Financial Conduct Authority

MS14/6.2: Annex 6

Market Study

# Credit Card Market Study

## Interim Report: Annex 6 – Affordability analysis

November 2015

# Introduction

1. This annex sets out the detailed evidence in relation to affordability and problem debt. The evidence in this annex is covered in three sections:
   - **Analysis of account-level data.** This section summarises our analysis of the account-level data provided by firms, and illustrates the scale and nature of problem credit card debt.
   - **Consumer experiences, behaviours and biases.** This section summarises a range of evidence on consumer experiences, behaviours and biases in credit card markets, including from academic studies and existing third-party surveys.
   - **Firm behaviour and incentives.** This section describes firms' processes for assessing creditworthiness (credit risk and affordability) and granting forbearance. This is followed by an analysis of profitability, which we use to assess firm's lending incentives.

2. The main sources of information used in this annex are responses to our Market Questionnaire (MQ) and account-level data submissions from firms. The account-level data encompasses submissions from nine firms, which represent the breadth of business models in the market (e.g. monoline providers to large banks, operating in various market segments). The data covers the period January 2010 to January 2015 and contains monthly information on balances, repayments, and product information (e.g. interest rates and fees). After cleaning and matching the data it contained information on 21 million consumers (compared to 38 million in the whole market) and 41mn active accounts (95 million in the whole market).[1]

3. Throughout this annex we refer to problem debt as shorthand for credit card debt that has become unaffordable. With this description, and in the majority of our analysis of the account-level data, we refer to 'ex post' outcomes (i.e. the observed outcomes, for example in terms of repayments, for a consumer after a lending decision has been made). This is distinct from the 'ex ante' assessment that firms will have made when making lending decisions.

# Analysis of account-level data

4. Our interest in affordability and problem debt is motivated by the idea that some consumers are suffering welfare losses because of credit card debt. These losses may be financial (e.g. paying high interest rates or fees) and/or non-financial terms (e.g. forgoing essential expenditure, experiencing personal distress). Identifying when these adverse outcomes are occurring can be challenging, for example because levels of debt that are affordable one day may become unaffordable the next and, similarly, what is affordable for one person may not be for another. Past work, summarised in the literature reviews commissioned for the credit card market study[2], emphasises that there is no general consensus on the definition of problem debt. The majority of previous studies rely on one or more indicators based on subjective thresholds (e.g. months in arrears).

5. Definitions of problem debt are particularly challenging for credit cards. The flexible drawdown and repayment options of these products make it difficult to distinguish

[1] Each account was open for some or all of the five year period that the data spans.

[2] Argarwal, S. and Zhang, J., (2015) *A review of credit card literature: perspectives from consumers*
Mues, C., et al (2015) *Credit Card Market Literature Review: Affordability and Repayment*

between consumers actively choosing to use these features and those struggling to meet repayments and suffering welfare losses. This distinction is clearly important as the welfare implications are very different, with the flexibility offered by credit cards being a key feature that is likely to be valued by many consumers. Our approach to these challenges has been to first identify high-level concerns regarding the affordability for credit card products and then, using these as a guide, to specify a number of quantitative indicators that map to these concerns.

6. At a conceptual level, we identified three areas of potential concern:
   - The first concern is when consumers default or miss repayments. The financial and non-financial implications in these cases are likely to be significant.
   - The second concern is persistent and long-term debt. Consumers in these cases may be able to meet repayments but have reached a level of debt that they are unable to recover from, even over a sustained period of time. This cycle may begin with relatively minor incidents, but the cumulative welfare implications that follow may be large. We review some of the evidence of non-financial impacts of credit card debt later in this annex.
   - The third concern is when consumers are making minimum repayments while incurring interest charges. The low minimum repayment requirement of credit cards means that these consumers may not be struggling to meet the repayments but, over time, may be incurring high interest costs as a result of their repayment profile. Behavioural biases may contribute to the prevalence of minimum repayments, and we summarise some of the academic evidence on this topic later in this annex.

7. The indicators we chose cover a range of measures that map to these concerns. These include identifying consumers that: have been charged off[3], are missing payments, maintaining a high level of credit limit utilisation, or making systematic minimum repayments. We also considered the cost that consumers pay for credit and the length of time it will take them to repay their debt. Each of these measures is described in more detail below.

8. To implement each indicator it was necessary to specify a number of thresholds. For presentational purposes, we focus on certain baseline thresholds to present the detailed results. However, we also tested a number of alternative thresholds and definitions, which are presented as sensitivity checks. The choice of thresholds necessarily involves subjective judgement and, for this reason, the indicators are best interpreted collectively.

9. There are a number of limitations to each indicator.
   - In some cases they will capture some consumers that do not have problem credit card debt issues (for example, some consumers making minimum repayments will be doing so only for a temporary period before resuming higher repayments).
   - In other cases, individual indicators will neglect aspects of unaffordable credit card debt (for example, some consumers making above minimum repayments are doing so with difficulty).

10. The tension between these two possibilities motivated our approach of using several indicators and again highlights the importance of interpreting the results together.

[3] Charged-off refers to debt that issuers have deemed unlikely to be collected and that they have written off on their balance sheet. Consumers whose accounts have been charged-off have not been relieved of their repayment requirement, and charged-off accounts are often pursued via collection processes.

11. More generally, it is important to recognise that some degree of problem debt will always be present in this market. With any risk-based product, by definition there must be some losses. It is unfortunate but inevitable that some consumers will, for example, fall into financial difficulty because of major adverse life events (e.g. job losses, divorce). Many of the outcomes captured by our indicators may be due to these unavoidable causes. However, at least some of the outcomes will be due to other factors, for example because some consumers may make uninformed or poor borrowing decisions and firms find it profitable to lend to these consumers. We review these issues later in this annex.

12. The results from the analysis are presented in three subsections:
    - Indicators of potential problem debt;
    - Cost of credit and repayment term;
    - Balance transfers and future problem debt.

13. For each set of baseline results presented in the following three subsections we have used a random sample of approximately 5 million consumers, each of whom had at least one credit card during 2014.[4] In our sensitive checks, we draw on account level data from other periods.

## Indicators of potential problem debt

14. In this section we use quantitative indicators to provide an indication of the likely scale and nature of problem debt.

### Definition of indicators

15. We have used four indicators, each based on data from January to December 2014. The indicators are defined as follows:
    1. **Severe arrears:** consumers that have been charged off or were at least six months in arrears.[5]
    2. **Serious arrears:** consumers that missed three or more repayments, and were in arrears at some point.[6]
    3. **Persistent debt:** consumers that had an average credit limit utilisation of 90% or more while incurring interest charges.[7,8]
    4. **Systematic minimum repayments:** consumers that made nine or more minimum repayments while incurring interest charges.[9]

16. We chose these indicators based on a review of the academic literature, existing research and consumer surveys, and our own analysis and understanding of the market. As explained above, there is necessarily an element of subjectivity in defining the indicators and their thresholds. In recognition of this we have conducted a number of sensitivity checks to assess the impact of our choices on the results, for

[4] Data checks show that the results based on the random sample of five million consumers are aligned with those from the full dataset.

[5] We noted that the distinction between this category and the serious arrears category is partially driven by firm practices and their decision of when to charge-off a consumer. Some firms will do this sooner than others. This will mean that there is a degree of overlap between these two categories that the data does not reflect.

[6] We chose three repayments as the threshold rather than one or two repayments as we considered that the latter two thresholds may capture a number of consumers that simply missed repayments by mistake.

[7] This was calculated by finding the credit limit utilisation each month and then taking a simple average across months.

[8] We excluded those accounts not incurring interest charges from this indicator to remove those with promotional deals, for which maintaining a high credit limit utilisation is unlikely to be an indication of problem debt.

[9] We excluded those accounts not incurring interest charges from this indicator to remove those with promotional deals, for which making systematic minimum repayments is unlikely to be an indication of problem debt.

example by considering alternative thresholds (e.g. 75% rather than 90% for persistent debt, or six months instead of nine for systematic minimum repayment) or alternative definitions (e.g. using an absolute level of debt rather than credit limit utilisation for persistent debt). We describe these sensitivity checks in more detail later.

17. For each consumer, we checked which indicators applied to the accounts they held.[10] In some cases, more than one indicator applied to a single account or to multiple accounts held by the same consumer. We assigned each consumer a single indicator by selecting the 'worst' arrears status across all of their accounts, with indicator 1 being the most severe and indicator 4 being the least severe.[11]

18. For example, if a consumer held two credit cards, with their first card identified by indicator 4 (systematic minimum repayment) and their second card identified by indicator 1 (severe arrears), we would report indicator 1 for that consumer. As another example, if a consumer had one credit card account and this was identified by both indicator 3 (persistent debt) and indicator 4 (systematic minimum repayments), we would report indicator 3 for that consumer.

### Summary of results

19. The majority of credit card consumers do not appear to be dealing with unaffordable debt. The results of baseline indicators (described above) show that:
    - Approximately 1.9% of consumers (0.6m consumers) were in severe arrears. These consumers were either charged-off or were at least six months in arrears.
    - Approximately 4.9% of consumers (1.5m consumers) were in serious arrears. These consumers missed three or more repayments, and were in arrears at some point.
    - Approximately 6.6% of consumers (2.1m consumers) were in persistent debt. These consumers were incurring interest charges while maintaining a high level of credit limit utilisation.
    - Approximately 5.2% of consumers (1.6m consumers) made systematic minimum repayments. These consumers were incurring interest charges while also making minimum repayments for a sustained period of time.

20. We conducted sensitivity checks on the thresholds used in the definitions of persistent debt and systematic minimum repayments. This increased the proportion of consumers identified by each indicator, to 12.0% for persistent debt and 6.2% for systematic minimum repayments.

21. The severe and serious arrears indicators were correlated with credit risk as expected, with many of these consumers already charged off or likely to be so in the future. The persistent debt and minimum repayments indicators were less well correlated with credit risk, suggesting that a number of low risk individuals may be struggling with credit card debt or not paying down their debt for other reasons. For example, they may be unaware that they are making low repayments or that this leads to higher costs.

[10] To undertake the analysis at a consumer level, we needed to be able to identify credit card consumers who have multiple accounts, and be able to match the account level information provided by different firms to the same individual. To do this we relied on a data look-up table built by a CRA which mapped individual account identifiers to a unique consumer identifier. The data-table included a list of all UK consumers who have held at least 1 personal credit card account over the period 1 January 2010 to 31 January 2015. This includes both accounts which were originated prior to January 2010, and credit card accounts which have been originated over this period.

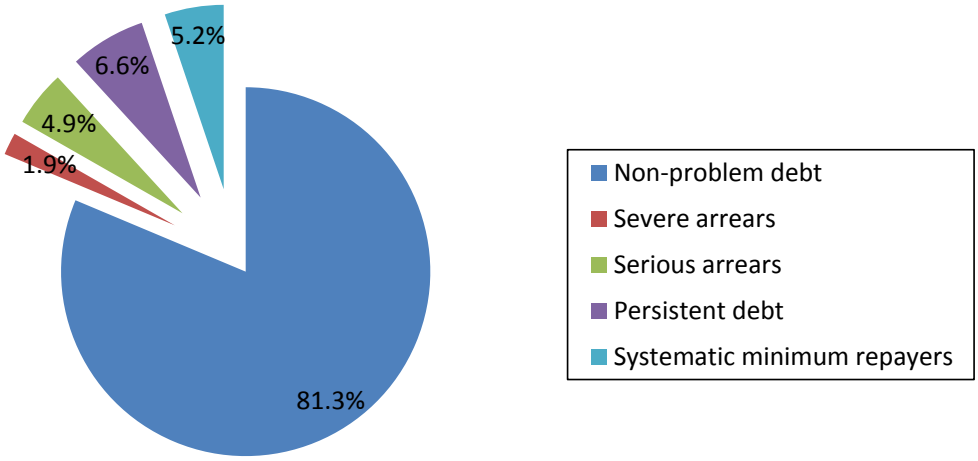
[11] This ordering is supported by analysis presented later in this annex regarding cost of credit and estimated length of repayment.

22. Later in this annex we consider the incentives of firms to lend to consumers, and in particular how these incentives differ across the four groups identified by our indicators.

