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How easy is it to understand consumer finance?

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Abstract

We consider the readability of payday loan websites against conventional lenders. Our findings show that credit card websites are harder to read and contain more complex terminology. Our central contribution is to provide the first known measurement of readability in consumer finance – something regulators have found helpful in other domains.

Keywords: Bibliometrics, Household Finance, Readability

JEL Classification: C63 D1 E6 G4 I2

1 Introduction

A large interdisciplinary literature discusses readability. Many notable applications can be found in medicine (Ley and Florio, 1996). Research has variously focussed upon consent forms (Paasche-Orlow et al., 2003), information leaflets (Munsour et al., 2017) and internet-based information (Ahmed et al., 2012). Regulation is also widely developed. The EU produces strict readability guidelines for medical products. The Food and Drug Administration (FDA) also produces strict readability guidelines for medical devices. In contrast, both the US SEC and the FCA in the UK take a relatively light touch approach to financial readability. However, a natural question to ask is why should consumer finance be more difficult to understand than say the accompanying literature that can be found in everyday items like a box of Paracetamol? In the aftermath of the Securities Acts of 1933 and 1934 financial disclosure requirements have been much studied. However, given the limits of human attention perhaps the best way to improve disclosure quality is to simplify them (Loewenstein et al., 2014).

The study of readability in finance leads naturally to wider questions of financial literacy. Studies have found very low levels of financial literacy (see e.g. OECD, 2017). Low levels of financial literacy have been variously associated with poor pension planning (Lusardi and Mitchell, 2007), the selection of costly debt (Lusardi and Tufano, 2015) and borrowing beyond an individuals debt capacity (Gathergood, 2012). However, users of payday loans may simply have little access to alternative forms of credit (Bhutta et al., 2015). This is in debate, as Bertrand and Morse (2011) present evidence to suggest that information disclosures which target consumer biases can reduce borrowing by up to 11%. Regardless, the size of the payday loan

market is substantial (Gathergood et al., 2018). Moreover payday loans themselves have been associated with financial hardships (Melzer, 2011) and other socially negative outcomes (Baugh et al., 2017).

In response, money savings websites typically suggest customers turn to cheaper forms of credit than payday loans such as credit cards. This naturally leads us to ask the following questions. How easy to understand are consumer finance websites? Moreover, are cheaper forms of debt as easy to understand as payday loans? The study is given further significance both by the novelty of applying readability methods to finance (see Section 2).

The remainder of this paper is laid out as follows. Section 2 discusses the computational measurement of financial readability. An empirical application to payday loan, personal loan and credit card companies is discussed in Section 3. Section 4 concludes.

2 Computational measurement of financial readability

In finance the study of readability is still in its infancy. Research currently focusses on the readability of financial disclosures (Loughran and McDonald, 2014), consumer insurance contracts (Boom et al., 2016), and annual reports (Bloomfield, 2008). Research suggests a clear link with financial literacy and the selection of costly debt (Lusardi and Tufano, 2015). At the other end of the spectrum readability may also have important implications for elite academic performance (Dowling et al., 2018).

In the UK the FCA’s own website lists the dual principles of clarity and minimising jargon in any financial promotion. In the US the SEC has plain English principles but this typically applies only to disclosures and annual reports. At present this understates the size of the payday loan market (Gathergood et al., 2018) and the potential social costs (Melzer, 2011; Baugh et al., 2017). This justifies the need for a systematic computational study of readability within consumer finance.

Motivated by a rich interdisciplinary literature, and studies of internet-based information in other disciplines (Ahmed et al., 2012), we automatically compute measures of financial readability by scraping web pages for readable text. However, assessing the readability of websites is challenging. Websites frequently contain text representing titles, drop down menus and stylistic attributes such as bullet points and phrases without punctuation. We try to minimise the effect of these features by parsing the website only for the text considered to be continuous, removing HTML and piecing together the remaining text as it would be read. We then tokenise (decompose) words and sentences and count syllables to establish readability.

Following the classical approach (Gunning, 1952) readability is defined in terms of the *Fog Index*:

$$\text{Fog Index} = 0.4(\textit{wps} + \%c), \tag{1}$$

where wps is equal to the average number of words per sentence and $\%c$ is the percentage of complex words – defined as words with more than two syllables. The index result reflects the number of years in education a person can be expected to have to be able to comprehend the text. For example the New York Times has a Fog Index of around 11-12 – a level similar to that of a person prior to attending university. For text to be comprehensible to a wide audience it is generally recommended to achieve a Fog Index score less than 12 (Grewal and Alagaratnam, 2013).

