

McElvaney, Terry; Lunn, Pete; McGowan, Féidhlim

Working Paper

Do consumers understand PCP car finance? An experimental investigation

ESRI Working Paper, No. 586

Provided in Cooperation with:

The Economic and Social Research Institute (ESRI), Dublin

Suggested Citation: McElvaney, Terry; Lunn, Pete; McGowan, Féidhlim (2018) : Do consumers understand PCP car finance? An experimental investigation, ESRI Working Paper, No. 586, The Economic and Social Research Institute (ESRI), Dublin

This Version is available at:

<https://hdl.handle.net/10419/193923>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Do consumers understand PCP car finance? An experimental investigation

Terry McElvaney^a, Pete Lunn^{*a,b} and Féidhlim McGowan^a

**** DRAFT – DO NOT CITE WITHOUT PERMISSION ****

Abstract: A Personal Contract Purchase (PCP) plan is an innovative, complex and increasingly popular form of car finance. Consumers pay a deposit and monthly payments, but instead of paying off the total value of the car, they pay off the depreciation over a specified term. We used an experiment to investigate comprehension of PCP plans and scope for improving it through information disclosure and consumer advice. A representative sample of consumers (n=100) completed choice tasks, product rating tasks and multiple choice questions to measure the accuracy of consumers' decisions and extent of comprehension. Disclosures designed to improve the processing of mileage and cost information varied between participants. The tasks were also undertaken before and after reading an advice document. The results revealed poor understanding of PCP plans based on information typically disclosed by car dealers. Participants also made mistakes, often rating objectively worse offers more favourably than superior ones. The alternative disclosures were ineffective, but consumer advice sheets did improve comprehension and reduce mistakes. A sheet with a graphical explanation outperformed one with only text. We conclude that the complexity of PCP plans raises issues of consumer protection and that policymakers might consider stronger regulation.

*Corresponding Author: pete.lunn@esri.ie

Keywords: Personal Contract Purchase (PCP); explanatory diagram; decision-making; comprehension

JEL Codes: C91, D18, D91, G41

Acknowledgements: This research is supported by PRICE Lab, a research programme in Ireland funded by the Competition and Consumer Protection Commission, the Commission for the Regulation of Utilities and the Commission for Communications Regulation. The authors would like to thank John Shine and the CCPC team and a seminar audience at the ESRI for discussions and feedback.

a The Economic and Social Research Institute
b Department of Economics, Trinity College Dublin

1. Introduction

For many households, the purchase of a car represents the second largest financial transaction they undertake. The impact of innovations in car finance on consumer decisions is therefore an important research issue with potentially substantial implications for consumer policy. Probably the most prominent innovation in recent times is the Personal Contract Purchase (PCP) plan, which has received little attention from consumer researchers heretofore. PCP plans typically involve lower monthly payments than Hire Purchase (HP) deals or personal loans, allowing consumers to benefit from increased affordability. However, PCP plans are also relatively complex and involve potential drawbacks that may, or may not, be properly understood by consumers. The present paper employs an experimental study to investigate the extent of consumer comprehension of PCPs and to explore scope for improvement in understanding through the provision of consumer advice. As far as we can see, it is the first empirical study to investigate consumer comprehension of PCP plans and their impact on decision-making.

PCP plans operate in a somewhat similar fashion to traditional HP deals, in that the consumer acquires a new vehicle by paying an initial deposit followed by regular monthly repayments. The innovative element is that rather than paying off the full cost of the car over the term of the deal (as they would under HP), the consumer pays off only the depreciation in the car's value. This is calculated as the difference between the retail price and a guaranteed minimum future value (GMFV), which forms part of the deal and is subject to agreed conditions in relation to maximum mileage allowance and care of the car. At the end of the deal, the car can be purchased at the GMFV price, assuming that the consumer can afford the necessarily substantial final payment. Otherwise, there are two possibilities. If the car has depreciated

less than expected, the consumer can make use of this “equity” as part of a deposit for a new PCP plan with the same provider. Alternatively the consumer can simply return the car.

Evidently, given the above, PCP deals are more complex than previous forms of car finance.

It is important to recognise from the outset that PCP deals have advantages and enjoy popularity. Because consumers pay off only depreciation, monthly repayments are lower and so car purchase is more affordable. In Ireland, where the present study was conducted, a majority of car dealerships and brands now market PCP plans as their primary attraction for new car buyers. Industry figures show that at the start of 2016 over half of new car sales were conducted under a PCP framework.¹ The central innovation behind PCP deals originated in the United States and is spreading internationally. PCP deals are now available in the United Kingdom, Italy, the Netherlands, South Africa and Russia, with closely similar deals centred on monthly repayment of depreciation available also in Australia, Canada, China, Switzerland and Germany.

Nevertheless, in some countries consumer organisations, regulators and consumer journalists have expressed fears about comprehension of PCP plans and associated levels of debt.² In response to such concerns, the UK Financial Conduct Authority began a review of the implications of PCP plans for consumers in 2017. There are multiple potential downsides. Consumers do not have legal ownership, must abide by mileage limits and conditions of care (with negative financial consequences for breaking them) and must shoulder risk associated with future second-hand car prices. At the end of the contract, they may also find themselves

¹ Figures taken from www.motorcheck.ie/blog/car-finance-increases-139-percent.

² See www.irishtimes.com/life-and-style/motors/car-sales-nervously-reliant-on-pcp-1.3088002; www.independent.ie/business/personal-finance/charlie-weston-pcp-car-finance-deals-could-be-a-subprime-mess-all-over-again-35331251.html; www.ft.com/content/0e651206-0ee1-11e7-a88c-50ba212dce4d; www.theguardian.com/business/2017/jun/10/car-loans-personal-contract-plans-vehicle-financial-crisis-pcp.

in a weak negotiating position or effectively tied to a single dealer unless they have sufficient liquidity to pay the GMFV and take their business elsewhere. Furthermore, previous consumer research in other contexts has shown that consumers may struggle with the constructs at the heart of PCP finance, including trade-offs between immediate and future costs (Herrmann & Wricke, 1998; Dasgupta, Siddarth & Silva-Risso, 2007), other aspects of price framing (Wonder, Wilhelm & Fewings, 2008), non-linearities inherent in interest calculations (e.g. Lusardi & Mitchell, 2011) and calibration of likely usage (Grubb, 2009). We briefly review relevant studies in the next section.

Given this backdrop, consumer policymakers might welcome empirical evidence in relation to whether consumers understand the structure and consequences of PCP plans. Consistent with the notion of empirically informed regulation advocated by Sunstein (2011), the study was undertaken in close collaboration with the Competition and Consumer Protection Commission (CCPC) and had the explicit aim of informing relevant consumer policy. Specifically, our study set out to address two primary research questions: (i) How well do consumers understand PCP plans? (ii) Can understanding be improved?