## Detailed results

23. Figure 1 shows the proportion of consumers identified by each indicator in our baseline specifications (i.e. those described above in paragraph 19).

**Figure 1: Baseline indicators of potential problem debt**




*Source: FCA analysis.*

24. In the baseline results 1.9% (an estimated 0.6m consumers) are identified as being in severe arrears, 4.9% (1.5m consumers) in serious arrears, 6.6% (2.1m consumers) in persistent debt and 5.2% (1.6m consumers) making systematic minimum repayments.

25. We have conducted the following sensitivity checks of these results:
    - The results were consistent when replicated for the 12 months to December 2013 (i.e. one year earlier). We found that 18.2%% of consumers were identified by our indicators compared to 18.7% in the 12 months to December 2014. The proportion of consumers identified by each individual indicator was also broadly the same.
    - The results were similar when using different thresholds for the persistent debt and systematic minimum repayment indicators. Decreasing the credit limit utilisation threshold from 90% to 75% and the threshold for systematic minimum payers from nine months to six, and increasing the definition of a 'minimum repayment' by 10%, increases the proportion of consumers identified by the persistent debt indicator from 6.6% to 12.0% and those identified by the systematic minimum repayment from 5.2% to 6.2%.

26. We also considered an alternative definition of the persistent debt indicator. This alternative was based on the value of debt over time (i.e. in £) rather than credit limit utilisation (i.e. the 90% threshold described earlier) and time horizons over one year. In the absence of reliable income data, we considered a range of different

thresholds and settled on a threshold of £500 as a base case.[12] Using this approach, we found that 11.7% of consumers maintained at least £500 of credit card debt for the majority of months (75%) during a two years period (8.9% of consumers over a three year period). Comparing these consumers to those identified by our four baseline indicators, 4.2 percentage points (3.1 percentage points over a three year period) of consumers are additionally identified by this alternative definition and were not identified when using our baseline indicators. As expected, using a lower threshold for the value of debt returns a higher proportion (and vice versa for higher thresholds).[13]

27. In the remainder of this subsection we provide some insights into the profile of those consumers identified by our indicators. We first consider credit risk, and then more broadly the consumer demographics.

28. Problem debt is likely to be more prevalent for those consumers categorised as high risk (i.e. high probability of default). To assess this we considered how these indicators compared across consumer risk segments. For the purposes of the results presented in this subsection, we defined risk segments using a CRA credit score reported as of May 2015. We then defined risk segments by deciles (i.e. consumers ordered by risk score and then split into ten equally sized groups).[14]

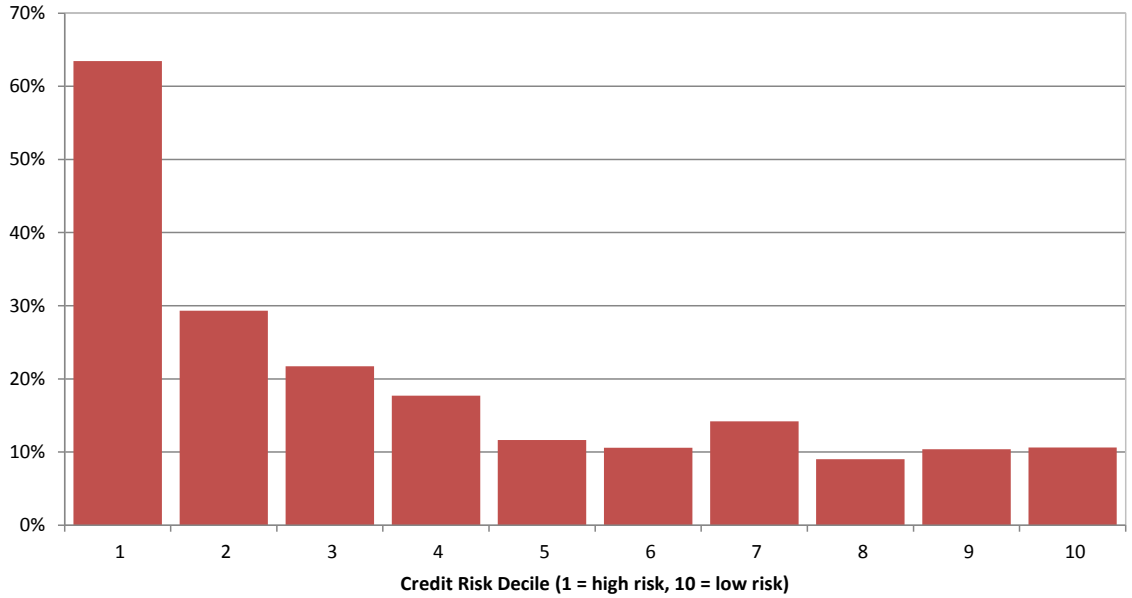
29. Figure 2 shows the proportion of consumers in each credit risk decile identified by any of our four indicators.

[12] Ideally the value of debt threshold would take into account the income of a consumer, reflecting that the burden of a particular level of debt will depend on your ability to repay and purchase other goods.

[13] The impact of using alternative thresholds is as follows. For a threshold of £250, the comparable results to earlier are: 13.4% had at least £250 of outstanding debt over two years of consumers (10.0% of consumers over 3 years), of which 5 percentage points (3.6 percentage points) were not identified by our baseline indicators. For a threshold of £1000, the comparable results to earlier are: 9.3% had at least £1,000 of outstanding debt over two years of consumers (7.1% of consumers over 3 years), of which 3.1 percentage points (2.3 percentage points) were not identified by our baseline indicators.

[14] The credit risk scores provided by the CRA are an ex-post measure of risk, measuring credit worthiness at the end of our sample period rather than at the point of account origination. The effect of using ex-post scores is that the adverse credit events captured by the indicator variables are already reflected in the risk scores. This explains part of the clustering in the high risk deciles. To consider the impact of using ex-ante scores we undertook the analysis using the (standardised) risk scores – see annex 10 - provided by firms as part of their account-level submission. We found that these results were qualitatively very similar in terms of the risk profile to those produced by the ex post scores.

**Figure 2: Proportion of consumers identified by problem debt indicators in each credit risk decile**

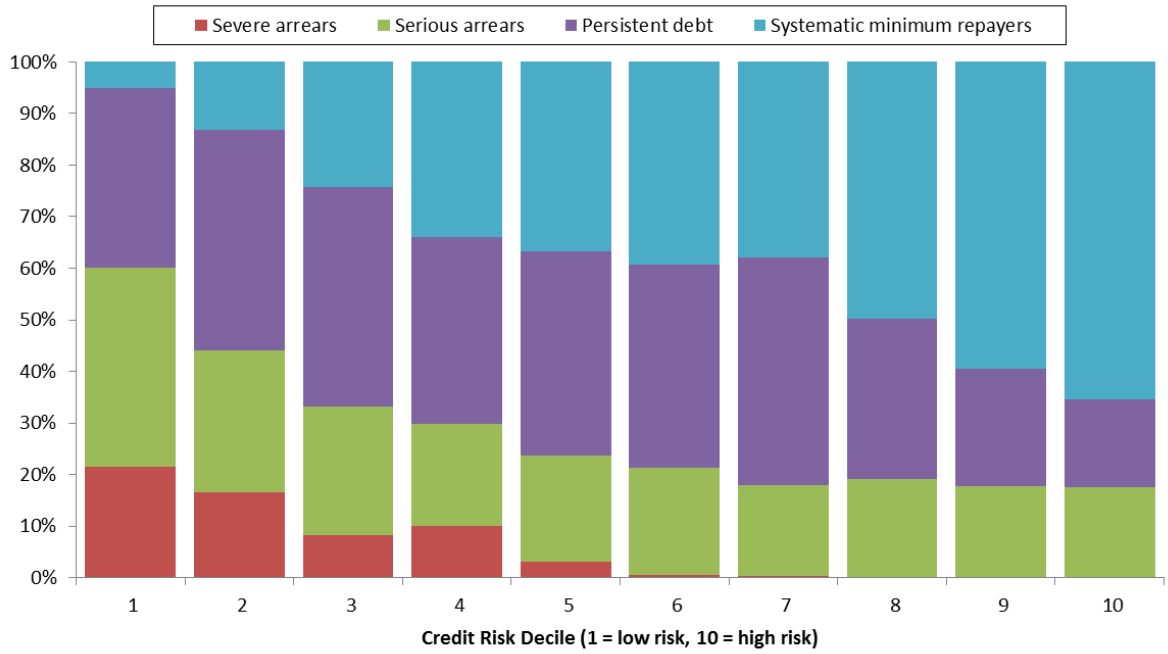



*Source: FCA analysis.*

30. As expected, a higher proportion of consumers in high risk segments are identified by the indicators. The proportion of consumers in the highest risk decile identified by our indicators (63%) is over three times higher than the average proportion of consumers across other risk deciles (15%).

31. Figure 3 shows how those consumers identified by the indicators (as presented in Figure 2) are split across the four individual indicators.

**Figure 3: Proportional breakdown of consumers identified by problem debt indicators by each indicator**




*Source: FCA analysis.*

32. For the highest risk consumers (decile 1), the majority of those identified by the indicators are in severe (22%) or serious arrears (38%). In general the severe arrears category, as expected, appears highly correlated with risk and very few low risk consumers were identified by this indicator.

33. In the middle of the risk spectrum (deciles 4–7), the majority of those identified by the indicators are either in serious arrears (20%) or persistent debt (40%). These consumers may not be at particularly high risk of default, but may be struggling to meet repayments and/or to reduce their debt levels.

34. For the lowest risk consumers (decile 10), the majority of those identified by the indicators fall into the systematic minimum repayment category (59%). This group of very low risk consumers may contain a proportion that are not struggling with repayments, but are making minimum repayments for other reasons. For example, they may be unaware that this leads to higher costs, or have unintentionally opted for a minimum repayment option with their direct debit.

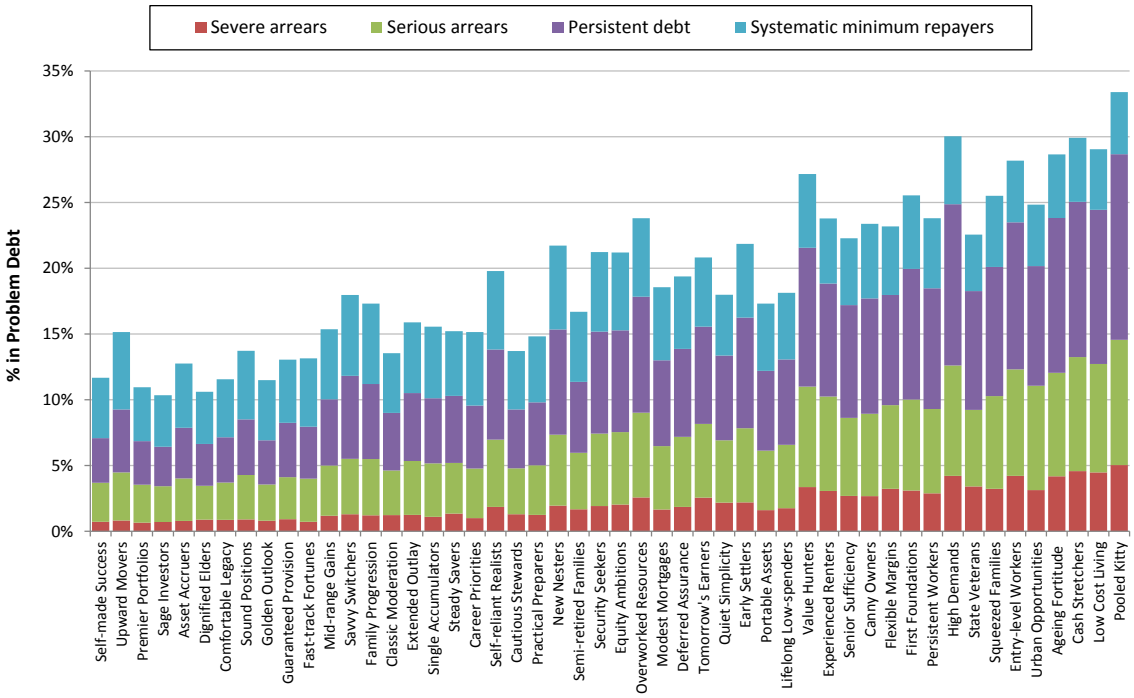
35. To profile the consumers identified by our indicators, we examined their demographic characteristics. We found that the majority of those identified were aged between 25 and 55 (over 75%), and that the gender balance was roughly even. This was roughly similar across the groups identified by different indicators. Compared to the population of credit card users as a whole, relatively few consumers of those identified by our indicators were older than 55 (around 36% in the population compared to 21% with problem debt).

