in a precautionary manner against the possibility of the constraint binding in future, though this effect is distinct from the precautionary savings motive for holding wealth. To the author's knowledge this type of question has not been included in any household survey previously, despite the theoretical basis for this second-order impact of borrowing constraints on household consumption behaviour.

As discussed earlier, the main attraction of using responses to these subjective survey questions to identify credit constrained households is that they reveal otherwise private information on the household's recent credit application experience and adjustment to its spending patterns in light of potentially binding credit constraints which is not otherwise available to the researcher. The main limitation of the use of responses to these questions is that they do not quantify the magnitude of the constraint in terms of the value of additional borrowing the household would ideally undertake or, in the case of the second question, the value of spending the household has been deterred from undertaking.

Results

Summary Statistics

We first present some summary statistics for the sample based on responses to the survey instruments and household characteristics. All summary statistics and estimates presented are weighted using survey weights. The proportion of households borrowing constrained and/or discouraged from spending over the five waves of data is shown in Table 1. The proportion of households reporting they were either borrowing constrained or discouraged from spending grew from 8.8% in 2006 to 27.1% in 2010. Most of this increase is attributable to a larger rise in the proportion of discouraged spenders, which approximately quadrupled over the period compared with a doubling of the proportion of borrowing constrained households. These data show the proportion of households who perceived they were affected by credit constraints by either measure trebled over the period.

Summary data for the five waves of survey, pooled together, is shown in Table 2. ‘Age’ is the respondent’s age in years. ‘Male’ is a 1/0 dummy designating a male respondent. ‘Married’ is a 1/0 dummy designating the respondent is married or in a relationship with a live-in partner, and takes a value of 0 otherwise. ‘Children’ is a 1/0 dummy to designate the respondent has at least one dependent child. The ‘Employed’, ‘Unemployed’ and ‘Self-Employed’ 1/0 dummy variables represent three (independent) employment statuses. Two further 1/0 dummies designate whether the respondent’s highest educational qualification successfully attained was A-Levels (college) or Degree (university) education. The household finances variables all refer to the household unit.

Pooling the five waves of data, there are 5516 households in the sample. In Table 2 the sample is split into categories by whether they were borrowing constrained, discouraged from spending, both, either or neither. Comparing Columns (d) and (e), those households who faced a borrowing constraint or were discouraged from spending are distinct in their demographic background by being, on average, younger, less likely to be married, more likely to have children and twice as likely to be from a racial minority group. They are also

more likely to be in the labour force, less likely to be homeowners, have on average lower incomes, higher values of outstanding unsecured debt plus mortgage debt, and less housing equity.

For some of these characteristics the differences in means between the groups are quite large. Households affected by credit constraints are typically nine years younger than those unaffected, and 27% more likely to have children. They are more than twice as likely to be unemployed and 22% less likely to be homeowners. Affected households have, on average, 17% lower incomes. It is also notable that households in the affected group are twice as likely to report they are from a racial minority background. Column (f) presents p-values from t-tests for the equivalence of means between Columns (d) and (e) which show there are statistically significant differences in the average characteristics of the two groups across a broad range of characteristics, including racial minority status.

A comparison of the number of households in categories (a) to (d) in Table 2 also reveals there is not a natural ordering in responses to the two survey questions. Of the 402 households in the borrowing constrained category (a), only 237 are also in the discouraged from spending category (b). One might expect households who are borrowing constrained to also be discouraged from spending. However, the survey question on discouraged spending asked whether households had been *'put off spending because you are concerned that you will not be able to get credit when you need it'*, which refers specifically to a precautionary reduction in spending on the basis of potentially future binding borrowing constraints, not a reduction in spending due to a current constraint. Households currently facing a binding constraint may well not be deterred from spending on the basis of a future potential constraint because instead they are prevented from spending by the current constraint.

Table 3 presents summary statistics by racial minority status. As the racial group question was omitted from the 2010 wave of the survey, the data shown in Table 3 is from the 2006-2009 waves only, comprised of 4,264 observations. The summary statistics for the two groups reveal that racial minority households are typically more likely to include children, more likely to have a respondent in employment and the respondent is less likely to have a degree. The homeownership rate is lower among racial minority households and household income is also typically lower among this group. These differences are all statistically significant at the 1% level, as is the average difference in liquidity constraints between households in these two groups by both measures of liquidity constraints.