Linguistic complexity is not necessarily the same as financial complexity. Complex financial words may require readers to understand the specialist meaning and involve higher-level abstract reasoning. Following criticisms of the use of the Fog Index for business applications (Loughran and McDonald, 2014) we consider three additional measures of financial complexity. Thus, we calculate the ratios of financial words to total words, the ratio of complex words to total words and the ratio of complex financial words to total complex words (cfw/cw). Additional summaries are provided by counting the average numbers of words per sentence and the overall word count. To define financial words we use Campbell Harvey’s Hypertextual Finance Glossary (Morgenson and Harvey, 2002). Following standard practice in linguistics each word in the glossary is converted to lower case to allow a standardised matching to words in the text. Stop words (for example *and*, *or*, *the*) are removed to avoid matching these to acronyms in the glossary. Finally, we group together the inflected forms of a word so that they can be analysed as a single item. This step is essential so as not to miss identifying a word as financial if the inflected form of the word is in the dictionary but not in the main text.

3 Empirical application

We sample webpages from 31 payday lenders, 31 personal loans and 31 credit cards in the UK. The sample is determined by ordering the results of Google searches, itself a proxy for size/market power, and reflects the significance of online searches for consumer finance, including lead generators, in the UK (CFA, 2016; CMA, 2015; Gathergood et al., 2018). This gives us a reasonably-sized sample and one that is sufficiently representative given the approximate size of the UK market shown in Table 1.

| Lender type | Number of borrowers |
|---------------|---------------------|
| Personal loan | 6.3m |
| Credit card | 9.6m |
| Payday loan | 3.1m |

Table 1: Approximate size of the UK consumer credit market. Data adapted from Harari (2018).

Our reasons for looking at UK data are threefold. Firstly, the UK is the world’s second largest market for payday loans after the United States (Gathergood et al., 2018). Secondly,

from a regulatory perspective, our study reflects recent interest the UK regulator, the FCA, has expressed in exploring issues relating to financial readability. Thirdly, the UK also enjoys regulatory consistency in that all credit providers are subject to the same advertising and promotions principles, and the same rules found in the consumer credit conduct of business sourcebook.

Our reasons for analysing webpages are threefold. Firstly, websites constitute a rich and multifaceted data source and contain, for instance, a combination of marketing and technical finance material. Secondly, focussing on websites reflects academic (Gathergood et al., 2018) and practitioner (CFA, 2016) evidence that online lending dominates the market. Moreover, the market share of high-street lending is declining (CFA, 2016). Thirdly, lender websites are responsible for the majority of payday loans. Recent practitioner evidence suggests that lead generators are responsible for around 40% of payday lending (CMA, 2015). Moreover, survey evidence suggests that the websites of lead generators and payday lenders are qualitatively very similar (CMA, 2015). For payday lenders we select the homepage. This is the direct interface for the consumer to gather the information and begin an application. We select the equivalent webpages for the other two categories. Each site is then parsed and analysed for key variables following the procedures defined above.

Table 2 presents summary statistics of our data. This shows that payday loans sites are easier to read, but that all are difficult. There is a similar pattern amongst the proportion of financial words to total words, words per sentence and the proportion of complex financial words to total complex words. A potentially interesting finding is that payday loan websites appear to be longer than those in other categories.

Table 3 shows the results of a test for readability applied to the Fog Index shown in equation (??). Results show that only the Payday loans websites would pass basic tests for readability (Grewal and Alagaratnam, 2013). Personal loans and credit card websites both violate this criterion. These websites would also compare unfavourably to accepted communication standards in medicine (Ley and Florio, 1996).

Table 4 investigates the extent to which these data discriminate between the different categories of lender. An Analysis of Variance and Tukey HSD test reveal differences in the overall readability (Fog Index), the ratio of financial words to total words and the ratio of complex financial words to total complex words. Credit card websites persistently score worse for readability. However, no significant differences are found between payday loans and personal loans. A Bartlett test for homogeneity of variances shown in Table 5 suggests that there is limited evidence for heterogeneity. However, there does seem to be some evidence that both the proportion of financial words used and the website length shows some heterogeneity between lender types. There is more variation in the length of payday websites. The extent to which credit card websites include complex financial terminology is also more varied. This may reflect qualitative accounts of credit card websites adapting their style to focus more upon payday loan style customers. Inter alia Ru and Schoar (2016) suggest that credit card issuers may take particular steps to target products towards less-educated customers. A Principal Components