36. In Figure 4, we provide a consumer profile of those identified by our indicators using Experian's Financial Strategy Segments (FSS) classification.[15] To help with the

[15] The Financial Strategy Segments (FSS) categorisation developed by Experian seeks to describe the financial behaviour of UK households. The FSS segmentation characterises financial behaviour around key dimensions such as demographics, investments, equity, borrowings and debt, and household attitude and aspiration. FSS classifies all adults in the UK into

interpretation of the results we have ordered the segments to reflect the level of deprivation typical for each segment (from least deprived to most deprived).

**Figure 4: Proportions of consumers in Experian FSS segment identified by our indicators**




*Source: FCA analysis of Experian data and account level data*

37. Figure 4 shows that 20–30% of credit card consumers from the more deprived segments are identified by our indicators. In comparison, around 10-15% of those from the least deprived segments are identified by our indicators. Individuals from deprived households are found to experience the highest levels of severe arrears, serious arrears and persistent debt. Conversely, systematic minimum repayment appears to be a more widespread across the different categories.

38. Finally, we examined the number of credit cards held by individuals in each problem debt category: those in severe arrears had the least (1.8 on average), followed by those with serious arrears (2.4 on average) and then those in persistent debt or making systematic repayments (each around 2.9 on average). Those not identified by our indicators held around 2 cards each on average.[16]

## Cost of credit and repayment term

39. To provide further insight into problem debt, we computed estimates of the cost of credit and repayment term. The former provides an indication of the direct financial impact of credit card debt while the latter may be related to the non-financial impacts (e.g. because consumers experience the debt for longer).

one of 93 individual types, which are the aggregated into 50 household types and 14 groups. See Experian (2012) for further details on the FSS segmentation and descriptions of the particular segments.

[16] In general, around half of consumers have only one credit card, and for most credit risk deciles the average number of credit cards is around 1.5 to 2, with only the low risk deciles having an average number of credit cards above 2.

## Definition of indicators

40. We have defined the two indicators as follows:

- **Estimated cost of credit:** the total interest and charges on an account divided by the total value of transactions. The rationale behind this measure is that it provides a simple estimate of the actual costs incurred by the account holder as a proportion of each £1 of transactions.[17] We calculated this measure for all accounts opened after January 2010 with total transactions above £50.
- **Estimated repayment term:** the length of time taken for a consumer to repay their outstanding credit card debt as of January 2015 – i.e. the last observation in our sample - with a rate of repayment equal to their average over the last 6 months.[18] It was assumed that no future transactions are made and all future interest charges are applied to the outstanding balance at the current purchase rate.[19]

41. While the two measures are clearly linked—lower repayments will lead to a longer repayment term and more interest charges—the cost of credit measure takes into account any charges that the consumer may have incurred. The cost measure also takes into account actual payments while the repayment term measure is an estimate based on recent behaviour.

42. We examine these indicators for accounts identified by the previous four indicators and the remainder of accounts. The results for consumers not identified as having problem debt provides not only a useful comparison, but also an alternative view of whether some of these consumers may be struggling despite not being picked up by our earlier four indicators. Each indicator is calculated at the account-level and the results below are presented on this basis.

### Summary of results

43. Consumers identified by our indicators pay a significantly higher cost of credit and will take significantly longer to repay their debt than those not identified.

44. From those consumers identified by our indicators, a substantial proportion pay a cost of credit over 100% (around 4.6%) and are estimated to take more than 10 years to repay (around 17.7%). The cost of credit and estimated repayment term generally increases with the severity of problem debt indicator. For example, those that have been charged off or are missing repayments pay more and are estimated to take longer to repay, than those making systematic minimum repayments.

45. For those consumers not identified by our indicators, over half pay an estimated cost of credit that is below 5% (many of whom will exhibit 'transacting' behaviour) and the large majority pay a cost of credit below 30%. Similarly, over half are estimated to repay their debt within one year and the large majority within five years. Only a

[17] An alternative measure of cost would be to calculate the Annual Percentage Rate (APR). This measure is usually applied when there is a fixed repayment schedule, which does not apply in the case of credit cards. As a result, applying the APR measure to credit cards raises a number of methodological challenges. An APR can be calculated each month, but then it must be decided how best to weight the monthly APR to give a single number. One solution would be to introduce a weighting scheme based on closing balance. However, such a solution creates new challenges, such as the treatment of fees and charges for consumers who are characterised by transacting behaviour, where this important component of costs would be ignored. Given these difficulties, we opted for the simple measure described above.

[18] As an indication of how representative average repayments over the last 6 months are as predictor of future repayments, we estimated the average repayments made on accounts over the 6 months prior December 2012 and measured how well they forecasted repayments in 2013. We found that the actual level of repayments predicted by this measure were within 30% of the average actual repayments for 52% of accounts.

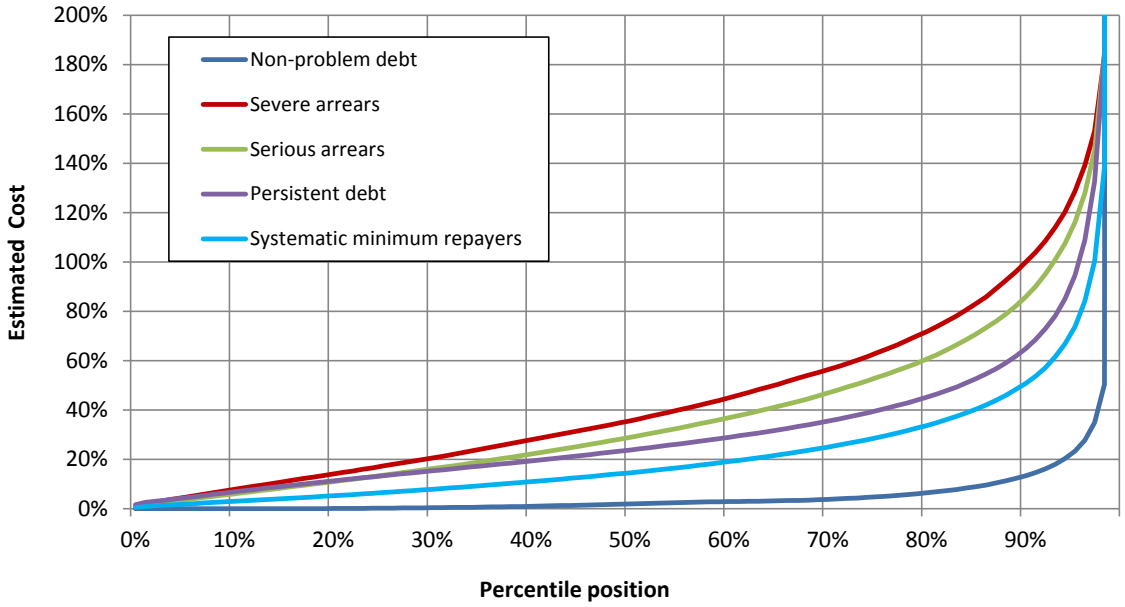
[19] This analysis has been conducted at the account-level as undertaking it at the consumer-level would be more complex and require making additional assumptions in order to capture the repayment behaviour of consumers across multiple cards.

relatively small proportion of these consumers pay above 100% (around 0.24%) or are estimated to take longer than 10 years to repay (around 6.21%). A proportion of those with an estimated repayment term exceeding 10 years are likely to be those consumers on 0% deals.

### Detailed results

46. Figure 4 shows the distribution of the estimated cost of credit for accounts that fall into each category of unaffordable credit card debt.

**Figure 4: Distribution of the estimated cost of credit, by indicator**




*Source: FCA analysis.*

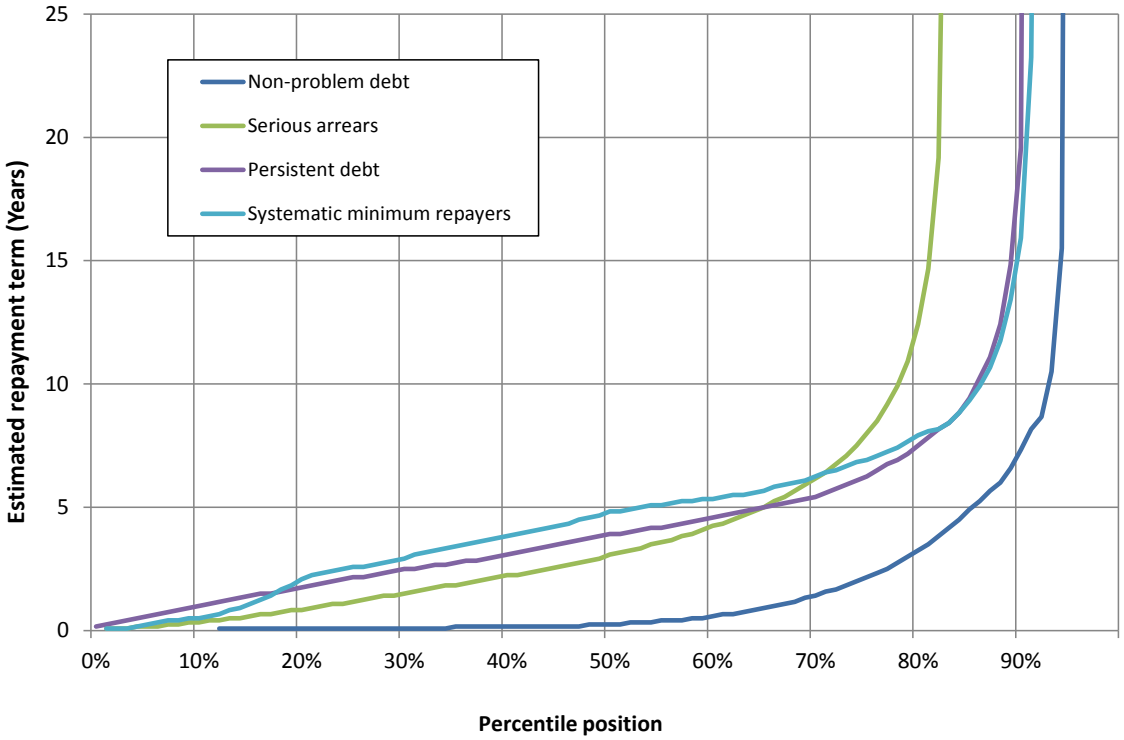
47. For consumers that met none of our indicators, around 95% paid an estimated cost of 20% or less. Many of these consumers will be transactors, paying little or no interest and charges.

48. For the consumers that were identified by our indicators, the estimated cost of credit was significantly higher, and increased in line with our hierarchy. Those in severe arrears paid the highest, those making systematic minimum repayments paid the lowest and those in serious arrears or persistent debt fell in the middle. For those in arrears or with persistent debt, over 15% of consumers paid an effective cost of 50% or more. A non-negligible proportion of consumers in each category also paid an effective cost of 100% or more—10% of those in severe arrears, 7% of those in serious arrears, 4% of those in persistent debt and 3% of those making systematic minimum repayments.

49. It is important to recognise that the cost of credit estimates reported in Figure 4 reflects only the observed costs that have accrued on the account to date. However no allowance is taken for the size of the outstanding balance at the end of the sample or the length of time it is expected to pay-off this balance which will result in costs in the future. These cost calculations will therefore underestimate of the full costs which are likely to accrue on the account, particularly for those accounts that are carrying a significant balance at the endpoint of the data (e.g. those with persistent debt).

50. Figure 5 shows the distribution of the estimated repayment term for accounts identified by each indicator. Those in severe arrears are excluded from the analysis on the basis that by definition they will not or are unlikely to repay.