Tables 4 and 5 break-down the rates of reporting borrowing constraints or discouraged spending by respondent characteristics, including racial minority status, over the five years of the survey. They show that the prevalence of constraints rose evenly across households defined by a broad range of characteristics (excluding race) over the period. Turning to households reporting a borrowing constraint in Table 4 first, it is apparent that, across all age groups, education groups, income groups, mortgage and unsecured debt groups, the rate of borrowing constraints approximately doubled over the period. This indicates a broadly even pattern across household characteristics over the wave of the data, showing that the increase in credit constraints in the sample as a whole is not explained by a concentration of credit constraints in one particular group.

From Table 5, the prevalence of discouraged spenders across these groups approximately trebled with a similarly even pattern across characteristics. There are some exceptions: in the case of the 50-64 age range the rate increased eight-fold (though the figure for 2006 might be seen as an outlier when compared to subsequent values for this group). Similarly, the proportion of those without a degree and below median income increased more than for other groups. With these exceptions, in general, the data illustrate a pattern of

tightening credit conditions impacting on all households (as defined across these criteria). That is, the pattern of cross-sectional variation in reported rates for both borrowing constraints and discouraged spending in 2006 remains through the following five waves of data.

However, for minority racial vs non-minority racial household responses the pattern is very different between the two groups. In 2006 the proportion of racial minority households reporting borrowing constraints or discouraged spending was very similar to that among non-minority racial households. However, between 2006 and 2009 borrowing constraints among racial minority groups increased more than four-fold, whereas for non-minority racial groups they less than doubled. Similarly, between 2006 and 2009 the rates of reporting discouraged spending among racial minority groups increased six-fold whereas among non-minority racial groups approximately doubled.

These differences in average level of credit constraints across the two groups are reflected in average levels of debt and debt-to-income ratios for the groups, provided in Table 6. Average unsecured debt values among racial minority and non-minority households both increased over the four years for which the racial group data is available, with no statistically significant difference in average levels between them. However, data on average debt-to-income ratios, which might provide a better indication of a credit constraint by scaling unsecured debt by household ability to pay, reveal that this ratio grew faster for racial minority households compared with non-minority households, and that by 2009 the difference in average ratios between the groups was statistically significant from zero at the 1% level. So the increased prevalence of credit constraints among racial minority households is reflected in their increased unsecured debt levels relative to income.

Multivariate Analysis

The pattern in the responses shows that in 2006 there was only a small racial disparity in borrowing constraints or discouraged spending across respondents, but by 2009 these rates had diverged strongly towards greater prevalence of both responses among racial minority households. One possibility is that these differences are explained by associated factors not controlled for in the unconditional comparison, such as different income levels or characteristics among racial minority compared with non-minority racial group households and changes in these over time. Another possibility is that the relationship between racial minority status and being credit constrained changed over the period.

To examine the first idea, that associated factors explain this difference, two multivariate pooled probit models are estimated for each of the credit constrained indicators, firstly using a specification which includes income and unsecured debt linearly and secondly in a non-linear specification which includes higher-order polynomial terms for both income and unsecured debt. As the racial group question was not included in 2010, the analysis is limited to the four waves 2006-2009. A range of demographic, socio-economic, housing tenure and financial control variables are included in the models. Time dummies and regional dummies are also included in the model. Results are shown in Table 7.

In each of the four models estimated the coefficient on age is negative and statistically significant at the 1% level in each specification. The marginal effect of -0.001 on the age variable in each model evaluated against the baseline predicted probabilities implies that a household with a household head one decade younger is only 25% more likely to report being borrowing constrained in the first model, or 8% more likely to report being discouraged from spending in the second model. The coefficient on the unemployment variable is positive in each specification and implies a household with an unemployed head is approximately one third more likely to report being borrowing constrained or discouraged from spending,

though this coefficient is only statistically significant in the case of the borrowing constrained specifications.

The non-linear specifications in income and unsecured debt show that there are strong and statistically significant non-linearities in the relationship between the level of unsecured debt held by the household and the likelihood of reporting either outcome, but this is only weakly the case for income. These specifications (shown in Columns 2 and 4) demonstrate the importance of controlling for non-linearities in the debt-constraint relationship in both cases.