| Variable | Mean | Stdev | Min | Max |
|-----------------------------|-------------|--------------|------------|------------|
| Payday Loans | | | | |
| Fog Index | 12.39 | 2.52 | 8.19 | 21.33 |
| Financial Words/Total Words | 0.12 | 0.02 | 0.07 | 0.16 |
| Complex Words/Total Words | 0.13 | 0.03 | 0.07 | 0.18 |
| <i>cfw/cw</i> | 0.11 | 0.06 | 0.00 | 0.25 |
| Words per sentence | 18.12 | 5.68 | 10.75 | 38.00 |
| Word Count | 1413.42 | 3935.14 | 95.00 | 22,501.00 |
| Personal Loans | | | | |
| Fog Index | 13.13 | 2.63 | 10.62 | 24.13 |
| Financial Words/Total Words | 0.11 | 0.02 | 0.06 | 0.17 |
| Complex Words/Total Words | 0.14 | 0.02 | 0.09 | 0.18 |
| <i>cfw/cw</i> | 0.10 | 0.06 | 0.02 | 0.29 |
| Words per sentence | 19.22 | 6.21 | 12.08 | 43.75 |
| Word Count | 920.35 | 802.42 | 229.00 | 4,667.00 |
| Credit Cards | | | | |
| Fog Index | 14.15 | 3.04 | 10.60 | 23.31 |
| Financial Words/Total Words | 0.14 | 0.03 | 0.09 | 0.23 |
| Complex Words/Total Words | 0.14 | 0.03 | 0.09 | 0.22 |
| <i>cfw/cw</i> | 0.17 | 0.08 | 0.05 | 0.37 |
| Words per sentence | 21.66 | 6.69 | 15.30 | 44.80 |
| Word Count | 1020.97 | 811.73 | 224.00 | 3,696.00 |

Table 2: Summary Statistics

| Lending category | <i>t</i>-value | <i>p</i>-value |
|-------------------------|-----------------------|-----------------------|
| Payday loans | 0.8699 | 0.3912 |
| Personal loans | 2.3933 | 0.0232 |
| Credit cards | 3.9414 | 0.0004 |

Table 3: Test of the null hypothesis of acceptable readability: $H_0 : \text{Fog Index} \leq 12$.

Analysis of this data is illuminating. The second Principal Component shown in Table 6 is a contrast between the amount of financial and non-financial terms used. Figure 1 plots the data on the first two Principal Components and suggests that some credit card and personal loans companies may have moderated the extent to which they use financial terminology in order to share qualitative similarities to payday-loan websites. As an additional robustness check Table 7 presents the results of our readability analysis applied to an alternative data source, namely the corpus of credit card agreements taken from the Consumer Financial Protection Bureau. We analysed a sample of 289 agreements from the largest credit card issuers in the U.S.

| Statistic | F-value | p-value |
|------------------------------------|-------------------|----------------|
| Fog Index | 3.228 | 0.044* |
| Financial Words/Total Words | 9.149 | 0.000*** |
| Complex Words/Total Words | 0.893 | 0.413 |
| <i>cfw/cw</i> | 9.227 | 0.000*** |
| Words per sentence | 2.638 | 0.077 |
| Word Count | 0.376 | 0.688 |
| Variable | Difference | p-value |
| Fog Index | | |
| Personal - Payday | 0.736 | 0.543 |
| Credit-Payday | 1.761 | 0.034* |
| Credit-Personal | 1.025 | 0.309 |
| Financial Words/Total Words | | |
| Personal - Payday | -0.008 | 0.526 |
| Credit-Payday | 0.021 | 0.009** |
| Credit-Personal | 0.029 | 0.000*** |
| Complex Words/ Total Words | | |
| Personal - Payday | -0.007 | 0.546 |
| Credit-Payday | 0.009 | 0.433 |
| Credit-Personal | 0.001 | 0.981 |
| cfw/cw | | |
| Personal - Payday | -0.018 | 0.571 |
| Credit-Payday | 0.054 | 0.007** |
| Credit-Personal | 0.072 | 0.000*** |
| Words per sentence | | |
| Personal - Payday | 1.109 | 0.762 |
| Credit-Payday | 3.541 | 0.069 |
| Credit-Personal | 2.432 | 0.276 |
| Word count | | |
| Personal - Payday | -492.807 | 0.692 |
| Credit-Payday | -392.194 | 0.791 |
| Credit-Personal | 100.613 | 0.984 |

Table 4: Baseline linear model to estimate bibliometric differences across lender categories. Upper panel: Summary results of the linear model. Lower panel: Tukey HSD results of the linear model.