**Figure 5: Distribution of the estimated repayment term, by indicator**




*Source: FCA analysis.*

51. The estimated repayment term results show a similar pattern to those for the effective cost of credit. Accounts not identified by our indicators have a substantially shorter estimated repayment term than those identified by our indicators. Of these accounts, 36% are expected to pay off any outstanding balance in full within 1 month (49% of accounts within two month), and therefore these accounts could be thought of as transactors. For accounts identified by our indicators, the results broadly support our hierarchy of indicators, though there is more overlap between categories than for the cost of credit results.

52. Around 86% of accounts not identified by our indicators are estimated to repay their credit card debt within five years. The comparable proportion for accounts identified as being in serious arrears, persistent debt or making minimum repayments is much lower at 55–65%. Taking an aggregate view (not shown in the figure), around half of accounts are on course to repay within one year, 70% within three years and 80% within five years.

53. We considered how these estimated costs and repayment terms differ by risk segment. Table 1 presents these estimates for each risk decile for the consumers identified by any of the four indicators and all other consumers. For illustrative purposes, we present these results relative to a benchmark of 100% for cost of credit and 10 years for repayment term.

**Table 1: Proportion of consumers with an effective cost of greater than 100%, or a repayment term greater than 10 years, by credit risk decile**

| | Proportion with a cost of credit of more than 100% | | Proportion with a repayment term of more than 10 years | |
|---|---|---|---|---|
| | Other consumers | Accounts identified by indicators | Other consumers | Accounts identified by indicators |
| All accounts | 0.24% | 4.61% | 6.21% | 17.70% |
| Decile 1 | 1.5% | 6.7% | 23.5% | 27.1% |
| Decile 2 | 0.5% | 4.9% | 9.6% | 18.0% |
| Decile 3 | 0.3% | 3.4% | 6.6% | 14.5% |
| Decile 4 | 0.2% | 2.7% | 5.8% | 13.4% |
| Decile 5 | 0.1% | 2.6% | 4.6% | 12.0% |
| Decile 6 | 0.1% | 2.2% | 4.2% | 11.8% |
| Decile 7 | 0.1% | 2.5% | 5.0% | 13.1% |
| Decile 8 | 0.1% | 1.9% | 3.5% | 11.6% |
| Decile 9 | 0.1% | 1.5% | 4.7% | 12.1% |
| Decile 10 | 0.1% | 1.2% | 4.9% | 11.5% |

*Source: FCA analysis.*

54. These detailed results show that relatively small proportions of accounts not identified by our indicators have an effective cost greater than 100% (0.24%) or a repayment term exceeding 10 years (6.21%). A proportion of those with an estimated repayment term exceeding 10 years are likely to be those consumers on 0% deals. In comparison, for those accounts identified by our indicators, the proportion of accounts with an effective cost exceeding 100% or a repayment term over 10 years is significantly higher across all deciles, and increases broadly in line with risk.

## Balance transfers and future unaffordable debt

55. We considered whether there might be affordability concerns with balance transfer products. Affordability problems here may only be realised once consumers exit promotional balance transfer periods or become unable to transfer their existing balance to another promotional deal. This would not be captured by the indicators described earlier.

56. We found that 22% of new accounts in 2014 involved a balance transfer. This was similar for earlier years (the average for 2012-13 is 19%). The total amount of money held in balance transfers was £14bn at the end of 2014 (22% of all balances). The question we considered is what proportion of these balance transfer accounts might become unaffordable in the future. While this is necessarily uncertain, we used two separate (and unrelated) approaches to shed some light on the issue. As explained below, both approaches suggested that only a very small proportion of the current balance transfer accounts appear likely to result in problem debt in the future.

57. The first approach examined the risk scores of accounts with balance transfers. Since the risk score is a reflection of the future probability of default, it gives some indication of the balance transfer accounts that will become unaffordable in the future (with default being the unaffordable outcome). We found that relatively few balance transfer accounts belong to high risk consumers (i.e. those more likely to default in the future) largely because firms do not offer balance transfer products to these consumers. For example, for the most risky 30 per cent of consumers, only 9% of new accounts in 2014 involved a balance transfer.

58. We then used the risk score information to calculate the likelihood of consumers with new balance transfer accounts falling into financial difficulties in the next year (defined as missing three or more payments on any debt repayments).[20] This suggested that 2.5% of new accounts with a balance transfer might end up as unaffordable credit card debt.

59. The second approach examined the number of balance transfer 'roll-overs', which are cases when at the end of a promotional period the consumer takes out another balance transfer. These roll-over events might indicate consumers who were unable to repay their balances when the promotional deal expired. There are other reasons why these consumers may have taken out another balance transfer deal (e.g. to spread repayments over a longer time period) and we reasoned that this might apply more for low risk consumers. For this reason we also looked at the number of roll-over events amongst the higher risk consumers and considered that this might be a proxy for the proportion of unaffordable balance transfer accounts.

60. With regard to total roll-over events, we found that 20.9% of the new balance transfer accounts opened in 2014 were made by consumers that also had a balance transfer in either 2012 or 2013. However, the comparable number for the most risky 30 per cent of consumers is only 1.6%. Taken as a proxy for unaffordable credit card debt, this result is similar to the result from using the risk score approach.

61. As shown in Annex 4, the majority of individuals (over 70%) repay their debt within six months of a promotional balance transfer rate expiring. The results presented here, which show the proportion of 'roll-overs' is 20.9%, suggest that the majority of repayments made at the end of a promotional balance transfer period are likely to have reduced an individual's debt levels rather than simply transferring it to another credit card.

62. Both approaches—using risk scores or roll-over events—suggest that the proportion of consumers that might be unable to repay their balance transfers is low, at around 1.6–2.5%. Given that the number of balance transfer accounts is around 20%, this would imply that less than half a per cent of total accounts are expected to result in problem debt in the future through balance transfers.

## Consumer experiences, behaviours and biases

63. In this section we review a range of evidence that speaks to the role of the consumer in this market. We focus on consumers' experiences of credit cards and the extent to which consumer decision-making is subject to certain behavioural biases (e.g. by

[20] To do this we calculated the total number of new balance transfer accounts in 2014 for each risk decile and then multiplied this by the probability of getting into financial difficulty as given by the risk score for each decile. We then divided this by the total number of new balance transfer accounts opened in 2014 to give the probability of a new balance transfer account entering financial difficulty.

being overly optimistic or being unaware of the potential consequences).[21] Our evidence draws on three sources of information:

- **Our consumer survey.** While this was principally focussed on shopping around and switching, a number of questions are relevant to problem debt.
- **Existing third-party survey evidence**. A number of industry stakeholders have conducted previous surveys and we provide an overview of the relevant findings.
- **Academic evidence on consumers' behavioural biases.** We provide a brief review of the literature that directly relates to behavioural biases in credit card markets.

64. We discuss each of these in turn below.

## Evidence from our consumer survey

65. The full results of our consumer survey are described in Annex 3 Here we present a summary of those results relevant to problem debt.

### Self-reported concerns over credit card debt

66. We asked consumers to report their level of concern over their outstanding credit card balance. Approximately half of consumers reported some level of concern. In particular, we found that: 17% of consumers reported being 'very concerned' about their outstanding balance, 34% reported being 'slightly concerned' and 48% reported being 'not really concerned' or 'not at all concerned'. Rewards consumers were the least likely to report being concerned, while those with credit cards targeted at consumers with a poor credit history (a 'low and grow' product) were the most likely to report being concerned.

### Spending and repayment behaviour

67. Over a third of the consumers we surveyed claimed that they were usually unable to repay the full amount on their credit card each month (i.e. revolved balances). This was most prevalent amongst consumers with a low and grow credit card. Moreover, over the past year, 29% of respondents claimed to have spent more on their credit card than they had budgeted for and 24% claimed it took them longer to repay their balance than they had expected.

### Non-users of credit cards

68. We also asked consumers that did not currently hold a credit card about their attitudes. When asked why they did not hold a credit card, 25–29% of these consumers gave reasons related to overspending. For example, 29% said their credit card led them into uncontrollable levels of debt, 26% said it was leading them to spend more than they wanted and 25% said they stopped holding a credit card because they were paying too much in interest.

## Evidence from existing third-party surveys

69. We reviewed recent credit card and problem debt research conducted by UK consumer groups and other government agencies to further understand consumer behaviour and the types of welfare losses that some consumers are experiencing. This research covers credit card debt as well as other types of debt.

[21] For a wider discussion of behavioural biases see: Financial Conduct Authority *Applying behavioural economics at the Financial Conduct Authority* (2013) Occasional Paper No. 1, April.

### Self-reported concerns over credit card debt

70. Research by the UK Credit Cards Association (UK Cards) found that one in five cardholders are worried about credit and debt.[22] Worrying was found to be correlated with the propensity to revolve balances, make minimum repayments and hold a high balance, but was not found to be correlated with experiencing difficulties when meeting repayments. In particular, it was found that: 66% of consumers that worried revolve balances compared with 39% that did not worry; 35% of consumers that worried make minimum repayments on at least one card compared with 13% that did not worry; 54% of consumers that worried had an outstanding balance of at least £1001 compared with 23% that did not worry; and, 15% of consumers that worried had problems repaying credit compared to 11% that did not worry.

### Debt triggers

71. A recent report by the Competition and Markets Authority (CMA) examined debt triggers.[23] In the early stages of debt, the CMA found that consumers that use credit products often need, or perceive that they need, access to credit at short notice, for example due to an unexpected income or expenditure 'shock' (e.g. home or car repairs). As a result, when applying for credit, consumers may value speed of access to credit over other factors, such as the long-term cost. The CMA report also noted that debt can be triggered by major changes in life circumstances.

72. Major life changes as a debt trigger has also been cited in other research. Christians Against Poverty noted that 45% of its clients reported the primary reason for their debt as relationship breakdown, unemployment or long-term illness.[24] StepChange also reported that unemployment is the reason given most often by their clients when seeking debt advice, with just under a quarter citing it as the primary cause of their problem debt.[25]

### Making decisions against own interests

73. Evidence from UK Cards[26] has shown that some cardholders appear to be making decisions against their own interests. They identify the following explanations for consumer behaviour:

- 'Lifestyle entitlement', e.g. a justification to 'live life to the full' or fear of losing out, for example, buying designer clothes.
- 'Rationalisation', e.g. a feeling that minimum payments is all that is required. The report showed that one in six card holders are paying the minimum on at least one card.
- 'Present value', e.g. gratification today having power over avoiding pain in the future or being over optimistic about the future availability of funds.
- 'Value-action gap', i.e. the difference between what people say and what people do. For example, there might be a gap between the high value people place on

[22] Research submitted to the FCA from UK Cards, March 2015.
[23] CMA *Problem Debt – a report commissioned by the Consumer Protection Partnership* (2014): https://www.gov.uk/government/publications/problem-debt-report
[24] Christians Against Poverty official response to the FCA's credit card market study terms of reference
[25] Step Change *Personal Debt 2014; Statistics Yearbook Findings* (2014): http://www.stepchange.org/Mediacentre/Researchandreports/PersonalDebtStatisticsYearbook2014.aspx
[26] Research submitted to the FCA from UK Cards, March 2015.

repaying the debt and the relatively low level of action taken by individuals to actually repay it.

74. Research conducted by Which? also examined the use of minimum repayments and found that 12% of credit card users generally repay only the minimum on their card every month.[27]

### Negative effects of debt

75. Research by StepChange has highlighted the impact of problem debt on consumers and their families. One survey showed that problem debt had a negative impact on their clients' physical and mental health, with the majority of clients experiencing insomnia (71.1%), low energy (70.4%), or headaches (65.9%). Moreover, 47% of respondents said they had visited their GP as a result of mental or physical health problems caused by their debts, and a further 6% said they had visited hospital.[28] Other StepChange surveys has shown debt may negatively affect: relationships with family and/or friends; people's ability to work (e.g. attendance, concentration)[29]; their access to cars, telephones or the Internet.[30]

76. StepChange has also conducted research on the impact of problem debt on children.[31] This research found that families with problem debt are more than twice as likely to argue about money problems, leading to stress on family relationships and emotional distress for children. It was also found that problem debt impacts on the ability of children to engage in social activities and damages their relationships with peers. There is also the suggestion that problem debt can lead to children facing difficulties at school which may affect their long-term prospects.