In all four models, racial minority status has a positive and statistically significant (at the 1% level) impact on the likelihood of a respondent reporting they are either borrowing constrained or a discouraged spender, with little difference in the results from the models in which income and unsecured debt enter non-linearly compare with those in which they enter linearly. The magnitude of the marginal effect on the racial minority indicator in Columns 1 and 2 (0.04) evaluated against a baseline predicted probability of 5% suggests that racial minority groups are 80% more likely to report being constrained. In the case of Columns 3 and 4, the marginal effect is 0.07 and the equivalent value for the percentage increase in the likelihood of a household from a racial minority group reporting they are discouraged from spending is 54%.

Therefore, the magnitude of the difference in the cross-section pattern in responses to these questions by racial minority status in the multivariate model is weaker than in the unconditional comparison, but nevertheless racial minority households are nearly twice as likely to report being borrowing constrained and half as likely to report being discouraged from spending, controlling for a range of demographic, socio-economic and financial covariates. To examine whether the relationship between racial minority status and being

credit constrained has changed over time, two further sets of models are estimated in which the coefficient on the racial minority status variable is allowed to vary over time. (In the pooled probit model the coefficient on the racial minority indicator variable was restricted to be the same across waves of the data).

In Tables 8 and 9 the cross-section probit models estimated on the pooled data in Table 7 are re-estimated on each of the four waves of data separately for both dependent variables. The specification in which unsecured debt and income enter non-linearly is used here. The models include all of the covariates reported in Table 7, including region dummy variables. Table 8 presents results for the borrowing constrained dependent variable. The pattern in the control variables is very similar to that in Table 7, with the non-linear terms in unsecured debt significant in all specifications. The pattern in the racial minority variable is notable: the coefficient on the racial minority dummy is not statistically significant in either 2006 or 2007, but becomes positive, significant and strong in magnitude in the models for the 2008 and 2009 waves. The baseline average predicted probability for being borrowing constrained in 2009 across the whole sample is 5%, so the marginal effect of 0.12 on the 2009 racial minority variable coefficient implies that racial minority households were nearly two and half times more likely to face a borrowing constraint compared with non-minority households.

Table 9 presents results for models with the discouraged spender dummy variable as the dependent variable. As with the models shown in Table 8, the pattern in the control variables is very similar to that shown before. For this outcome variable, the coefficient on the racial minority dummy variable is negative and significant at the 5% level in 2006, positive in 2007 and again positive and with stronger statistical significance in 2008 and 2009. The marginal effect on the racial minority dummy of 0.14 in 2009 implies a racial minority household was nearly twice as likely to report being discouraged from spending.

These results from repeated cross-section probits suggest the relationship between racial minority status and reporting a constraint changed over the period. To test this idea formally, Table 10 presents results from pooled probit models with year-dummy interaction terms of the racial minority variable. This allows a test of the significance of the difference between the coefficients on different year interaction terms. However, this approach presents the difficulty in correctly interpreting marginal effect terms in non-linear models with interaction terms, explained by Ai and Norton (2003). The authors show that standard calculations of marginal effects on interaction terms are not applicable to non-linear models, and demonstrate how these can be calculated correctly for models with a single interaction term, but are undefined for models with multiple interaction terms.

Consequently, Table 10 presents results from both linear probability models (in which 3 year-dummy racial minority interaction terms are included to span the four waves of data) and probit models in which a single bivariate ‘early period’ (2006 and 2007) / ‘late period’ (2008 and 2009) time-dummy interaction term is used. For the probit models the marginal effects are then correctly calculated using the Ai and Norton (2003) derivation. Results from both models show the same time pattern in the coefficients as in the earlier tables: the racial minority dummy is statistically insignificant in the early periods but positive and statistically significant from zero at the 1% level in later period. In each case, the coefficients on the later year interaction terms are statistically significant from the base term at the 1% level. So these results confirm the statistical significance of the difference in the coefficient over time.

How might we explain this racial disparity in self-reported credit constraints, which is robust to a variety of econometric models which account for a range of covariates and time effects? As discussed earlier, an increase in the proportion of households reporting they faced a borrowing constraint or were discouraged from spending cannot, in itself, be taken as indicative of a supply-side contraction in available credit as the increase might be explained

by increased household demand for credit causing more households to hit a binding supply constraint imposed by lenders.

However, it is unlikely that a demand-side explanation would explain the racial disparity found in the analysis. That is, for the racial disparity to have arisen due to demand-side growth in credit demand it must have been the case that, conditional on demographic, financial and related variables, racial minority households increased their credit demand by more than non-minority racial households over the period considered. Therefore, the only plausible interpretation to these results is that racial minority households have found themselves more likely to perceive a binding credit constraint since the onset of the recession compared with non-minority racial group households.