Given the lack of existing literature and exploratory nature of the research questions, the investigation employed a controlled laboratory experiment, which permitted a much more thorough and controlled investigation than would be possible via a survey. The study began by providing a representative sample of 100 consumers with information about PCP finance deals of the sort typically distributed by car dealerships. Participants then completed a series of computerised tasks. First was an Adaptive Choice Task (ACT) designed to assess consistency of decisions, involving a between-subjects comparison of equivalent PCP and HP deals. Second was a Rating Scale (RS) task in which participants rated a series of PCP deals

for good value, some of which strictly dominated others. Third was a set of Multiple Choice Questions (MCQ) that tested explicit comprehension of the key components of PCP deals. Participants then experienced one of two interventions involving the provision of detailed consumer advice. One originated from the website of Ireland's Competition and Consumer Protection Commission (CCPC), the other was designed by the research team. Following this, the fourth task presented a counterbalanced set of MCQs. The fifth and final task involved another sequence of RS responses. Changes in pre- and post-intervention performance on these measures were used to assess the two interventions.

The results raise concerns from a consumer protection perspective. We found that some participants were less able to make consistent decisions over PCP deals than over HP deals. When rating PCP deals, an offer that was objectively inferior to another was rated more highly in around one quarter of judgements. Performance on the initial MCQ questions was straightforwardly poor – key elements of PCP deals were not understood. Following exposure to the consumer advice, however, performance on the RS and MCQ tasks improved significantly. Overall, the study provides initial evidence that consumers struggle to comprehend PCP deals, but also that comprehension can be improved by helpful and detailed advice.

2. Literature Review and Hypotheses

2.1 Comprehension and Cognitive Load

In what follows, we consider the concept of comprehension broadly, to cover not only understanding of individual product features but also how features interact and are integrated

into judgements and decisions. Although previous studies have not addressed comprehension with respect to PCP plans specifically, there is a growing empirical literature on how consumers comprehend key components of personal loans, which offers some relevant insights. One way to view a PCP deal is that it possesses the same key properties as typical consumer loan (principal, term, interest rate, financial cost) plus a number of additional features and considerations. Thus, it is a reasonable presumption that many empirical findings in relation to personal loans will also apply to PCP plans, but that additional effects may result not only from features specific to PCPs but also because additional features increase cognitive load. Empirical investigations generally employ either surveys or laboratory experiments and one of three types of tasks: judgement tasks, rating/ranking tasks and choice tasks.

In judgement tasks, respondents are provided with information about a loan and asked to estimate another aspect that is determined by the information provided. For instance, they may be required to estimate how long it will take to pay off a loan with a given principal, monthly repayment (MR) and APR. The non-linearities inherent in these relationships appear to cause problems, with consumers underestimating the time to pay off loans (Overton and MacFadyen, 1998; Ranyard and Craig, 1995; Yard, 2004) and overestimating the financial cost of shorter loans (McHugh, Ranyard & Lewis, 2011). The complexity of interactions between components may also explain why, when asked to rate or rank sets of loans, participants rank short-term loans with very high APRs above longer term loans with lower APRs (Yard, 2004) and do not weight different price components equally in terms of cash value (Herrmann and Wricke, 1998).

Several choice experiments reveal that consumer decisions over loans are easily influenced by superficial aspects of presentation of information, such as the disaggregation of repayments into smaller more regular amounts or repayments are just below a salient round number (Estelami, 2001). Choices are also sensitive to which of the subset of co-determined properties of a loan (principal, APR, term, financial cost) are made explicit at the decision-point (McHugh et al., 2011; Lunn, Bohacek & Rybicki, 2016).

Generalising from these empirical studies, two points might be emphasised. First, the complexity (perhaps especially the non-linearity) of the key relationships that underlie a loan biases judgements. This finding is in keeping with the wider literature on financial literacy that demonstrates consumers' difficulty in handling non-linear relationships and interest compounding (Stango & Zinman, 2009; Lusardi & Mitchell, 2011) and relates individual differences to credit decisions (Disney & Gathergood, 2013). Second, the volume of information processing leads to inconsistent weighting of loan attributes in decisions. Out of necessity, loans involve a variety of interacting factors expressed in a diversity of units of measurement (Köcher & Holz Müller, 2014), e.g. €per month, % APR, lump sum deposit, accumulated cost of credit. Cognitive processing of individual factors may be taxing even before the requirement to integrate them (Homburg, Totzek & Krämer, 2014).

A PCP plan is, in essence, a more complex form of loan. Field and laboratory studies suggest that product complexity adversely affects consumer decision making. Individuals struggle to evaluate complex choices accurately (Jacoby, 1984; Schwartz, 2004; Agnew & Szykman, 2005) and often 'satisfice' by focusing on a subset of the information available (Simon, 1955). Complex price structures mean consumers often do not pay the lowest price for homogenous goods in markets for residential electricity (Wilson & Price, 2010), credit

products (Agarwal, Driscoll, Gabaix, & Laibson, 2009; Agarwal, Chomsisengphet, Liu, & Souleles, 2015) and broadband internet (Lambrecht & Skiera, 2006). Product complexity often leads consumers to choose dominated options (Loewenstein et al, 2017). Laboratory evidence shows that consumers' ability to assess good value deteriorates rapidly as the number of compensatory attributes increases (Lunn et al, 2017, forthcoming).

Marrying this previous empirical work with the fact that PCPs require additional product attributes to be taken into account, including a mileage limit, conditions relating to care, a GMFV and contractual conditions surrounding options at the end of the contract, the likelihood is that any problems of information processing capacity will be exacerbated relative to more traditional HP and personal loan finance. Moreover, cognitive load is likely to be further increased where finance packages are offered in the same context as the car purchase itself. Some evidence specific to the car market indicates failure to integrate relevant financial information (Wonder, Wilhelm & Fewings, 2008). Lastly, one notable feature of PCP deals is that consumers must consider the situation they are likely to face at the end of the deal. Any "present bias" (Frederick, Loewenstein & O'Donoghue, 2002) will lead them to weight this aspect of the deal less than the immediate benefits and costs. This may be strengthened by the deleterious effect of cognitive load on self-control (Baumeister, Vohs & Tice, 2007; Shiv & Fedorikhin, 1999; Ward & Mann, 2000; Fudenberg & Levine, 2006). Lower self-control is linked to higher use of easy-to-access credit products (Gathergood, 2012).

2.2 *Boosting Comprehension*

The above conclusions regarding cognitive capacity imply that consumers will be susceptible to marketing that gives prominence to key attractive features of PCP plans while making less salient the potential downsides. While this claim may be true of many products, it is likely to be particularly the case where cognitive capacity is so strongly taxed. One result is that PCPs may be an area where consumer advice is especially needed, to ensure that both positive and negative product features are made sufficiently salient. Building on Tversky & Kahneman's (1981) notion that individuals build specific mental constructs to compare alternatives, Thaler (1999) developed the concept of mental accounting to describe the segregation and integration of economic choices. In the context of PCP plans, consumers might be aided most straightforwardly by ensuring that the most important information enters the mental account, or by framing information in such a way as to simplify or make more salient the key relationships to improve the integration of information into the consumer's mental account. The present study focused on the provision of consumer advice and three specific types of framing manipulation, the empirical rationale for each of which is outlined in the following subsections.