## Academic evidence on consumers' behavioural biases

77. During the course of this study we commissioned two academic literature reviews.[32] In this section we briefly outline a selection of this evidence in relation to consumers' behavioural biases. The majority of this evidence does not relate to the UK market and often uses historic data. However, many of the findings are likely to be relevant for the UK market.

### Direct effects of credit cards on consumer behaviour

78. Credit cards have been shown to influence consumer spending behaviour directly. In a range of different studies (Hirschman, 1979[33]; Feinberg, 1986[34]; Prelec and Simester, 2001[35]; Soman, 2003[36]; Raghurbir and Srivastava, 2008[37]) consumers

[27] Which? *Credit Britain 2* (2014): http://www.which.co.uk/documents/pdf/credit-britain-2---september-2014-378871.pdf

[28] Step Change *Personal Debt 2014; Statistics Yearbook Findings* (2014): http://www.stepchange.org/Mediacentre/Researchandreports/PersonalDebtStatisticsYearbook2014.aspx

[29] Step Change *Life on the Edge: Towards more resilient family finances*: http://www.stepchange.org/Mediacentre/Researchandreports/LifeontheEdge.aspx

[30] CMA Problem Debt – a report commissioned by the Consumer Protection Partnership (2014): https://www.gov.uk/government/publications/problem-debt-report

[31] Step Change *The Debt Trap: Exposing the impact of problem debt on children* (2014): http://www.stepchange.org/Portals/0/documents/media/reports/TheDebtTrap.pdf

[32] Argarwal, S. and Zhang, J., (2015) *A review of credit card literature: perspectives from consumers*

Mues, C., et al (2015) *Credit Card Market Literature Review: Affordability and Repayment*.

[33] Hirschman, E. C., 1979, Differences in consumer purchase behavior by credit card payment system. Journal of Consumer Research, 58-66.

[34] Feinberg, R. A., 1986, Credit cards as spending facilitating stimuli: A conditioning interpretation. Journal of Consumer Research, 348-356.

[35] Prelec, D. and D. Simester, 2001, Always leave home without it: A further investigation of the credit-card effect on willingness to pay. Marketing letters 12, 5-12.

[36] Soman, D., 2001, Effect of payment mechanism on spending behavior: the role of rehearsal and immediacy of payments. Journal of Consumer Research 27(4), 460-474.

have been shown to have a higher willingness to pay for certain goods when a purchase is made or associated with a credit card compared to cash or cheque.

79. The credit limit on a particular card has also been shown to influence levels of spending with past studies finding that consumer spending increases when credit limits are increased (Gross and Souleles, 2002[38]; Agarwal et al, 2014[39]). While this is perhaps expected for those consumers with an already high credit limit utilisation or requesting the higher limit themselves, some results indicate that the spending responses occur for all consumers (e.g. including those that had unsolicited credit limit increases).

### Effects of behavioural biases

80. Present bias and optimism bias are aspects of consumer behaviour that have been shown to affect credit card spending. Present bias describes when a decision is unduly influenced by the present at the expense of the future and can lead to regretful purchases. Evidence of this includes consumers making initial borrowing decisions that are inconsistent with their subsequent borrowing behaviour (Shui and Ausubel, 2005)[40] and consumers that exhibit higher levels of present bias borrowing larger amounts (Meier and Sprenger, 2009).[41] Optimism bias, where consumers may be overconfident when assessing the likelihood of future events, has also been shown to be important. Consumers with more moderate levels of optimism have been shown to be more likely to pay off their credit card balances (Puri and Robinson, 2006)[42] while extreme optimists have been shown to have preferences for credit card features that are inconsistent with their subsequent borrowing behaviour (Yang, Markoczy and Qi, 2007).[43]

81. The role of behavioural biases in repayment decisions has been extensively researched. One particular area of focus has been on how repayment behaviour is influenced by the presentation and framing of information about repayment, particularly the minimum repayment level. Keys and Wang (2014)[44] showed that the majority of repayments are either in full or at the minimum. A group of studies (Stewart, 2009[45]; Navarro-Martinez et al, 2011[46]; Salisbury, 2014[47]) have then shown that removing minimum payment information or accompanying it with additional information (e.g. regarding alternative courses of action) has increased levels of repayment.

[37] Raghubir, P., and J. Srivastava, 2008, Monopoly money : the effect of payment coupling and form on spending behavior. Journal of Experimental Psychology: Applied 14(3), 213-225.

[38] Gross, D. B. and N. S. Souleles, 2002a, Do liquidity constraints and interest rates matter for consumer behavior? Evidence from credit card data, Quarterly Journal of Economics, 117(1):149-185.

[39] Agarwal, S., S. Chomsisengphet, N. Mahoney and J. Stroebel, 2014f, Household credit during the Great Depression,.Working Paper.

[40] Shui, H. and Ausubel, L. (2004) Time inconsistency in the credit card market. The 14th Annual Utah Winter Finance Conference. SSRN-id586622.

[41] Meier S. and C. Sprenger, 2010. Present-Biased Preferences and Credit Card Borrowing, American Economic Journal: Applied Economics, 2(1), 193-210.

[42] Puri, M., and Robinson, D. T. (2006) Optimism and economic choice, Journal of Financial Economics 86, 71-99

[43] Yang, S., Markoczy, L., & Qi, M. (2007). Unrealistic optimism in consumer credit card adoption. Journal of Economic Psychology, 28(2), 170-185.

[44] Keys and Wang (2014) Perverse Nudges: Minimum Payments and Debt Paydown in Consumer Credit Card, No 323, 2014 Meeting Papers, Society for Economic Dynamics.

[45] Stewart, N., 2009, The cost of anchoring on credit-card minimum repayments. Psychological Science 20, 39-41.

[46] Navarro-Martinez, D., L. C. Salisbury, K. N. Lemon, N. Stewart, W. J. Matthews and A. J. Harris, 2011, Minimum required payment and supplemental information disclosure effects on consumer debt repayment decisions. Journal of Marketing Research 48, S60-S77.

[47] Salisbury L.C., 2014, Minimum payment warnings and information disclosure effects on consumer debt repayment decisions. Journal of Public Policy and Marketing, 33(1):49-64.

### Understanding of credit card products

82. Some studies have examined whether consumers have a good understanding of, or have an ability to understand, credit card documentation. In study by Gao (2006)[48] it was found that disclosure documents for a large number of credit cards were written at a reading level significantly above the average reading level of US consumers. The same study also found that certain features were particularly poorly understood by consumers (e.g. default interest rate, late payment fees, cash withdrawals, grace periods, balance computation methods).

## Firm behaviour and incentives

83. Firms' lending decisions and criteria are a key aspect of unaffordable borrowing. These decisions include which consumers to lend to, how much to lend, and how to manage open accounts including when consumers get into difficulty. We begin this section with a description of how firms are making these decisions, based on their responses to our market questionnaire. We discuss decision making under the following headings:
    - Credit risk assessments;
    - Affordability assessments;
    - Forbearance policies.

84. The first two of these issues are key elements of 'creditworthiness' as defined in our rules. CONC requires lenders to undertake an assessment of creditworthiness before granting credit and before any significant increase in the amount of credit. The assessment must include the potential for the commitments under the agreement to adversely impact the consumer's financial situation and their ability to make repayments as they fall due or (in the case of open-end credit such as a credit card) within a reasonable period. Consumers should be able to repay in a sustainable manner, without undue difficulties, and while meeting other reasonable commitments and without having to borrow further.

85. The third issue relates to how firms treat consumers that are failing to meet repayments. Our rules require firms to monitor repayments and take appropriate action where there are signs of actual or potential financial difficulties. They also require firms to treat consumers in default or arrears difficulties with forbearance and due consideration, and include examples of such forbearance mechanisms.

86. After discussing firm processes, we then turn to the issue of firm incentives. Firm decisions are expected to be made on the basis of profit incentives and we have therefore analysed the profitability of different consumer segments.

### Credit risk assessments

87. All firms told us that they assess credit risk, by which they mean the likelihood that the applicant will default. A credit score is the central criteria used to determine whether an application is accepted by a firm. This score is determined by applying statistical techniques to data on past performance of borrowers. The credit score also plays a role in determining the credit limit offered to accepted applicants, and

[48] Gao, 2006, Credit cards: increased complexity in rates and fees heightens need for more effective disclosures to consumers, report to the Congress, ww.gao.gov/products/GAO-06-929.

potentially the interest rate and other terms. The assessment process and determination of credit scores is at the core of firms' credit card business and is heavily invested in.

88. The data used in credit risk assessments includes information from credit reference agencies, application form data (e.g. employment status and income), and, for existing consumers or once an account becomes active, transaction data from the firm's own records. [49] Each firm has its own score card and policy rules. A score card is a set of weights that are attached to each piece of information about a consumer and form part of the calculation of the consumer's credit score. Higher weights are associated with information that is a stronger predictor of default. Each firm designs and reviews its own score cards to try and improve the predictive power of the model (i.e. to provide a better assessment of the likelihood of default for a given consumer).

89. A firm's policy rules determine the acceptance criteria for credit card applicants. These rules will involve credit score thresholds and often include a number of other exclusion criteria. Examples of exclusion criteria include where an applicant has: recent or frequent missed payments; a county court judgement; defaulted on a previous account; too many existing accounts or a large amount of outstanding unsecured debt; or income below a certain threshold.

90. Once an account is active, firms routinely update credit scores for each consumer and review how they are managing their account. The frequency of these updates varies between firms but is typically between monthly and quarterly. Updated credit scores are monitored and feed into decisions over changes to credit limits (which can be increased or decreased) and other product features (e.g. the interest rate). These updates can also affect promotional offerings and, in extreme cases, lead to the suspension of credit facilities.

91. For all firms credit risk processes are largely automated and there is very little role for manual interventions. Even in cases where firms told us that there was a role for human intervention this was said to very rarely lead to a change in outcome.

## Affordability assessments

92. As part of a creditworthiness assessment, firms are also required to consider affordability—that is, the ability to repay in a sustainable manner. An affordability assessment can influence a credit card application in different ways. In some cases it is part of an integrated assessment alongside credit risk, while in others it was a separate assessment, typically applied only if the applicant first passes a credit risk assessment. In either case it can have a direct influence on the credit limit that is granted. The practical steps involved in affordability assessments were similar for several firms, and often involve a comparison between a consumer's income, expenditure and prospective debt repayments.

93. In submissions by firms, we were told that the following factors can be taken into account in affordability assessments:

- Debt capacity. This might include factors such as a consumer's net income and expenditure (e.g. housing cost, cost of living, and other credit commitments). It is common for firms to calculate debt to income ratios, such as total debt/net income or unsecured debt/net income. Firms then apply different thresholds to

[49] This covers existing credit card consumers, as well as consumers who use other types of products with the provider, such as current accounts, mortgages, savings accounts, and personal loans.

these ratios, e.g. unsecured debt/income ratio should not be higher than x%. For example, one firm told us that their ratios are set at levels where consumers would not have any disposable income left to service new credit such as an additional credit card. In another example, a firm told us that a consumer's disposable income must exceed a multiple of their credit limit plus a fixed buffer to allow sufficient headroom to afford an increase.

- Repayment period. Some firms evaluate a consumer's disposable income to check they will be able to pay down a drawdown of the full credit limit within a certain period of time (e.g. 3 years) without financial difficulty. This time period varied by firm, with one firm having different time limits depending on the credit limit (e.g. with lower credit limits being evaluated against shorter time horizons).
- Sustainability. Some firms told us that they assess a consumer's ability to repay if the economic environment or consumer's personal circumstances worsen. For example, one firm told us that it requests information to ensure that the information being provided in the application form is not likely to change in the foreseeable future, e.g. through retirement, career change, or change in family circumstances. Another firm told us that it assumes a proportional reduction in income for all consumers aged 60 and over to adjust for possible reduction in income upon retirement.
- Observed transaction behaviour. Some firms told us that they use behavioural scoring, i.e. detailed behavioural trends of the consumer. This includes looking at how the consumer has managed their credit card account, the length of time an account has been open, credit limit history, credit limit utilisation and payment records (missed payments, repayment arrangements, trends in payment values). One firm told us that it also takes into account any suspicious behaviour of its consumers, such as excessive amounts of money spent on gambling transactions, payday loan activity, and significant increases in cash withdrawals.