Conclusion

This study has presented evidence which strongly confirms the idea that the recent recession has led to a large increase in the proportion of UK households facing binding credit constraints. It has also shown, for the first time, that a larger fraction of households adjust their spending behaviour in a precautionary manner in anticipation of the possible future tightening of credit constraints. This study has also shown a disproportionate increase in credit constraints reported by racial minority households compared to non-minority racial households during recent years.

This difference is not attributable to differences in age, incomes, employment status, demographics or the composition and level of debts across the two types of households and so no evident demand-side explanation for the difference is apparent in the data. Whereas the previous literature has found that racial minority households are less likely to use or be granted credit, we find that for the U.K. no disparity in credit constraints existed in 2006, but

a large disparity has emerged since. This racial disparity is much more pronounced during the recession period compared to pre-recession.

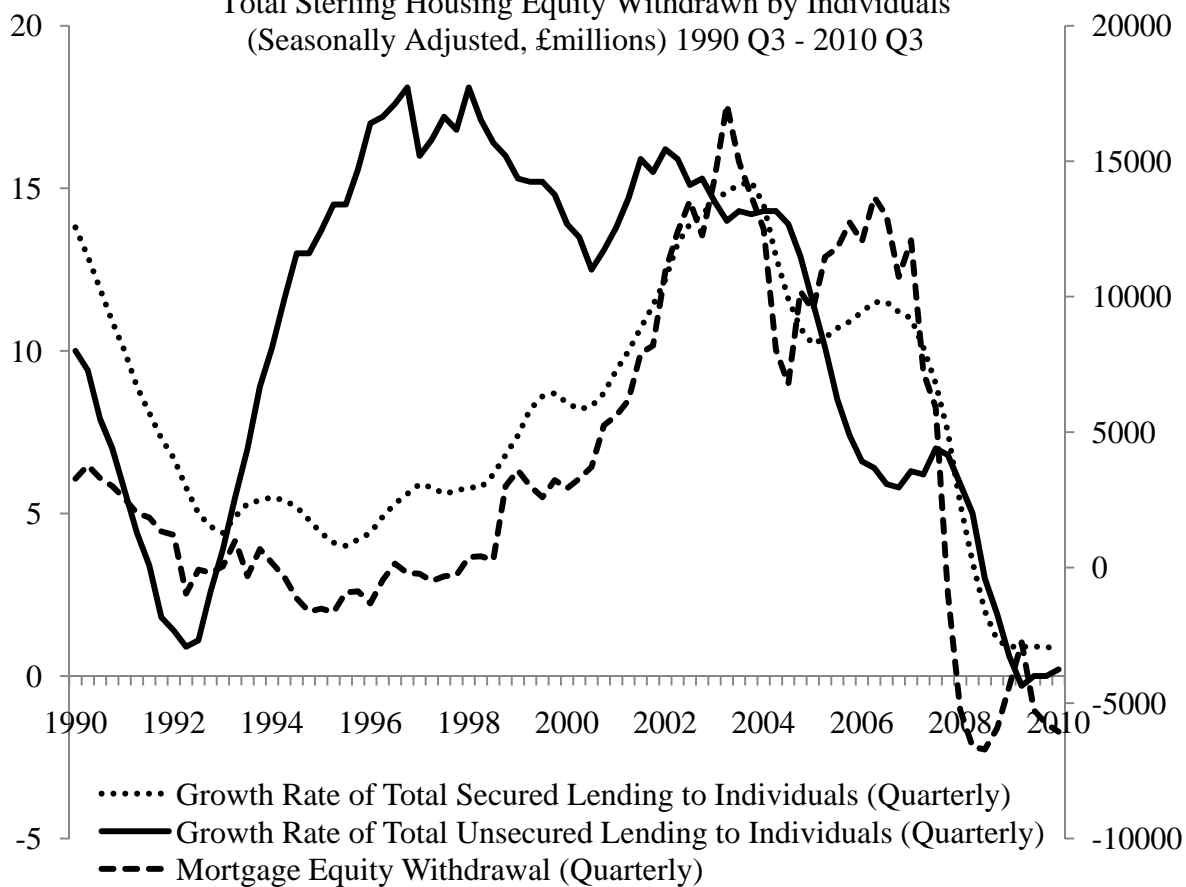
Why do we find this result? It may be the case that the onset of the Great Recession caused lenders to alter their attitude towards discriminating between racial minority and non-minority households. Whereas in a period of credit market growth and general growth in household income and ability to repay lenders may have been more willing to pool households on the basis of race, tighter market conditions in the recession might have caused them to discriminate in this dimension. Alternatively, racial minority households might have been affected by the recession differentially compared with non-minority households in some dimension not controlled for in the analysis which induced them to perceive a tighter constraint (though we control for household income and employment status in flexible specifications). We cannot provide a definitive explanation for our result, but document this new and sizeable disparity in credit constraints between racial minority and non-minority households since the onset of the recession.