2.2.1. Minimum Total Cost

One possible way to reduce the cognitive load associated with processing information about PCPs is to frame the cost of the deal as a simplified single figure. Summing the monthly payments with the initial deposit generates a Minimum Total Cost (MTC) figure that represents the minimum amount of money that the consumer has agreed to part with over the course of the deal. This is potentially a helpful way to simplify the mental account for a PCP plan, because regardless of what happens at the end of the deal the MTC will be exchanged for leasing the car over the term of the contract. Evidence from experimental studies of personal loans suggests that making financial cost information salient may improve

comprehension and influence decisions (Ranyard et al., 2006; McHugh et al., 2011). There is, however, a danger associated with an additional information disclosure in a context where consumers already struggle with the volume and complexity of information, even if in theory that disclosure integrates some of the existing information into a simplified form. In their loan study, Lunn et al. (2016) provide evidence that while presenting financial cost information may lessen bias, it may simultaneously reduce the consistency with which information is integrated into decisions. In the present study, we test the hypothesis that MTC information improves consumers' rating of PCP deals.

2.2.2 *Weekly Mileage*

Another feature unique to PCP Finance is the mileage limit. If violated, the consumer must pay a fine proportional to the excess distance travelled. Violation also reduces the likelihood of emerging with positive equity at the end of the deal, as it decreases market value. In current PCP advertising, the mileage allowance is expressed annually. In Ireland it typically ranges from 10,000 km/year to over 30,000 km/year. Such large absolute figures may reduce the attention consumers apply to these important limits. Annual mileage may also be less intuitive, leading to underweighting of this attribute in decisions.

Accumulations over time can be framed in multiple ways and there is existing evidence that choice of frame can affect how the information enters consumer decisions. For instance, reframing a large lump sum as a series of smaller ongoing expenses can increase transaction compliance (Price, 1994) – sometimes referred to as the “Pennies-a-Day” strategy (Gourville, 1998). We hypothesise that framing the mileage limit as a smaller and perhaps more intuitive equivalent weekly mileage may make it more salient and easy to process, helping consumers to integrate the information into their assessments of PCP plans.

2.2.3 *Explanatory Diagrams*

PCP plans straightforwardly contain more related attributes than HP deals. One possible way to help consumers to understand the relationships between the attributes is with the use of graphical diagrams. Diagrams can shift part of the burden of information processing to the perceptual system and thus enhance overall understanding (Lurie & Mason, 2007). Graphical aids can also promote causal inference relative to equivalent blocks of text (Mayer, 2002; Butcher, 2006; McCrudden, 2007). Hence, diagrams could help consumers to understand PCP plans by unlocking additional cognitive capacity or replacing textual information (Ainsworth, 2006). For example, one concern is whether consumers realise what components of a PCP deal the APR is charged on (the retail price minus both the deposit and GMFV). Graphical presentation of the relationships between components may help to overcome such difficulties.

2.3 *Hypotheses*

Combining the empirically established problems of comprehension associated with loans generally and the additional cognitive demands of PCP plans, we developed the following hypotheses for test in relation to our first research question regarding comprehension of PCPs:

H1: PCP agreements will increase the inconsistency of consumer decision-making relative to more traditional finance agreements such as HP.

H2: Consumers will make objective mistakes when evaluating PCP deals.

H3: Consumers will struggle to understand the main features of PCP plans based on standard marketing material.

Based on the analysis of the previous section, we then developed the following hypotheses in relation to the potential to improve consumer comprehension of PCP deals:

H4: Consumers' comprehension of PCP plans will be improved substantially by independent consumer advice highlighting key features from their perspective

H5: Consumers' evaluation of PCP deals will improve when provided with MTC information.

H6: Consumers evaluations will improve when mileage limits are expressed in weekly terms.

H7: Consumers' comprehension of PCP plans will improve in response to advice containing a diagram designed to illuminate the relationship between the main components of a PCP plan.

3. Methods

Given the exploratory nature of the research questions and hypotheses, our experimental study used multiple sequential tasks. In line with previous empirical work on loans, we deployed a mixture of choice, rating and judgment tasks, with the latter organised into MCQs. The experimental session consisted of eight stages: (1) initial briefing; (2) car preference selection; (3) Adaptive Choice Task (ACT); (4) Rating Scales (RS); (5) Multiple Choice Questions (MCQs); (6) advice intervention; (7) post-intervention MCQs; (8) post-intervention RS. These stages are summarised in Table 1.

3.1 Participants

Participants were 100 consumers aged 20-65 years from the Dublin area, recruited by a market research company. The sample was balanced by gender, age and working status.

Participants were paid €30 for participation and could win an additional €50 voucher through a lottery, entries into which were based on performance in stage 5 and 7 (see Appendix A for details).

Table 1: Structure of Experiment

Stage	Task	Description
(1)	Initial briefing	Participants read a typical information sheet from providers describing PCP and HP deals
(2)	Car preference selection	Participants selected a favourite and second favourite car from a selection of current leading models
(3)	Adaptive Choice Task (ACT)	Multiple binary choices within a staircase procedure balanced preference for first versus second car against difference in the retail price or APR. Half sample choose among PCP deals; half HP deals
(4)	Rating Scales (RS)	Participants rate PCP deal for good versus bad value on a 7-point scale
(5)	Multiple Choice Questions (MCQs)	Participants respond to questions probing understanding of the components of a PCP deal
(6)	Advice intervention	Participants read a consumers advice sheet. Half sample read regulator's website advice; half read advice designed by experimenters that includes a diagram of a PCP
(7)	Post-intervention MCQs	Participants respond to questions counterbalanced from Stage (v)
(8)	Post-intervention RS	Participants rate PCP deals again for good versus bad value

3.2 *Design and Materials*

The tasks were computerised. They were programmed in Python using the PsychoPy package (Peirce, 2007; 2009) and presented on 14” (1366x768) laptops.

3.2.1 *PCP Information Sheet*

Participants were given an initial one-page information sheet explaining a PCP agreement (provided in Appendix B). It was based on information given on websites of the main car dealerships and brands in Ireland. Thus, it was designed to mimic the type of information consumers receive from PCP providers when considering deals. Since the quality of this initial information was potentially an important determinant of performance and we did not wish to underestimate consumers’ capabilities, we combined the clearest text we could find from multiple sites. The quality of this sheet was therefore arguably somewhat higher than information a consumer might typically be given by an individual supplier. A brief description of HP appeared also. Participants had two minutes to read the sheet – enough to read through it carefully more than once.

3.2.2 *Car Preference Selection*

Participants negotiated a simple onscreen decision tree to select a first and a second preference car. A first screen showed four classifications (Small Hatchback, Regular Hatchback, Saloon, Sport Utility Vehicle (SUV)) from which participants clicked through to a second screen showing five options within the chosen class from the five most popular brands in Ireland: Ford, Nissan, Toyota, Hyundai and Volkswagen. They could click back to switch classifications as they wished. The full list of the cars is shown in Appendix C.