94. Data used in the affordability assessments is similar to that in the credit risk assessments and includes credit reference agency data, information provided by the consumer, and firm own data. In some cases this was supplemented by data from the Office of National Statistics on average household expenditure (e.g. on food and bills). Some firms also relied on affordability or indebtedness indices provided by credit reference agencies.

95. Income data plays a key role in affordability assessments yet it is typically not verified. In most cases income data is self-reported by the applicant or obtained from credit reference agency data. Income data from the latter is often based on historic credit applications (self-reported) or estimated. Some firms told us that they do make some efforts to verify data where possible. For example, one firm told us that it checks an applicant's stated income against current account turnover data. Another firm told us that they verify an applicant's stated income where there is a mismatch between salary, age and employment type. Validation may require the consumer to send in proof of income. We also noted that the definition of income used by firms can vary significantly.

96. Firms do not typically conduct regular affordability assessments once an account is active. The firms that do undertake some form of later review request updated income data, though again this is usually not verified.

## Forbearance policies

97. All firms told us that they have forbearance policies in place that are designed to help consumers that are experiencing financial difficulty. Consumers can contact their credit card provider at any time if they believe they are at risk of financial difficulty. To qualify for forbearance, an individual account will be reviewed, taking into account the consumer's circumstances and an income and expenditure assessment. Some firms have certain thresholds that consumers must meet in order to qualify for the forbearance program (e.g. in terms of the future monthly repayments).

98. Forbearance can be short-term or long-term and come in the form of, among other things, freezing of interest and/or charges or a different payment arrangement. Each firm has its own forbearance policy, with one or more of the following options available to its consumers:
    - A period without any collections activity ('breathing space') that usually lasts for 30-60 days. This does not necessarily involve suspension or reduction of interest and charges, thus interest may continue to accrue during this period.
    - A reduction or suspension of interest and charges during the forbearance period. One firm told us that it offers refunds of interest and charges to consumers in financial difficulties, where a consumer's income is insufficient to cover reasonable living expenses and meet financial commitments.
    - Refinancing, when monthly payments or the rate of interest are reduced on a permanent basis. Some firms also offer temporary payment arrangements that allow for reduced payments for a short period.
    - Re-aging of an account. This involves writing off arrears following a number of consecutive minimum payments (usually three) by the consumer.
    - Part-settlements may occasionally be negotiated, where less than 100% of the outstanding debt is accepted by the firm.
    - Write-off of debts in response to major unsettling life events of their consumers, such as terminal illness.

99. Debt is normally charged-off after an account has been in arrears for a certain period of time. This period varies by firm, but several firms charge off debt after between 120-180 days of arrears. This may be followed by internal recoveries, placing the debt with debt collection agencies, or the sale to debt purchasers.

## Incentives and profitability

100. The main objective of this section is to set out our methodology for analysing account level profitability and return on lending discussed in Chapter 5 and our analysis of firms' profitability incentives discussed in chapter 6.

101. This sections discusses:
    - The data sample: The scope of the sample taken from the account level database
    - Base line model: Defining the variables used in the main version of our analysis
    - Results: The results from the base line model
    - Sensitivity analysis: How these results change as we adjust the baseline model

### The data sample

102. To analyse a full five year cohort of consumers we used a sample data set taken from the account level data.

103. Cohorts of accounts were selected from a number of different credit card products. The products were chosen to provide the widest market coverage whilst prioritising:
- firms with high levels of revolving debt,
- clean financial data
- a balance of products between the lower and higher risk segments

104. The data set used in our analysis builds a cohort data sample using accounts opened in January 2010. The data set is drawn from five firms looking at six different products. Whilst we have considered the results for each product separately, we report our results by grouping three of the products as "lower risk" and the other three products as "higher risk" and reporting the average results for both groups.

### Baseline model

105. In the base line model we use a single measure of profit designed to look at the marginal profitability of accounts. However, we also tested a number of alternative approaches, which are presented as sensitivity checks. The choice of approach was based on the available data and necessarily involves subjective judgement. For this reason, our conclusions are based on both the base line model and results from our various sensitivity tests.

106. In the baseline model we created a monthly profit variable using the following definitions:

Profit (baseline) = (Total Fee incomes + Total interest income + Interchange Revenue) – (Acquisition cost + Funding cost + Operational cost + Cost of charge off)

107. One major cost for firms in the credit card market is the cost of bad debt. The base line model uses a variable we define as being equal to the closing balance in the month an account was recorded as being charged off. Our sensitivity analysis considers an alternative measure of bad debt based on the accounting provision made for bad debt.

108. Our analysis considers profitability over a full five year period to provide as complete a view of an account's profitability as possible. We are aware there are several other analytical factors that could have been included in our analysis. Our approach does not seek to estimate terminal values to take into account the longevity of certain accounts after 5 years. Nor do we factor in any measure of economic capital or the regulatory costs that different risk groups may incur for different lenders. Our sensitivity analysis discusses the impact that using discounted profits has on our results.

109. In addition to profitability we also consider a measure of return on lending. The fact that accounts remain open for different periods of time as well as the fact that accounts borrow different sums of money creates some difficulties. Each group may therefore pose different levels of risk for the profit being generated. For example, one account may remain open for two months borrowing £200 over the period. Making £20 profit from this account would be of preference from a firm's perspective to making £20 from an account that borrowed £2000 for 2 months or £200 for 60 months, as the amount lent cannot be used for another purpose. This means that looking only at profitability of different groups could distort our view of firms' incentives.

110. To address this we created a return on lending measure by summing each individual account's profit variable (see above). Then summing (or averaging) these profit figures for each group of interest. This provided us with the total (or average) group profit figure which can be compared between groups who are all using the same product. Expressed mathematically:

$$\sum_{i=1}^{j} \Pi_i = \Pi_g$$ [50]

111. We used this estimate of profitability in conjunction with an estimate for the average balance lent to a customer during a month. As we do not have transaction level data we do this in each month for each account summing the opening and closing balance and dividing by two. For each account we create an estimate of the total average balance by summing this balance measure over the number of periods the account was active. For each account we can then obtain the total average balance across time for each group of interest. Expressed mathematically:

$$\sum_{i=1}^{j} \overline{\mathrm{B}}_i = B_g$$

112. We estimate return on lending for each group by dividing the group's average total profit by the group's average total balance. This provides an estimate of monthly return for the group which we then annualise.

$$\frac{\Pi_g}{\overline{\mathrm{B}}_g} = Return\ on\ lending$$

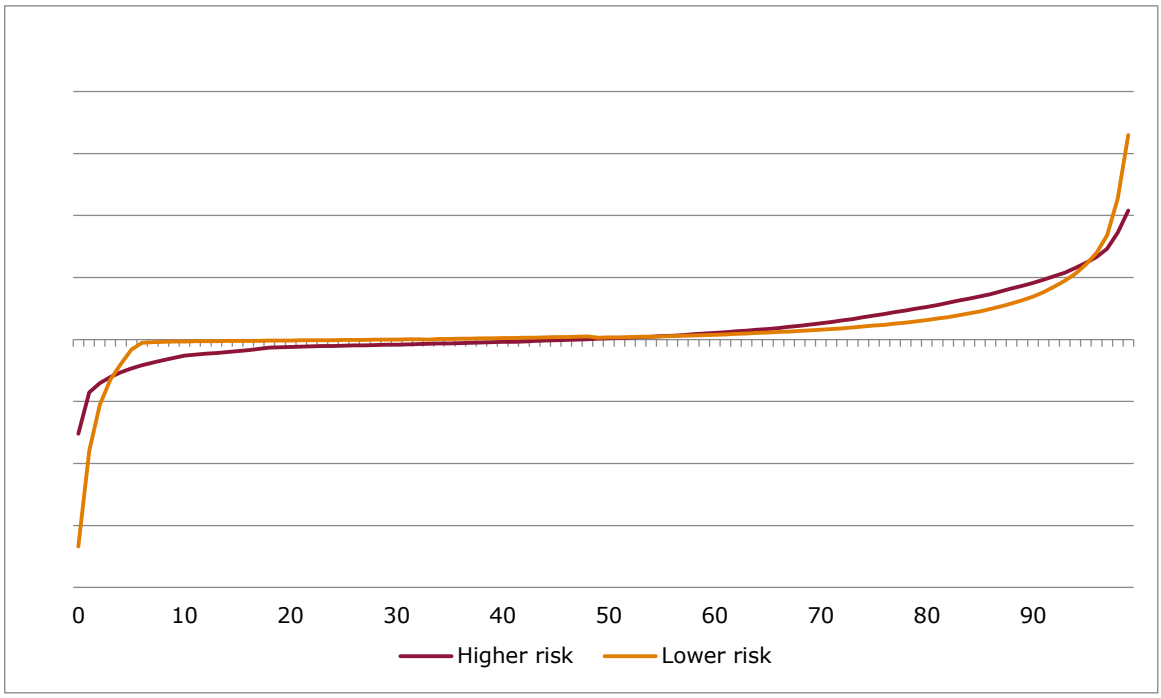
113. This measure of return is useful for looking at profitability between different account categories since it corrects for the different levels of borrowing between groups. As discussed above it makes no attempt to measure economic capital and so we have used it to analyse firms' incentives.

### Results: Profitability distribution

114. We then turn to consider profitability. In figure 6 (below) we look at how profit is distributed for each product, to see whether all the profits are generated by a very small group of customers.

[50] Note g denotes a group of consumers. In our analysis we group consumers using a number of different criteria. The two key groups we discuss in the analysis below are based on initial risk groups and problem debt categories.

**Figure 6: Distribution of 5 year profitability in the high and low risk segments**




115. Figure 6 is produced by ordering the 5 year profitability of each account for each of the six products in our sample. We then split the data into a hundred groups and take averages for each percentile to give a distribution of profit and loss for each product. Figure 6 shows an average of these distributions with each product's distribution split into two groups based on whether the product under examination is targeted at a high or low risk segment of the market.

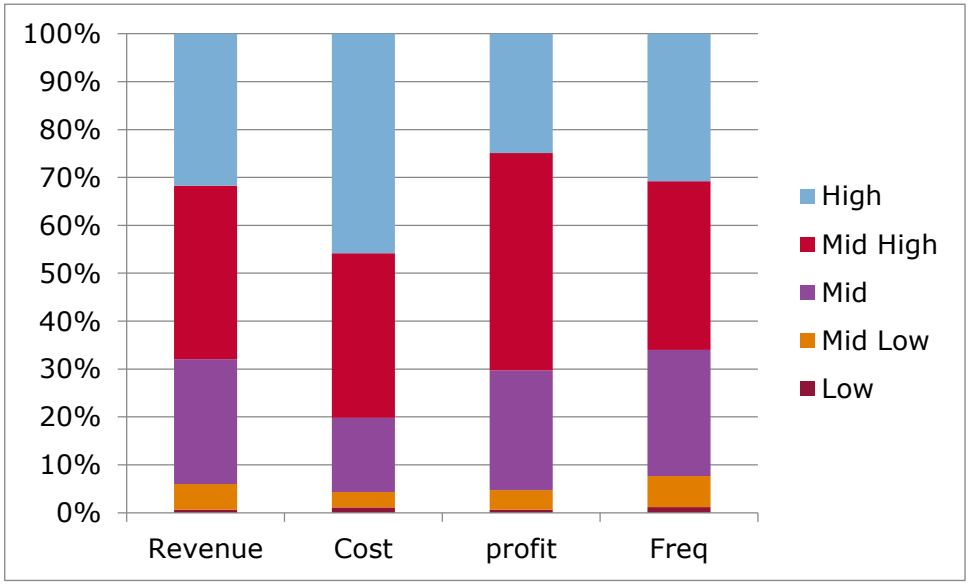
116. The lower risk products tend to produce more extreme tails. We find that a relatively small proportion of accounts(approximately 30%) are responsible for 90% of profits but another smaller group of consumers, around 5%, are responsible for almost 90% of losses.