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Figure 1: Annual Growth Rates of Total Secured and Unsecured Lending to Individuals (Quarterly Frequency, %) and Quarterly Total Sterling Housing Equity Withdrawn by Individuals (Seasonally Adjusted, £millions) 1990 Q3 - 2010 Q3



Source: Bank of England

Table 1: Proportion of Respondents Borrowing Constrained or Discouraged From Spending Due to Anticipated Credit Conditions, 2006 – 2010

	2006	2007	2008	2009	2010
a. Borrowing Constrained	4.3%	6.9%	6.0%	9.1%	9.1%
b. Discouraged Spenders	6.6%	11.7%	20.0%	18.9%	24.3%
Either a. or b.	8.8%	15.0%	22.3%	23.2%	27.1%

Table 2: Summary Statistics for Whole Sample 2006-2010

	(a) Borrowing Constrained	(b) Discouraged Spender	(c) (a) and (b)	(d) (a) or (b)	(e) Unaffected	(f) p-value for equivalence of means (d) and (e)
N	402	958	237	1123	4393	
<i>Demographics</i>						
Age	39.1	42.5	38.1	42.2	51.2	0.0000
Male=1	0.51	0.55	0.52	0.54	0.51	0.1019
Married=1	0.55	0.55	0.50	0.53	0.63	0.0000
Children=1	0.86	0.79	0.84	0.80	0.53	0.0000
Racial Minority=1*	0.21	0.17	0.24	0.17	0.08	0.0000
<i>Education and Employment</i>						
Employed=1	0.53	0.54	0.53	0.54	0.49	0.0046
Unemployed=1	0.09	0.07	0.10	0.07	0.03	0.0000
Self- Employed=1	0.06	0.04	0.07	0.04	0.03	0.3066
Highest Qual. A-Levels=1	0.21	0.19	0.21	0.20	0.19	0.5922
Highest Qual. Degree=1	0.26	0.25	0.25	0.25	0.31	0.0002
<i>Household Finances</i>						
Homeowner=1	0.43	0.50	0.38	0.50	0.72	0.0000
Household Income (£)	32,000	33,000	34,000	33,000	36,000	0.0000
Unsecured Debt (£)	4,200	4,600	4,700	4,400	1,900	0.0000
Mortgage Debt (£, owners only)	84,000	89,000	82,000	89,000	82,000	0.2244
House Value (£, owners only)	169,000	176,000	135,000	181,000	215,000	0.0001

*Notes: Ethnic minority status not included in 2010.

Table 3: Summary Statistics by Racial Minority and Non-Minority Racial Groups 2006-2009

	(a) Non-Minority	(b) Racial Minority	(c) p-value for equivalence of means (a) and (b)
N	3840	424	
<i>Demographics</i>			
Age	48.2	49.1	0.2140
Male=1	0.48	0.53	0.1056
Married=1	0.61	0.61	0.7510
Children=1	0.54	0.82	0.0000
<i>Education and Employment</i>			
Employed=1	0.49	0.59	0.0003
Unemployed=1	0.03	0.05	0.2019
Self-Employed=1	0.03	0.04	0.5085
Highest Qual. A-Levels=1	0.21	0.25	0.0628
Highest Qual. Degree=1	0.35	0.29	0.0084
<i>Household Finances</i>			
Homeowner=1	0.69	0.48	0.0000
Household Income (£)	38,000	33,000	0.0003
Unsecured Debt (£)	2,300	2,300	0.8061
Mortgage Debt (£, owners only)	82,000	84,000	0.0254
House Value (£, owners only)	214,000	216,000	0.0487
<i>Liquidity Constraints</i>			
Borrowing Constrained=1	0.06	0.14	0.0000
Discouraged Spender=1	0.14	0.25	0.0000