3.2.3 *Adaptive Choice Task*

Participants (randomised into a PCP or HP condition) completed a series of binary choices designed to test the consistency of decisions. Their first preference car was presented on the left-hand side of the screen and their second preference car on the right-hand side, with each associated with a different PCP (or HP) plan. Screen shots depicting this task are shown in Appendix D. Responses were entered simply by clicking on the chosen offer. The offers presented followed an interleaved staircase procedure designed to locate balance points between the preference for the first over the second choice car and the difference in retail price or APR between the financial plans. Two staircases were “top-down”, meaning that they initially presented a much more expensive (retail price or APR) first preference car and narrowed the gap in steps, or “bottom-up”, meaning that they started with equivalent financial plans and made the first preference car steadily more expensive. Each staircase proceeded until it reversed direction twice. In addition, the PCP condition had a fifth staircase interleaved that presented two offers that both involved the favourite car, but where the GMFV had to be traded-off against the mileage limit. Additional trials were added to the HP condition to ensure that the overall length of the task was equivalent between conditions. More detailed information on the rules that governed the staircase procedure is provided in Appendix E.

3.2.4 *Rating Scales*

In the RS task, 12 single PCP offers were presented for participants to rate on a scale from 1 to 7. The financial offers were the same for each participant, but the cars associated with them matched the brand preference shown in Stage 1. Trials were partially randomised to ensure that the same car did not appear consecutively. Unbeknownst to participants, trials were paired such that within each pair one offer strictly dominated the other. Pairs were the

same on all attributes except APR and mileage allowance, with one offer having a higher APR and stricter mileage limit. Detailed information on the prices of the cars displayed can be found in Appendix F. At this stage, participants were randomised into four conditions, with half presented with a weekly mileage alongside the annual limit and half presented with minimum total cost (MTC) information. This followed an orthogonal 2x2 structure, such that one quarter of participants received both manipulations and one quarter received neither.

3.2.5 Multiple Choice Questions

Eight MCQs were presented sequentially to test explicit understanding of the properties and operation of a PCP agreement. Two questions explored whether the components of a PCP deal were understood: what APR is charged on; how equity is calculated. These questions had four possible answers. Two questions were true/false questions and explored basic factual issues: who owns any equity at the end of the deal; whether equity is transferable. Four questions tested whether participants understood the direction of key relationships: higher GMFV implies lower repayments; higher second-hand car market implies increased chance of equity at the end of the deal; higher GMFV implies decreased chance of equity at the end of the deal; higher mileage allowance implies lower GMFV. These questions had four possible answers. Responses were given by simply clicking on one of the answers.

After the initial set of questions was established, a second set was developed in which each of the relationships was inverted, e.g. the first set asked about the implications of higher GMFV for repayments while the other asked about the implications of lower GMFV. Half the participants answered the first set of questions, half answered the second. The full list of questions is given in Appendices G and H.

3.2.6 Advice Intervention

Participants were randomly assigned to two conditions. In one they were given a written version of the advice on PCPs given on the website of the Competition and Consumer Protection Commission. The advice consisted of text designed to elucidate the pros and cons of PCPs. The second sheet, developed by the experimenters, focused on graphical aids designed to convey the relationships between different factors in a PCP agreement. The advice documents are provided in Appendices I and J. We refer to the two groups as the Textual Intervention (TI) and Graphical Intervention (GI) groups.

3.2.7 Post-Intervention MCQs

Participants were presented with whichever set of eight MCQs was the inverse of the set they tackled prior to the intervention.

3.2.8 Post-Intervention RS

In this final stage, participants repeated the RS task from Stage 4.

3.3 Procedure

The study was conducted in line with institutional ethical guidelines. It was undertaken in groups at the experimenter's research institute, with up to five participants per group. Before and on arrival participants were informed that they were taking part in a study on choosing car finance. Participants were presented with an information sheet describing what to expect but were not informed of the purpose of the study nor of the funder, in order to minimise experimenter demand. Consent was otherwise informed.

In Stage 1, participants were invited to open an envelope on the table in front of them and told to read it carefully. After a period of two minutes – enough to read the sheet carefully more than once – they were instructed to return the sheets to the envelopes. They then proceeded to Stage 2, where they were asked to select a favourite and second favourite car. At Stage 3, participants were instructed always to choose their preferred option of the two on-screen deals. They could proceed at their own pace and each decision was preceded by a fixation cross³ for 500ms.

When participants began Stage 4, it was stressed that they were no longer to respond according to how much they liked what was on offer. That is, they were to ignore whether the offer related to a hatchback or SUV etc., but instead to respond according to whether the offer represented objective good value. Participants clicked on the scale from 1 (“Not good value at all”) to 7 (“Very good value”) and were then asked to confirm their rating. A fixation cross was then presented for 500ms before the next trial. Ahead of Stage 5, participants were reminded that each correct answer increased their chances of winning a €50 voucher. After clicking on each answer they were invited to confirm their response before the next question was presented, following the 500ms fixation cross.

At Stage 6, participants were invited to open a new envelope (which had been placed on the table in front of them during Stage 5) and to read the contents carefully. They had six minutes before they were instructed to put the documents back into the envelopes – enough time to read the entire document and revisit key parts as they wished. Following the intervention, participants were again asked to complete Stage 7 as for Stage 5 above, and lastly Stage 8 as for Stage 4.

³ A small cross which appears in the centre of the screen between trials.

4. Results

4.1 Adaptive Choice Task

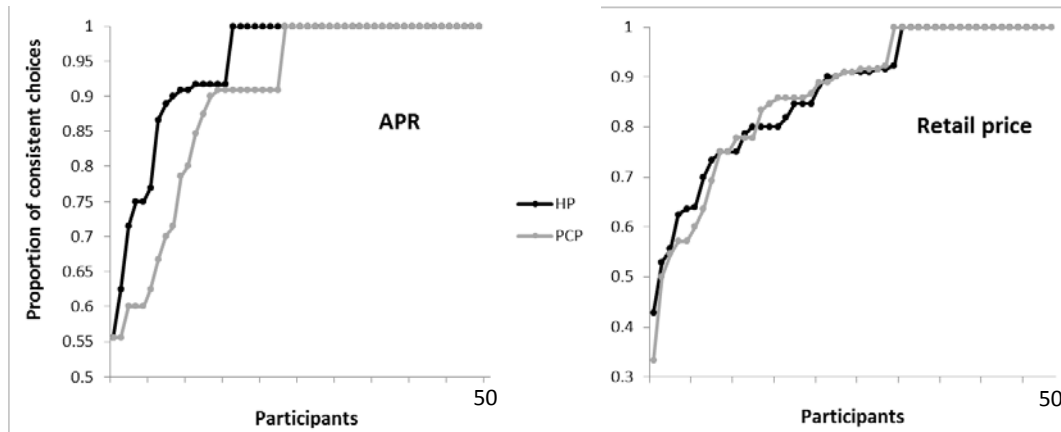
Participants' consistency in Stage 3, the ACT, was assessed separately for each of the two trade-offs undertaken in the PCP and HP conditions (price difference versus car preference; APR difference versus car preference). For each trade-off, there was an upper branch (starting with a large price/APR difference and decreasing it in steps) and a lower branch (starting with equal price/APR and increasing the difference in steps) of the staircase. We first produced a best estimate of the implied price/APR difference at which participants were indifferent between their first and second choice car, following principles similar to those employed with staircase procedures in perceptual psychophysics. For each participant and staircase, we located the smallest price/APR difference reached by the upper branch and the highest price/APR difference reached by the lower branch, then calculated the mean price/APR difference of these and subsequent trials as our best estimate of the participant's point of indifference. We then calculated the proportion of all responses that were consistent with this point of indifference.⁴

The cumulative distributions of consistent responses by staircase and condition are shown in Figure 1. For the staircases where participants had to trade-off their choice of car against an APR difference, more inconsistent responses were recorded for participants in the PCP group compared to the HP group. Around half the sample produced entirely consistent responses.