### Results: Profit distribution by risk

117. Our analysis also considered whether the highest risk accounts are the accounts which generate the most profit for firms.

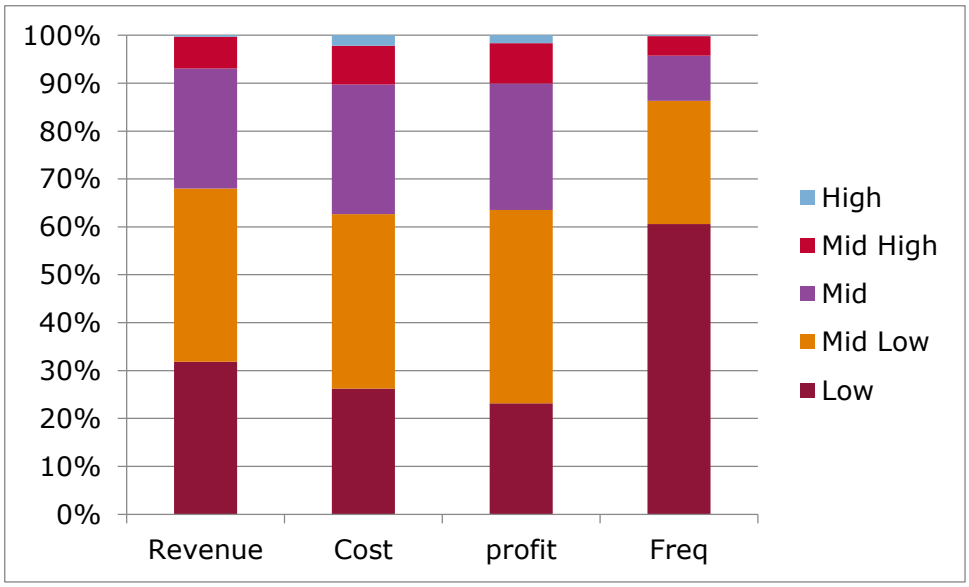
118. We use five risk groups by combining three of the 15 initial risk score categories in each (e.g. low risk = risk group 1, 2, 3). We looked at the proportion of products' revenue, cost and profit generated by each risk group, split between the higher and lower risk groups.

**Figure 7a: Higher risk targeted products**




119. We see that for the higher risk products no risk group seems to generate a disproportionate amount of revenue or profit.

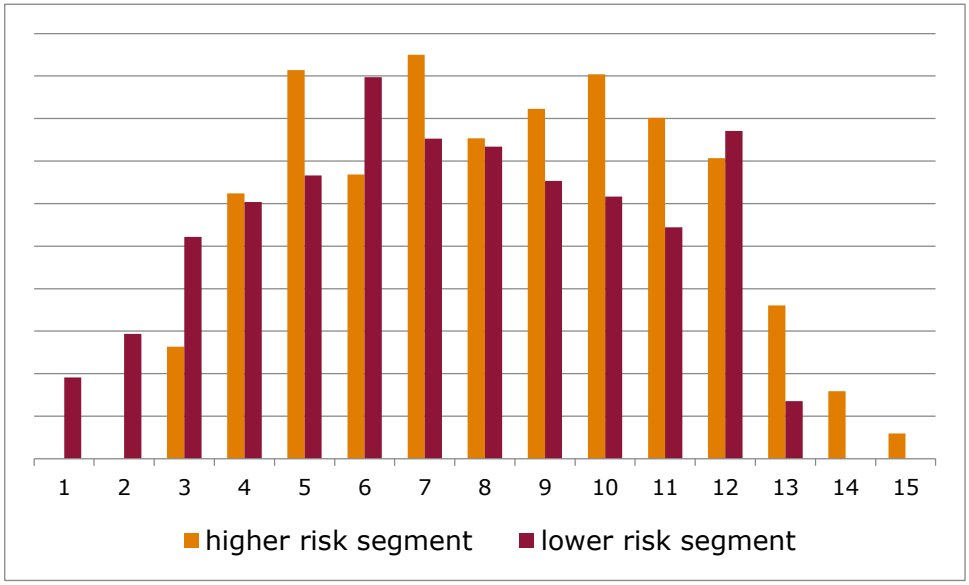
**Figure 7b: Lower risk targeted product risk**




120. The lower risk group however appears to have a much higher number of low risk accounts compared to the amount of profit generated. This could indicate that profits are on average lower for this segment with the opposite being said for the higher risk 'Mid-low' group.

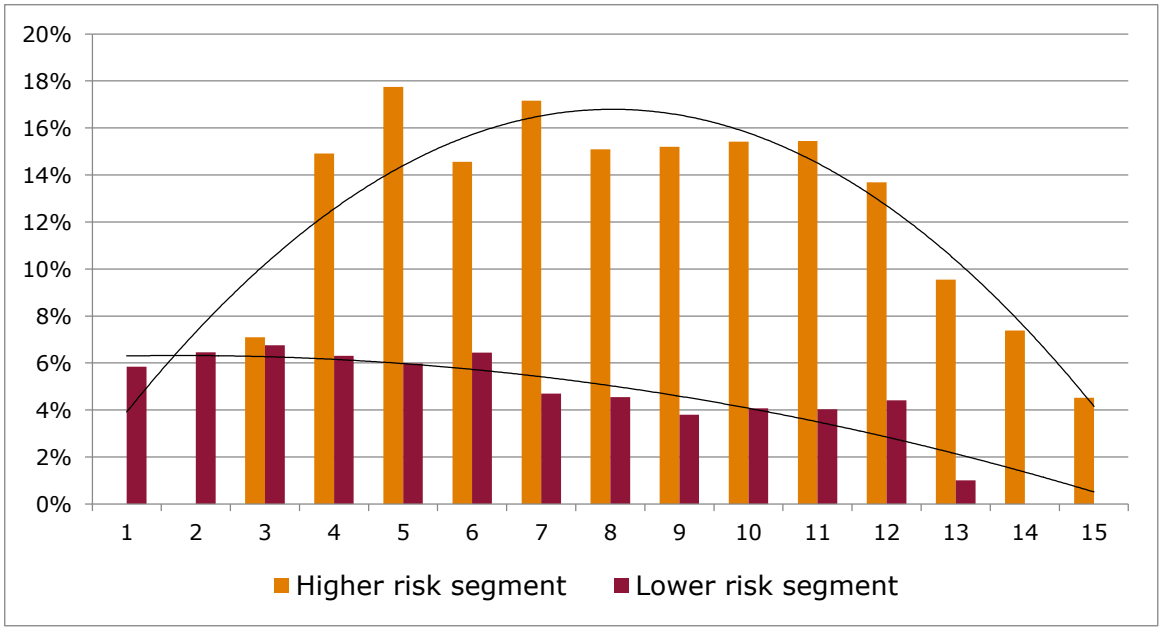
121. In figure 8 (below) we see that the lower risk products on average appear to be less profitable than higher risk products as initial risk of accounts rises. However even for high risk products increasing risk only increases profit to a point, beyond which the levels of bad debt brings profits down.

**Figure 8: Profit by risk group**




122. However looking at raw profit and cost does not take into account the fact that within each group the firm will be lending different amounts due to variations in credit limit. Our analysis addresses this by looking at return on lending rates (defined above) using our baseline measure of profit and grouping accounts by their initial risk classification.

**Figure 9: Return by risk classification average higher risk vs lower risk**




123. Figure 9 is a summary of our results and uses averages across all low and high risk products. We find a similar distribution of returns across initial risk scores for individual products as well.

124. We also note that products targeted at the higher risk segment generate, on average, higher returns on lending. This does not hold for all products however with some low risk segment products producing better returns than some high risk segment products in our sample.

125. Chapter 5 discusses this result in the context of our examination of the supply side of the credit card market however our current analysis covers only a single cohort across a fairly small (but significant) sample and, as noted, contains some variation of results. We also note that there are differences in the financial approach from each firm which makes it difficult to directly compare the return measures.

126. Our analysis is not intended to definitively state that returns in the higher risk targeted segment are higher than the equivalent returns in the lower risk targeted segment but rather to add further context to our analysis of competitive dynamics in the market.

127. As discussed above return on lending can be calculated using different profitability measures. We note that while different assumptions tend to change the level of returns the relationship between returns in the high and low risk segment is unaffected.

### Results: Problem debt

128. By looking at groups that exhibited behaviour that could indicate future problem debt we are trying to determine issuers' profitability incentives. If accounts exhibiting behaviour that could lead to problem debt are highly profitable this could indicate firms have incentives to target these consumers once they are identified, or to incentivise existing customers to engage in behaviour that could lead to problem debt.

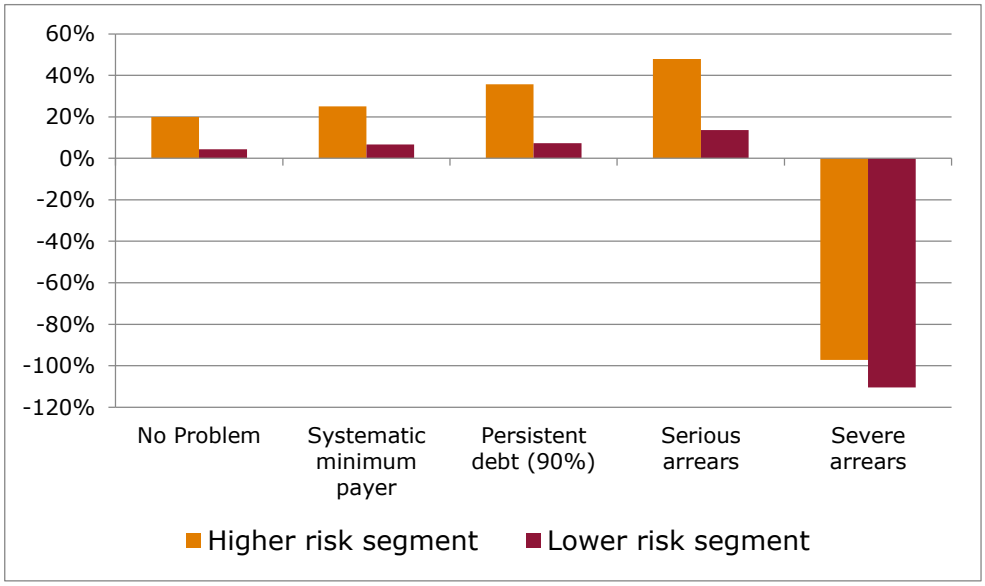
129. To assess the relationship between profitability and problem debt we split the account level data into five groups based on the four potential problem debt indicators outlined in this annex and accounts that fall outside these groups.

130. We use the four indicators to sub divide accounts based on the first 12 months of data to December 2014 for each account. These indicators were applied on a hierarchical basis, with indicator 1 being the most severe and indicator 4 being the least severe. Consumers were classified according to the most severe status indicator.

131. Our analysis uses the same five firms in our main sample, whose six products are divided into a lower and a higher risk segments. For each product we group accounts based on the four indicators above using the first 12 months of data for each account. We estimate a return on lending for each group, using the method described above. Figure 9 and 10 use the average of these returns to provide an illustration of our results.