4 Conclusions

The application of readability metrics in finance and economics is already in its infancy and may have wide-ranging implications for the discipline (Dowling, 2018). Much can ultimately be learnt from medicine (Ley and Florio, 1996). Medical regulations limit the level of complexity that can be found in the descriptions of medical products. However, in finance, readability is relatively under-explored by regulators. Amid much concern over financial literacy, and its associated negative social outcomes, only the payday loans in our sample conform to minimally accepted

| Statistic | K^2-value | p-values |
|-----------------------------|-------------------------------|------------------------------|
| Fog Index | 1.189 | 0.552 |
| Financial Words/Total Words | 8.040 | 0.018* |
| Complex Words/Total Words | 2.022 | 0.364 |
| <i>cfw/cw</i> | 3.581 | 0.167 |
| Words per sentence | 0.785 | 0.675 |
| Word Count | 97.074 | 0.000*** |

Table 5: Bartlett’s test of homogeneity of variance.

| Loading | PC 1 | PC 2 | PC 3 | PC 4 |
|------------------------------------|-------------|-------------|-------------|-------------|
| Fog Index | 0.574 | -0.268 | 0.000 | 0.267 |
| Financial Words/Total Words | 0.343 | 0.576 | 0.000 | -0.358 |
| Complex Words/Total Words | 0.214 | -0.270 | -0.843 | -0.305 |
| <i>cfw/cw</i> | 0.401 | 0.532 | 0.000 | -0.103 |
| Words per Sentence | 0.545 | -0.180 | 0.256 | 0.429 |
| Word Count | 0.221 | -0.456 | 0.458 | -0.717 |
| Cumulative % of variance explained | 42.263% | 65.359% | 82.145% | 94.146% |

Table 6: Summary results of the Principal Components Analysis. Upper panel: loadings of the first four Principal Components. Lower panel: Cumulative proportion of variance explained.

| Variable | Mean | Stdev | Min | Max |
|-----------------------------|-------------|--------------|------------|------------|
| Fog Index | 12.91 | 1.19 | 10.82 | 17.26 |
| Financial Words/Total Words | 0.13 | 0.02 | 0.10 | 0.18 |
| Complex Words/Total Words | 0.13 | 0.01 | 0.04 | 0.16 |
| <i>cfw/cw</i> | 0.16 | 0.03 | 0.03 | 0.27 |
| Words per sentence | 19.06 | 3.03 | 15.34 | 31.20 |
| Word Count | 6259.05 | 1594.09 | 3247.00 | 10,496.00 |

Table 7: Summary Statistics of Credit Card Agreements

readability levels (Grewal and Alagaratnam, 2013). Borrowers with different risk profiles are offered access to different products. As such there are occasions where payday loans may provide a genuine economic function (Bhutta et al., 2015). Therefore, one possibility is that readability is simply higher for higher-cost products and reading comprehension is, inevitably, negatively correlated with risk. The above notwithstanding credit card websites include more financial terminology and are generally less comprehensible compared to other lenders.

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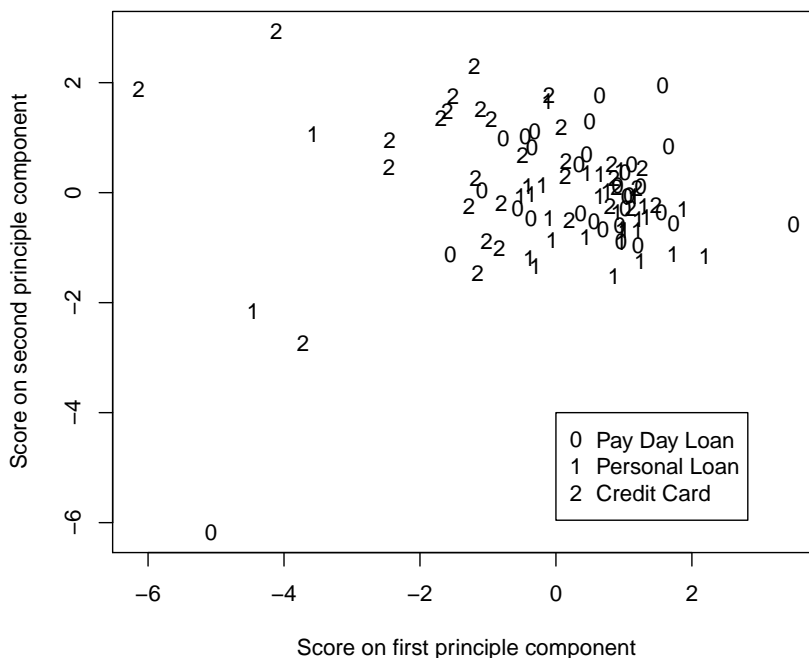


Figure 1: Plot of the bibliometric scores on the first two Principal Components

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