⁴ Data for three participants were discarded on the grounds that their responses were too erratic to estimate an indifference point.

The same pattern did not arise for the trade-off with the retail price, where the distributions of the proportion of inconsistent responses were closely similar between the two conditions.

Figure 1: Proportion of consistent responses in ACT task (Stage 3)



The number of inconsistent choices was modelled using Tobit regression, which takes account of left-censoring at zero. Dummy variables for gender, age, whether the participant had a degree and whether they were a car owner were included also. Results are presented for both the APR and retail price staircases in Table 2. In the APR condition, Model (1) finds that the number of inconsistent responses was higher in the PCP condition compared with the HP condition. This effect is significant at the 10% level, although the estimate here is conservative, since our hypothesis (H1) is directional and the reported significance level is for a two-tailed test. The number of inconsistencies was significantly lower among participants aged over 40 years and those with a degree. Model (2) shows that there was a significant interaction between the PCP condition and age. The pattern of coefficients implies that the PCP condition generated more inconsistent choices only amongst younger

participants.⁵ The estimated effect size for younger participants is of similar magnitude to possessing a degree. Models (3) and (4) repeat this analysis for the retail price staircases. There was no equivalent effect of the PCP condition. Those with a degree were more consistent in their choices.

Table 2: Tobit regressions for the number of inconsistent responses in the ACT task (Stage 3)

	APR		Retail Price	
	(1)	(2)	(3)	(4)
PCP	.101* (.057)	.204** (.077)	-.026 (.048)	.002 (.068)
Female	-.012 (.056)	-.011 (.054)	-.028 (.048)	-.026 (.048)
Age > 40	-.170*** (.063)	-.046 (.084)	-.067 (.052)	-.039 (.071)
PCP*Age > 40		-.222** (.111)		-.056 (.096)
Degree	-.178*** (.063)	-.177*** (.062)	-.147*** (.052)	-.147*** (.052)
Car Owner	-.038 (.060)	-.044 (.059)	-.055 (.052)	-.057 (.052)
Constant	.113 (.079)	.071 (.081)	.252*** (.066)	.241*** (.069)
N	97	97	97	97
Pseudo R ²	0.196	0.250	0.172	0.178

* p < 0.1; ** p < 0.05; *** p < 0.01
Standard errors in parentheses

The remaining responses required those in the PCP group to trade-off GMFV against mileage allowance and monthly payment. A low GMFV increases repayments but also loosens mileage restrictions and increases the chances of equity at the end of the contract. We tested whether participants would reach a balance between these factors, or whether they would always favour one direction. Just over one third of participants (17) failed to home in on a point of indifference. In 12 cases, the participant reached the point where they accepted a

⁵ We also tested for interactions of the PCP condition with gender and car ownership, both of which were non-significant and are excluded here for reasons of parsimony. Including these interaction terms does not alter the reported results.

mileage limit of just 5,000km, less than one third of average mileage for Irish car owners and half of the lowest limit offered in the market, at which point the staircase terminated.

Similarly, in 5 cases participants reached a GMFV of just €3,500 for a three-year old car. We found no impact of age, gender, education or car ownership on the likelihood of homing in on a point of indifference.

4.2 *Rating Scales*

The mean rating given to offers in Stage 4, prior to the advice intervention, was 4.47 (sd = 1.45). Rating differences were calculated for each dominant-dominated pair, such that a positive rating difference indicated that the objectively better offer (lower APR and higher mileage limit) had been rated more highly. Of the 600 pairs rated, this was the case for 303 (50.5%). However, in 143 (23.8%) of cases, the dominant offer pair was rated as a worse deal than the dominated one. These frequent violations of dominance were not confined to a minority of participants: 71 of the 100 participants generated at least one violation among just six paired ratings.

Rating differences passed standard tests for normality (Shapiro-Wilk, $p > 0.5$). To test for differences by condition, we estimated random intercept models with the rating difference as the dependent variable and the presence of weekly mileage and MTC information as covariates. Model (1) of Table 3 shows that neither information disclosure was of assistance to participants in rating the objectively better deal more highly. In fact, both estimated coefficients indicate a negative influence, with the negative influence of the MTC information statistically significant at the 10% level. We also tested for an interaction between the two disclosures, which was non-significant (not shown). Thus, there was a high

level of mistakes in the rating of the PCP deals, which was not helped by the additional information disclosures tested in Stage 4.

Table 3: Random intercept models for the rating difference (dominant – dominated) in Stages 4 (Model 1) and Stages 4 and 8 (Models 2 and 3).

	(1)	(2)	(3)
Weekly Mileage	-.110 (.198)	.015 (.177)	.014 (.165)
MTC	-.370 (.198)*	-.139 (.177)	-.289 (.177)
TI Advice		.212 (.129)*	.224 (.129)*
GI Advice		.344 (.157)**	.333 (.153)**
Female			.288 (.173)*
<i>Age (Ref = 20-29)</i>			
30-39			.304 (.262)
40-49			-.197(.254)
50+			-.166 (.270)
Degree			.242 (.195)
Car Owner			.074 (.191)
Constant	.818 (.190)***	.640 (.181)***	.391 (.290)
Obs	600	1,200	1,200
N	100	100	100

* p < 0.1; ** p < 0.05; *** p < 0.01
Cluster robust standard errors in parentheses

Ratings were taken again in Stage 8 following the consumer advice interventions. The number of pairs for which the dominant offer received a worse rating fell to 114 (19%), with 59 participants making at least one error. Model (2) in Table 3 expands the regression analysis to include the pairs from Stage 8, testing separately for an effect of the two different consumer advice interventions. Both had a positive effect on the rating difference relative to pre-intervention performance, with the TI advice significant at the 10% level and the GI advice significant at the 5% level.

Two robustness checks were performed. First, although random assignment to condition is designed to ensure that observed differences are not due to individual differences, Model (3) nevertheless introduces a number of background variables, both as controls and to test for any differences by gender, age, education and car ownership. The primary results relating to the interventions are largely unaffected. Having a degree, car ownership and age have no impact, but the performance of females is estimated to be somewhat superior (significant at the 10% level). Second, while we chose the rating difference as our dependent variable in order to exploit the maximum variation in the data, it could be argued that the directional difference from zero is more important than variation in the rating difference away from zero, perhaps especially the likelihood of a negative difference that indicates dominance violation. Thus, we first re-estimated the model as a mixed-effects ordered logistic, with the rating difference categorised into three outcomes (negative, equal, positive), then again as a mixed-effects binary logistic (negative rating or not). Results for the interventions tested were closely similar to those in Table 3. The positive effect for females became significant at the 5% level in both models – women were significantly less likely to generate dominance violations.