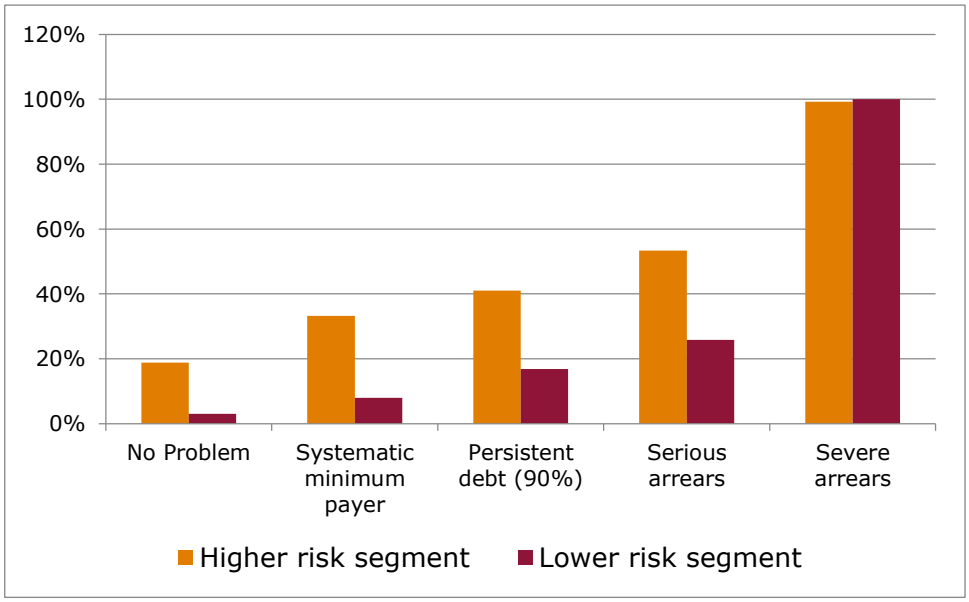
132. We see from Figure 10 (below) that if in the first year accounts show as being in potential problem debt, then as long as they have not defaulted (and hence charged off) they are much more profitable on average than accounts that aren't showing as being in potential problem debt.

**Figure 10: Initial year return by PD Category**



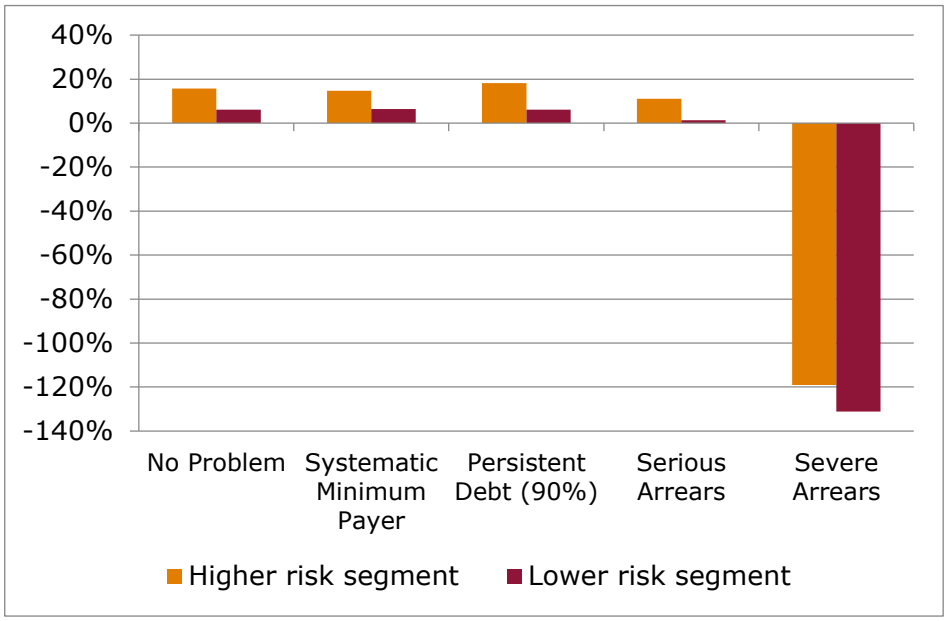

133. Figure 11 shows that getting into a problem debt category is correlated with the likelihood of charging off in the five year period and therefore to capture this effect we keep the groups based on the initial score but then look at the average revenue, cost and return for each group at the end of the five year period.

**Figure 11: Proportion of each group classified as charged-off within 5 year period for each PD category**



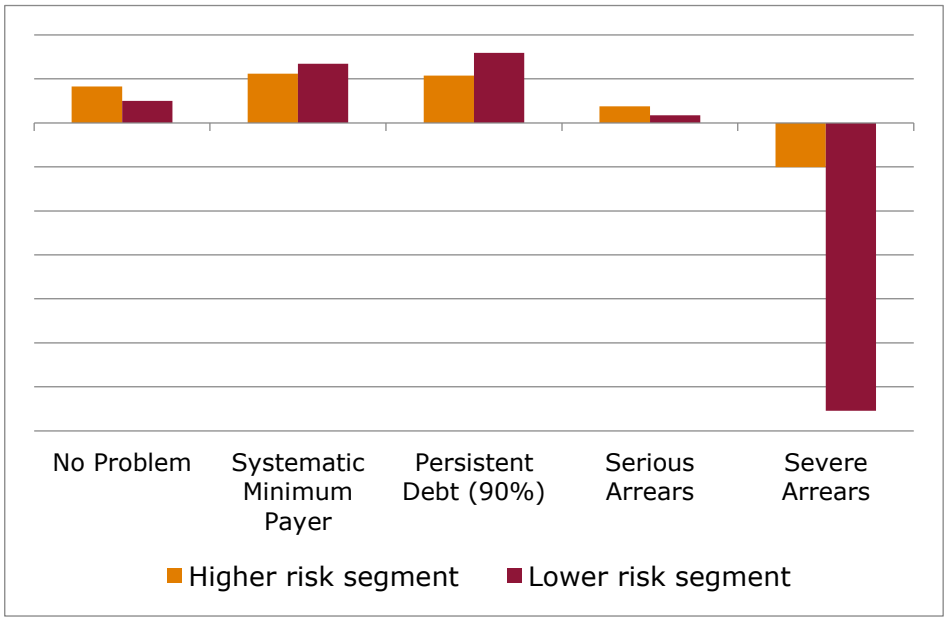

134. Figure 12 however, looks at the profitability of these groups over a full 5 year lifecycle. It is less clear from this perspective that accounts in problem debt are on average more profitable than other accounts, though they do remain profitable overall.

**Figure 12: Return after 5 years by PD Category, Average for higher risk and lower risk segments**




135. Figure 13 looks at the average five year profits of these groups. The incentive structure is similar to that shown by return on lending, though looking purely at five year profitability would suggest that the minimum payer and persistent debt categories would be preferred by firms over accounts in the no problem debt category. However, when profitability is normalised for the level of borrowing, return on lending levels are similar between these three groups. Using both measures gives a fuller picture of firms' incentives, though in both cases we note that profit and return are considerably lower for serious arrears and that severe arrears accounts remain unprofitable.

**Figure 13: Profits after 5 years by PD Category, Average for higher risk and lower risk segments**




### Sensitivity testing: measure of profit

136. Our results so far have relied on a base line measure of profit which:

- Does not include overhead cost
- Does not adjust for the time value of money
- Does not include recovery income
- Uses a measure of bad debt based on actual charge off as a measure of in expectation losses

137. For each of our results we looked at how changing our approach impacted our results. We found that a measure of profitability that, for example, included an estimate of recovery income or which used provisions instead of actual charge off, tended to shift our estimates of absolute profitability but did not tend to affect our conclusions regarding incentives.

138. After testing our initial results using several different measures, and seeing little variation, we proceeded with the base line model described above, since the methodology provides the best estimate of firms' incentives at the margin. Since there is a large combination of different variables that combine to make up a measure of profit, we also conducted sensitivity analysis using an upper and lower bound profit measure:

- Upper bound – Included all revenue items, funding costs, operational costs, acquisition costs and charge off costs discounted at 15% to assume a high level of recoveries.
- Lower bound – Included all revenue items, funding costs, operational costs, acquisition costs, allocated overheads and a 10% annual time discount value of money.

139. We found that although the measures of profit and return shift up for the upper bound measure and down for the lower bound measure our conclusions generally hold. Though we note that firms with lower risk products may be more incentivised to avoid lending to the serious arrears category of consumer in the lower bound case.

### Other sensitivity analysis

140. We also look at other decisions made in our base line analysis which, when changed, could alter our conclusions. We consider whether excluding accounts with missing risk scores or accounts which are inactive has any impact on our findings. We also look at the results for a different cohort to check the results based on a different sample. Finally we consider how our results change when we expand our sample to include additional products from other firms.

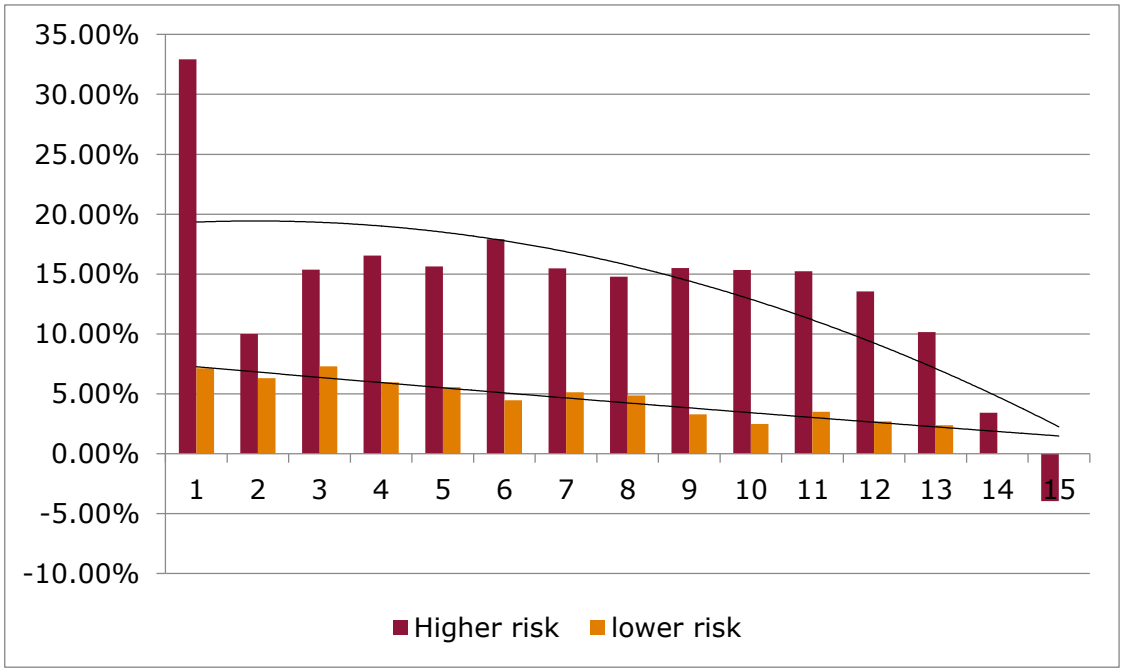
141. In our initial analysis where risk scores were missing we used the first available score. If some firms had more scores missing initially than others this could bias the results as there would be risk scores being taken from different points in time. We repeated our analysis in the base line case using a risk score taken only at February 2010 and ignoring all accounts which do not have a risk score in this month. This did not change our results.

142. In the sample used in our analysis it appears as though, for some products, there is a large number of accounts which are inactive for the entire period. In the base line model we included these accounts as there is some cost to keeping inactive accounts on book. However there is a chance that these accounts are erroneous and therefore we repeat the analysis with any account with summed average balance equal to zero. This also has no effect on either our results or our conclusions.

143. The base line model uses a product cohort from one point in time. Our concern was that this cohort may be an extreme example. As we only have 5 years of data and we seek to analyse the behaviour of accounts after the first year of being on book we have limited scope for picking alternative samples, however we repeat the analysis for a cohort beginning six months later in June 2010 and looked at the behaviour over the available 4 and half years. We use the base line model and report our findings based on the return by the initial risk score across the same group of products.

144. We see a very similar pattern with profits and returns falling off as risk increases for both the higher and lower risk products. In this analysis we found one of the few significant differences between our base line model and our sensitivity analysis. Figure 14 shows how the lowest risk consumers using higher risk products generate a significantly higher return than in the base line case. This is due to the small number of accounts that fall into the lowest risk bucket but who use a higher risk product. In this cohort this group generated very high returns causing the skew seen in figure 14. If these accounts were excluded the pattern would look very similar to our base line case.

**Figure 14: return by risk score for June 2010 cohort**




145. We also look at the returns for the different problem debt groups this time classified in the year between July 2010 and June 2010. Again we found that our result held with all categories.

146. Lastly, our main analysis uses three lower risk and three higher risk products. We also expanded our analysis to include three additional products from three other firms not included in the main sample. We find similar patterns of results for both risk adjusted returns and for returns across different levels of problem debt. Profits on the these products are slightly higher on average than for the three lower risk products in our sample and so overall return is slightly higher under each measure of profit when the expanded sample is included.

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