Table 4: Proportion of Respondents Borrowing Constrained by Characteristics, 2006 – 2010

	2006	2007	2008	2009	2010
<i>Age</i>					
Age < 35	8.8%	14.4%	12.0%	20.3%	16.7%
Age 35 - 49	3.5%	6.7%	7.5%	9.6%	10.6%
Age 50 – 64	2.0%	5.6%	3.2%	4.6%	5.4%
Age > 65	1.6%	1.4%	0.8%	3.5%	3.1%
<i>Degree Educated</i>					
Has a Degree	3.9%	6.5%	3.5%	7.2%	8.9%
Doesn't Have a Degree	4.4%	7.6%	6.8%	9.6%	9.1%
<i>Current Household Income</i>					
Above Median Income	3.6%	4.9%	4.9%	6.7%	7.6%
Below Median Income	4.6%	8.1%	7.1%	10.8%	10.6%
<i>Racial Minority Status (2006-2009 only)</i>					
Racial Minority	3.2%	7.7%	12.8%	23.7%	-
Non-Racial Minority	4.4%	6.0%	5.3%	7.5%	-
<i>Mortgage Leverage</i>					
LVR ratio >0.6	4.6%	5.4%	10.0%	12.7%	12.6%
LVR ratio <0.6	4.2%	7.1%	5.5%	8.7%	8.7%
<i>Unsecured Debt</i>					
Debt >£1,000	7.5%	9.8%	8.2%	14.7%	13.4%
Debt <£1,000	3.0%	5.9%	5.1%	6.6%	7.1%

Table 5: Proportion of Respondents Discouraged From Spending by Characteristics, 2006 – 2010

	2006	2007	2008	2009	2010
<i>Age</i>					
Age < 35	12.0%	21.5%	23.7%	34.8%	38.0%
Age 35 - 49	7.0%	14.2%	23.6%	22.1%	30.7%
Age 50 – 64	2.6%	7.2%	16.5%	12.7%	17.1%
Age > 65	2.3%	4.3%	7.2%	8.1%	9.2%
<i>Degree Educated</i>					
Has a Degree	3.9%	11.4%	14.6%	15.1%	23.9%
Doesn't Have a Degree	7.4%	12.1%	21.6%	20.2%	24.6%
<i>Current Household Income</i>					
Above Median Income	6.5%	9.6%	15.6%	14.6%	20.7%
Below Median Income	6.7%	12.1%	23.9%	23.0%	28.5%
<i>Racial Minority Status (2006-2009 only)</i>					
Racial Minority	6.2%	15.0%	30.8%	38.1%	-
Non-Racial Minority	7.2%	10.5%	18.8%	16.9%	-
<i>Mortgage Leverage</i>					
LVR ratio >0.6	12.3%	17.6%	21.3%	28.2%	37.9%
LV ratio <0.6	6.1%	11.3%	29.8%	18.0%	23.1%
<i>Unsecured Debt</i>					
Debt >£1,000	12.8%	21.9%	28.2%	28.9%	41.3%
Debt <£1,000	4.2%	7.9%	16.7%	14.7%	17.9%

Table 6: Summary Statistics for Unsecured Debt and Debt-to-Income Ratio, Racial Minority and Non-Minority Racial Groups 2006-2009

	(a) Non- Minority	(b) Racial Minority	(c) p-value for equivalence of means (a) and (b)
<i>Average Unsecured Debt (£)</i>			
2006	2040	1790	0.6636
2007	2060	2060	0.9892
2008	2400	1950	0.4865
2009	2700	3150	0.4865
<i>Debt-to-Income Ratio</i>			
2006	0.11	0.08	0.4388
2007	0.10	0.09	0.7527
2008	0.12	0.19	0.2125
2009	0.13	0.34	0.0004

Table 7: Pooled Probit Estimates for Borrowing Constrained / Discouraged Spending