The above analysis focuses on mistakes (dominance violations) and whether interventions reduced the likelihood of error. Also of interest is whether the consumer advice had any overall effect on ratings of PCP deals. If participants had specific misconceptions that were altered by the advice, overall ratings might have changed as participants found PCP deals in general more or less appealing. To test this, we matched pre- and post-intervention pairs and computed the difference between ratings, with a positive difference indicating a higher rating post-intervention. Of the 1,200 pairs, for 473 (39.4%) the post-intervention rating decreased, while for 347 (28.9%) it increased. Employing a similar random intercept model to Model 1 above, but with the post- versus pre-intervention difference as the dependent variable, we

tested the significance of this effect by condition. The form of advice (TI versus GI) had no significant effect ($p > 0.1$), but the effect did depend on the weekly mileage and MTC disclosures. Participants given the weekly mileage displayed greater decreases in ratings ($\beta = -.423$, $s.e. = .212$, $p < 0.05$) as did those given the MTC ($\beta = -.318$, $s.e. = .173$, $p < 0.1$), although there was a significant positive interaction between the two ($\beta = .617$, $s.e. = .291$, $p < 0.05$). Looking across this pattern of estimated coefficients, the upshot is that ratings were decreased significantly by the advice for participants who were given either piece of additional information, but not for those who were given both.

4.3 *Multiple Choice Questions*

Six of the eight MCQs had four possible responses while two MCQs had two possible responses. Thus, the expected total correct for a participant performing at chance was 2.5/8. The mean total correct in Stage 5 was 3.46 ($sd = 1.32$). Twenty-three of the 100 participants performed no better than chance, i.e. scored 2 or less. No participant scored the maximum 8. In Stage 6, following the consumer advice intervention, the number of correct scores increased, but did so differentially according to which intervention the participant received. The mean score following the TI advice was 3.98 ($sd = 1.53$), a significant increase (paired, $t(98) = -2.65$, $p < 0.01$). For GI advice it climbed to 5.22 ($sd = 1.57$), also a significant increase (paired, $t(98) = -5.16$, $p < 0.001$). The post-intervention mean score for the GI advice was significantly higher than that of the TI advice (unpaired, $t(98) = -4.00$, $p < 0.001$).

Overall, 67% of the participants improved their total score following the intervention. Specifically, 76% of consumers improved their comprehension score following the GI advice, while 58% improved their comprehension score following the TI advice. The

proportion of correct responses pre- and post-intervention by the type of consumer advice intervention is shown for each of the eight individual questions in Table 4. Statistical significance was determined by estimating a separate logistic regression for each question, where the dependent variable was whether the response was correct, the intervention type was specified as two dummy variables and a separate dummy variable was included to control for which version of the question was asked pre- and post-intervention (see Subsection 3.2.5).

The initial pattern of responses in Stage 5 indicates that participants struggled in particular to understand the impact of the second hand-car market on a PCP contract (Q2). Of the six questions with four responses, the question that related to the mileage-GMFV relationship (Q4) had the highest proportion of correct responses, while the proportion of correct responses on the other five questions did not exceed 38%. The TI advice significantly improved performance on two of the eight questions. The GI advice significantly improved performance on five questions, most of which related to relationships between the components of the PCP plan.

Table 4: Proportion of correct responses to MCQs pre- and post-intervention by type of consumer advice intervention

No.	Question Topic	Response options	Correct responses (%)		
			Stage 5	Stage 6 (TI)	Stage 6 (GI)
Q1	What is APR calculated on?	4	35	38	70***
Q2	Implication of 2 nd hand market movements?	4	27	26	62***
Q3	Is equity transferable?	2	50	66*	50
Q4	Direction of mileage-GMFV relationship?	4	64	62	76
Q5	How is equity calculated?	4	34	48	76***
Q6	Direction of GMFV-repayments relationship?	4	38	54**	70***
Q7	Who owns equity?	2	63	74	64
Q8	Direction of equity-GMFV relationship?	4	35	30	54**
Total			43.3	49.8**	65.3***

* p < 0.1; ** p < 0.05; *** p < 0.01

Additionally, we estimated a mixed logistic regression for responses to all questions, with the probability of a correct answer assumed to vary normally across individuals and control variables specified for which question was asked. This assumption is supported by our descriptive data, since the distribution of the number of correct responses across participants was approximately normally distributed (Shapiro-Wilk, $p > 0.5$). The results are shown in the final row. The improvement associated with the TI advice was statistically significant at the 5% level. The improvement associated with the GI advice was substantially greater and statistically significant at the 0.01% level. These results were unchanged by adding variables to the specification for gender, age, car ownership and whether the participant had a degree. Of these, only car ownership had a possibly significant influence on the likelihood of giving a correct response, although the effect ($\beta = .221$, s.e. = .125, $p < 0.1$) was weak relative to those associated with the TI advice ($\beta = .307$, s.e. = .130, $p < 0.05$) and, especially, the GI advice ($\beta = .925$, s.e. = .134, $p < 0.001$). The equivalent test comparing the two interventions revealed

that the GI advice significantly increased the probability of a correct response over and above the TI advice ($p < 0.001$). Note that interacting these dummy variables with the specific questions generated a very similar pattern by question to that shown in Table 4 (not shown).

5. Discussion

Given the lack of previous empirical consumer research on PCP finance, the present study set out to be exploratory in nature and to examine multiple hypotheses. In this final section we summarise the relevant findings with respect to each hypothesis, before considering the implications of the results for consumer policy and future research.

5.1 *Summary of Empirical Findings*

The findings offer some support for the hypothesis that PCPs reduce the consistency of consumer decisions relative to HP finance (H1). Consumers in the PCP group gave less consistent responses over a sequence of pair-wise choices in which preferences for model of car had to be traded off against APR, while no difference emerged in the equivalent trade-off against the retail price. Difficulty in understanding the credit aspect of a PCP deal is the obvious candidate to explain the difference, which was due to inconsistent responses among participants aged under 40. In addition, participants in the PCP condition also demonstrated some unusual choices in Staircase 5, wherein nearly a quarter of participants indicated that they would readily accept a mileage allowance of 5,000 km/year, an amount half that of the minimum mileage commonly offered by dealerships. While it is feasible that these participants (half of whom actually owned cars) may not use a car enough to violate this exceedingly low mileage allowance, it does imply that some of them may have been overly

attracted to the low monthly payments, despite the minimised future equity related to higher GMFVs.

This difficulty was also evident when consumers undertook the rating scale (RS) task in which they had to rate PCP deals for value. Almost one quarter of the time participants judged a deal to be better value than another that was in fact objectively superior, because it offered a lower APR and a higher mileage limit but was otherwise identical. This clear violation of dominance supports the hypothesis that consumers will make objective mistakes when evaluating PCP deals (H2).

Perhaps most striking, however, was performance in multiple choice questions (MCQs) that explicitly tested comprehension. The MCQs did not require any arithmetic, or indeed any kind of explicit calculation, only understanding of the essential elements of ownership, deal structure and directional relationships among key attributes. Yet, following exposure to standard marketing material of relatively high-quality, performance barely exceeded chance for a group of consumers who were incentivised to provide correct responses and more than half of whom were educated to at least degree level. This amounts to strong support for the hypothesis that consumers struggle to understand the main features of PCP plans (H3). Participants particularly struggled with questions related to the situation at the end of the contract, such as the likelihood of equity and how this relates to the GMFV and movement in the second-hand market.