	Borrowing Constrained		Discouraged from Spending	
	(1)	(2)	(3)	(4)
Racial Minority = 1	0.32** (0.09) [0.04]	0.30** (0.09) [0.04]	0.29** (0.08) [0.07]	0.31** (0.08) [0.07]
Age	-0.01** (0.001) [-0.0004]	-0.01** (0.001) [-0.0004]	-0.01** (0.001) [0.0004]	-0.01** (0.001) [0.0003]
Unemployed = 1	0.31* (0.14) [0.04]	0.32* (-0.002) [0.04]	0.12 (0.12) [0.03]	0.14 (0.12) [0.03]
Income	-0.06** (0.02) [-0.006]	-0.03 (0.10) [-0.003]	-0.08** (0.01) [-0.02]	0.06 (0.08) [0.01]
Income ²	-	-0.009 (0.02) [-0.0009]	-	-0.03* (0.02) [-0.007]
Income ³	-	0.0006 (0.001) [0.00006]	-	0.002* (0.0009) [0.0003]
Unsecured Debt	0.14* (0.06) [0.01]	0.76** (0.28) [0.07]	0.17** (0.05) [0.04]	0.79** (0.22) [0.16]
Unsecured Debt ²	-	-0.54* (0.21) [-0.0009]	-	-0.49** (0.17) [-0.007]
Unsecured Debt ³	-	0.09* (0.04) [0.009]	-	0.08** (0.03) [0.02]
Debt-to-Income Ratio	0.004 (0.05) [0.0005]	0.02 (0.05) [0.002]	0.03 (0.05) [0.007]	0.05 (0.05) [0.009]
N	4264	4264	4264	4264
Pseudo-R ²	0.12	0.12	0.11	0.11
Baseline Predicted Probability	0.05	0.05	0.12	0.12

Notes: standard error show in parenthesis, marginal effect shown in square brackets. * denotes statistical significance at the 5% level, ** denotes statistical significance at the 1% level. Model includes dummies for educational qualifications (gcse, a-levels, degree), dummies for marital status, employment status, age squared, homeownership status (outright owner, mortgaged owner, private renter) plus house value, mortgage value, monthly mortgage payment, monthly payment on unsecured debt plus time dummies and regional dummies. Values for household income, unsecured debt, house value and mortgage value are each divided by 10,000.

Table 8: Repeated Cross Section Probit Estimates for Borrowing Constrained – Individual Years 2006-2009

	(1) 2006	(2) 2007	(3) 2008	(4) 2009
Racial Minority = 1	-0.15 (0.31) [-0.01]	0.35 (0.21) [0.03]	0.35* (0.14) [0.03]	0.69** (0.17) [0.12]
Age	-0.08* (0.04) [-0.01]	-0.07* (0.03) [-0.01]	-0.08* (0.04) [-0.01]	-0.08* (0.04) [-0.01]
Unemployed = 1	0.64 (0.34) [0.08]	0.58 (0.34) [0.06]	0.60 (0.33) [0.08]	0.67 (0.31) [0.08]
Income	-0.02 (0.23) [-0.01]	-0.03 (0.24) [-0.01]	-0.02 (0.26) [-0.01]	-0.02 (0.28) [-0.01]
Income ²	0.01 (0.04) [0.01]	0.01 (0.04) [0.01]	0.01 (0.04) [0.01]	0.01 (0.04) [0.01]
Income ³	-0.02 (0.03) [-0.01]	-0.02 (0.03) [-0.01]	-0.02 (0.03) [-0.01]	-0.02 (0.03) [-0.01]
Unsecured Debt	1.74** (0.44) [0.19]	1.75** (0.45) [0.19]	1.81** (0.48) [0.21]	1.79** (0.48) [0.20]
Unsecured Debt ²	-1.17** (0.36) [-0.13]	-1.21** (0.34) [-0.15]	-1.15** (0.32) [-0.12]	-1.18** (0.39) [-0.13]
Unsecured Debt ³	0.19* (0.06) [0.02]	0.19* (0.07) [0.02]	0.19* (0.06) [0.02]	0.19* (0.07) [0.02]
Debt-to-Income Ratio	-0.01 (0.08) [-0.01]	-0.01 (0.08) [-0.01]	-0.01 (0.08) [-0.01]	-0.01 (0.08) [-0.01]
N	1018	1145	1093	1008
Pseudo-R ²	0.22	0.21	0.14	0.19
Baseline Predicted Probability	0.01	0.03	0.04	0.05

Notes: standard error show in parenthesis, marginal effect shown in square brackets. * denotes statistical significance at the 5% level, ** denotes statistical significance at the 1% level. Model includes dummies for educational qualifications (gcse, a-levels, degree), dummies for marital status, employment status, age squared, homeownership status (outright owner, mortgaged owner, private renter) plus house value, mortgage value, monthly mortgage payment, monthly payment on unsecured debt plus time dummies and regional dummies. Values for household income, unsecured debt, house value and mortgage value are each divided by 10,000.

Table 9: Repeated Cross Section Estimates for Discouraged Spender – Individual Years 2006 - 2009

	(1) 2006	(2) 2007	(3) 2008	(4) 2009
Racial Minority = 1	-0.93* (0.37) [-0.04]	0.41* (0.19) [0.07]	0.32** (0.13) [0.09]	0.51** (0.14) [0.14]
Age	0.01 (0.02) [0.01]	0.01 (0.02) [0.01]	0.01 (0.02) [0.01]	0.01 (0.02) [0.01]
Unemployed = 1	0.09 (0.20) [0.02]	0.10 (0.22) [0.02]	0.09 (0.21) [0.02]	0.12 (0.21) [0.03]
Income	-0.06 (0.15) [-0.03]	-0.08 (0.12) [-0.02]	-0.07 (0.14) [-0.03]	-0.07 (0.14) [-0.02]
Income ²	-0.01 (0.03) [-0.01]	-0.02 (0.04) [-0.01]	-0.01 (0.04) [-0.01]	-0.01 (0.03) [-0.01]
Income ³	0.01 (0.01) [0.01]	0.01 (0.01) [0.01]	0.01 (0.01) [0.01]	0.01 (0.01) [0.01]
Unsecured Debt	1.41** (0.35) [0.31]	1.40** (0.38) [0.30]	1.46** (0.31) [0.35]	1.49** (0.39) [0.38]
Unsecured Debt ²	-1.04** (0.33) [-0.27]	-1.06** (0.34) [-0.29]	-1.02** (0.35) [-0.25]	-1.03** (0.32) [-0.27]
Unsecured Debt ³	0.15** (0.06) [0.05]	0.14** (0.07) [0.06]	0.16** (0.07) [0.05]	0.14** (0.06) [0.05]
Debt-to-Income Ratio	0.17 (0.31) [0.02]	0.19 (0.26) [0.02]	0.30 (0.20) [0.02]	0.24 (0.21) [0.02]
N	1018	1145	1093	1008
Pseudo-R ²	0.20	0.21	0.18	0.19
Baseline Predicted Probability	0.04	0.07	0.14	0.17

Notes: standard error show in parenthesis, marginal effect shown in square brackets. * denotes statistical significance at the 5% level, ** denotes statistical significance at the 1% level. Model includes dummies for educational qualifications (gcse, a-levels, degree), dummies for marital status, employment status, age squared, homeownership status (outright owner, mortgaged owner, private renter) plus house value, mortgage value, monthly mortgage payment, monthly payment on unsecured debt plus time dummies and regional dummies. Values for household income, unsecured debt, house value and mortgage value are each divided by 10,000.

**Table 10: Estimates for Borrowing Constrained / Discouraged Spending,
Time Effect Interaction Terms**

	Borrowing Constrained		Discouraged from Spending	
	(1) <i>LPM</i>	(2) <i>Probit</i>	(3) <i>LPM</i>	(4) <i>Probit</i>
Racial Minority	-0.03 (0.02)	0.05 (0.14) [0.01]	-0.07 (0.04)	-0.23 (0.12) [-0.04]
Racial Minority * 2007	0.07** (0.02)	-	0.16** (0.06)	-
Racial Minority * 2008	0.08** (0.02)	-	0.15** (0.05)	-
Racial Minority * 2009	0.14** (0.04)	-	0.21** (0.05)	-
Racial Minority * after 2007	-	0.41** (0.16) [0.06]	-	0.78** (0.15) [0.23]
N	4264	4264	4264	4264
Pseudo R ²	0.08	0.11	0.12	0.13
Baseline Predicted Probability	-	0.05	-	0.12

Notes: standard error show in parenthesis, for probit estimates marginal effect shown in square brackets. * denotes statistical significance at the 5% level, ** denotes statistical significance at the 1% level. Model includes dummies for educational qualifications (gcse, a-levels, degree), dummies for marital status, employment status, age squared, homeownership status (outright owner, mortgaged owner, private renter) plus house value, mortgage value, monthly mortgage payment, monthly payment on unsecured debt plus time dummies and regional dummies. Values for household income, unsecured debt, house value and mortgage value are each divided by 10,000.