In sum, our first three hypotheses were supported and, consequently, the findings imply a clear answer to our primary research question. Consumers' comprehension of PCP finance appears to be poor.

Our second research question was whether comprehension could be improved. Exposure to independent consumer advice both increased the number of correct responses to MCQs and reduced the frequency of dominance violations in the RS task, providing evidence for the usefulness of independent advice written from the consumer's perspective (H4). However, two additional information disclosures we tested produced mixed results. Neither expressing the mileage limit as a weekly figure nor making explicit the minimum total cost (MTC) over the contract helped consumers to avoid dominance violations when rating deals. Indeed, the MTC intervention probably made matters worse. Thus, any improvement of comprehension associated with reframing this key aspect of the product may have been outweighed by the degree to which a further piece of information taxed cognitive capacity, given that consumers must already process multiple aspects of a PCP deal (retail price, APR, GMFV, mileage allowance, cost of credit, deposit, term, monthly repayments). Overall, therefore, we found little if any support for H5 and H6. However, while not assisting participants to make good relative comparisons, exposure to one of these disclosures (but not both simultaneously) did result in ratings in general falling after reading consumer advice. The implication may be that the disclosures are somewhat useful once essential elements of a PCP deal have been understood, but otherwise contribute to information overload. Finally, we recorded clear evidence that the consumer advice designed by the experimenters (GI), the main innovation of which was to display a diagram of the components of a PCP deal, had a larger effect on comprehension than the primarily text-based advice (TI) available online at the time of the experiment. This finding strongly supports H7. The advice containing the graphic was particularly effective in improving understanding of how the different components of a PCP plan relate to one another.

5.2 *Potential Limitations*

Before considering the implications of the findings, it is apt to consider carefully the potential limitations of the present study. As with all laboratory experiments, thought must be given to the extent to which responses given in the lab are a guide to choices and behaviours in real-world settings. We discuss three issues.

First, our study was hypothetical. It is possible, given the substantial sums involved, that car buyers devote more time and effort to understanding PCP deals than did our participants and, consequently, that they understand PCP deals better than our study implies. Although the results we present cannot rule this possibility out, they offer reasons to be sceptical of any such claim. Recall that participants were incentivised on a question-by-question basis and read the PCP marketing and advice material in the knowledge that they were about to face questions about it. They also displayed a substantial improvement in responses after reading the independent advice (especially in the GI condition). This improvement strongly indicates that participants tried hard to absorb information they were given and to produce good responses. It is ultimately a matter of judgement whether a typical car buyer tries to understand a PCP plan more determinedly than our participants did. However, given the extent of effort induced by our design and indicated by the data, we contend that a step-jump in comprehension from our participants to a typical car buyer is highly unlikely. In this context, recall also that the marketing material shown to participants at the beginning of the study (see Appendix B) was based on the material supplied by providers in the Irish market at the time of the study and selected to be the most easily understood material we could locate. Although this judgement is admittedly a subjective one made by the research team, the information placed before the average buyer is unlikely to be more helpful.

Second, the difficulty of the tasks in our study was set by the experimenters, so the absolute level of performance reflects this process as well as the comprehension of participants. The level of difficulty was not set arbitrarily, however, but on the basis of a judgement that failure to respond accurately would indicate a consumer protection issue. For instance, where consumers cannot make consistent choices between pairs of products, or rate offers that are objectively poorer than others more highly, when judged just moments apart, the indication may be that they will struggle to home in on good deals when conducting internet searches. Similarly, where consumers do not understand that when one component of a deal goes up another comes down, or that a choice made now has a specific consequence for their financial situation at a future date, there is an increased possibility that they will encounter an unpleasant surprise at some point after making a substantial financial decision.

Third, the specific experimental design employed may have somewhat overestimated the influence of independent advice. We opted to compare responses to MCQs on a pre- and post- intervention basis, inverting each question between the two sets such that it had to be tackled afresh. With such a design, it is possible that some improvement took place simply because participants learned as they progressed through the session, or that while reading the independent consumer advice participants specifically sought to understand the issues probed in the first set of MCQs. We opted not to include a control group that received no advice because we wanted to devote statistical power to the difference between the two advice formats. Indeed, the fact that the two interventions had differential effects, both in terms of magnitude and focus, strongly suggests that the results were not driven by learning during the session. It remains possible that when reading advice participants sought information specific to the MCQs previously asked. If so they might have outperformed a cold reader and,

therefore, produced stronger performance in the second set of (inverted) questions. We cannot be certain, given present data. Again, however, the differential comprehension induced by the TI and GI advice suggests otherwise, since information sufficient to answer the specific questions was available in both. Furthermore, it is perhaps an unlikely strategy for participants to adopt. They did not know that they would be asked a second set of MCQs and it would in any case be a considerable feat of working memory to retain eight separate concepts while searching actively within a technical document for information specific to each.

5.3 *Policy Implications*

PCP plans should be considered a complex financial product. The scale of misunderstanding of PCP finance implied by the present study provides evidence that a substantial proportion of car buyers are unlikely to comprehend such deals. It should be noted that this does not necessarily imply that their decisions are at fault, nor that they will suffer any negative consequences. However, it does suggest that the likelihood of these eventualities may be higher than when consumers engage with products they understand better. The evidence presented here implies that car buyers may struggle to locate the better deals. Of perhaps particular concern is the difficulty of comprehending the factors that dictate the situation faced at the end of a PCP deal. Deals with relatively high GMFVs generate attractive low monthly repayments at the expense of worse financial circumstances at the end of the deal. A proportion of consumers may be surprised to discover that, having paid a substantial sum over, say, three years, cared well for a car and stayed within stringent mileage limits, they own little or no part of any useful asset in return.

These findings and the lack of previous studies suggest that PCP finance requires greater attention from consumer policymakers than has perhaps been acknowledged. Nevertheless, consumer protection concerns need to be balanced against the positive benefit of increased affordability that has accompanied the arrival of PCP plans. Evidence suggests that many standard financial products generate confusion among consumers. Studies now link various features of insurance products (Bhargava et al, 2017; Suter et al, 2017) and investment products (Beshears et al, 2011) to objective mistakes. Key elements of mortgage products are not well understood by homeowners (Lacko and Pappalardo, 2010) and those with poor financial literacy are more likely to choose riskier mortgages (Gathergood and Weber, 2017). The degree to which preferences for pension products are subject to framing effects (Brown et al, 2008) suggests they are not well understood either. These inconsistencies, biases and straightforward mistakes present a challenge for policymakers, where a balance must be struck that allows consumers to reap benefits yet protects them from pitfalls. The same is true of PCP plans.

In this context, the current study provides strong evidence that consumers considering PCPs would benefit from good independent advice. It shows that comprehension of PCP plans can be improved substantially. Advice that included an explanatory diagram was particularly effective. The findings therefore raise the issue of how best to get effective advice in front of car buyers. The scale of miscomprehension revealed here might be taken to support a more interventionist approach, moving policy beyond the provision of independent information about PCPs that car buyers can seek if they wish, to the mandating of more effective disclosures at the point of sale. In keeping with the principles of empirically informed regulation (Sunstein, 2011) and given the regulatory costs involved, disclosures might be pre-tested for effectiveness to inform such a policy.

5.4 *Future Research*

The findings point to a need, perhaps urgent, for more research to support consumer policy in this area. As stated at the outset, car purchase is one of the largest financial transactions households undertake. An innovative form of finance is increasing in popularity and, according to the evidence presented here, consumers struggle to understand the basics of how it works. An important research question, therefore, is how well consumers who have entered a PCP deal understand the terms of their contract and the situation they are likely to face when it comes to an end. Our results suggest a likely answer indirectly, but field studies or surveys could be potentially be deployed to obtain an answer directly.

Another question not addressed in the current study is the degree of confidence that consumers have in their understanding of PCP deals. Work on financial literacy suggests that in some domains consumers are excessively confident in their understanding (OECD, 2005) and in general overconfidence is more likely when tasks are difficult or nearly impossible ((Fischhoff, Slovic, and Lichtenstein 1977; Kahneman and Tversky 1996), such as accurately assessing the future market value of a car . This is important, because overconfidence may make consumers less inclined to seek the sort of independent advice that our results show can be effective, potentially strengthening the case for stronger mandated disclosure.

Lastly, despite demonstrating shortcomings in consumers' comprehension, the current findings contain some grounds for optimism with regard to the effects of explanatory diagrams. Previous research has shown the benefits of diagrams in multiple domains of human understanding (Ainsworth, 2006). Our results suggest much potential for using

diagrams to improve consumer understanding of complex financial products. Moreover, the increased application of behavioural science to policy means that policymakers have similarly increased access to methods for designing and pre-testing diagrams as tools of information provision and disclosure.

References

- Agarwal, S., Chomsisengphet, S., Liu, C., & Souleles, N. S. (2015). Do consumers choose the right credit contracts? *The Review of Corporate Finance Studies*, 4(2), 239-257.
- Agarwal, S., Driscoll, J. C., Gabaix, X., & Laibson, D. (2009). The age of reason: Financial decisions over the life cycle and implications for regulation. *Brookings Papers on Economic Activity*, 2009(2), 51-117.
- Agnew, J. R., & Szykman, L. R. (2005). Asset allocation and information overload: The influence of information display, asset choice, and investor experience. *The Journal of Behavioral Finance*, 6(2), 57-70.
- Ainsworth, S. (2006). DeFT: A conceptual framework for considering learning with multiple representations. *Learning and instruction*, 16(3), 183-198.
- Baumeister, R. F., Vohs, K. D., & Tice, D. M. (2007). The strength model of self-control. *Current directions in psychological science*, 16(6), 351-355.
- Beshears, J., Choi, J.J., Laibson, D. & Madrian, B.C. (2011). How Does Simplified Disclosure Affect Individuals' Mutual Fund Choices? In Wise, D.A. (ed.), *Explorations in the Economics of Aging* (pp. 75-96). Chicago: University of Chicago.
- Bhargava, S., Loewenstein, G., & Sydnor, J. (2017). Evaluating Health Insurance Decisions: Health Plan Choices from a Menu With Dominated Options. *The Quarterly Journal of Economics*.
- Brown, J.R., Kling, J.R., Mullainathan, S. & Wrobel, M.V. (2008). Why Don't People Insure Late-Life Consumption? A Framing Explanation of the Under-Annuitization Puzzle. *American Economic Review*. 98(2), 304–309.
- Butcher, K. R. (2006). Learning from text with diagrams: Promoting mental model development and inference generation. *Journal of Educational Psychology*, 98(1), 182.
- Chen, Y. C., Shang, R. A., & Kao, C. Y. (2009). The effects of information overload on consumers' subjective state towards buying decision in the internet shopping environment. *Electronic Commerce Research and Applications*, 8(1), 48-58.
- Dasgupta, S., Siddarth, S., & Silva-Risso, J. (2007). To lease or to buy? A structural model of a consumer's vehicle and contract choice decisions. *Journal of Marketing Research*, 44(3), 490-502.
- Disney, R., & Gathergood, J. (2013). Financial literacy and consumer credit portfolios. *Journal of Banking & Finance*, 37(7), 2246-2254.
- Estelami, H. (2001). Determinants of discount rates in consumer credit decisions. *Journal of Marketing Theory and Practice*, 9(1), 63-73.

- Fischhoff, B., Slovic, P., & Lichtenstein, S. (1977). Knowing with certainty: The appropriateness of extreme confidence. *Journal of Experimental Psychology: Human perception and performance*, 3(4), 552.
- Fudenberg, D., & Levine, D. K. (2006). Superstition and rational learning. *The American economic review*, 96(3), 630-651.
- Gathergood, J. (2012). Self-control, financial literacy and consumer over-indebtedness. *Journal of Economic Psychology*, 33(3), 590-602.
- Gathergood, J., & Weber, J. (2017). Financial literacy, present bias and alternative mortgage products. *Journal of Banking & Finance*, 78, 58-83.
- Gourville, J. T. (1998). Pennies-a-day: The effect of temporal reframing on transaction evaluation. *Journal of Consumer Research*, 24(4), 395-408.
- Greer, J. M., & Levine, D. K. (2006). A dual-self model of impulse control. *The American Economic Review*, 96(5), 1449-1476.
- Grubb, M. D. (2009). Selling to overconfident consumers. *The American Economic Review*, 99(5), 1770-1807.
- Herrmann, A., & Wricke, M. (1998). Evaluating multidimensional prices. *Journal of Product & Brand Management*, 7(2), 161-169.
- Hoelzl, E., Kamleitner, B., & Kirchler, E. (2011). Loan repayment plans as sequences of instalments. *Journal of Economic Psychology*, 32(4), 621-631.
- Homburg, C., Totzek, D., & Krämer, M. (2014). How price complexity takes its toll: The neglected role of a simplicity bias and fairness in price evaluations. *Journal of Business Research*, 67(6), 1114-1122.
- Jackson, T. W., & Farzaneh, P. (2012). Theory-based model of factors affecting information overload. *International Journal of Information Management*, 32(6), 523-532.
- Jacoby, J. (1984). Perspectives on information overload. *Journal of consumer research*, 10(4), 432-435.
- Kahneman, D., & Tversky, A. (1981). *The simulation heuristic* (No. TR-5). STANFORD UNIV CA DEPT OF PSYCHOLOGY.
- Kahneman, D., & Tversky, A. (1996). On the reality of cognitive illusions.
- Köcher, S., & Holzmüller, H. H. (2014). Zu viel des Guten? Eine Analyse der Wirkung von Verbraucherschutzinformation. *Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung*, 66(4), 306-343.
- Lacko, J. M., & Pappalardo, J. K. (2010). The failure and promise of mandated consumer mortgage disclosures: Evidence from qualitative interviews and a controlled experiment with mortgage borrowers. *The American Economic Review*, 100(2), 516-521.

- Lambrecht, A., & Skiera, B. (2006). Paying too much and being happy about it: Existence, causes, and consequences of tariff-choice biases. *Journal of marketing Research*, 43(2), 212-223.
- Loewenstein, G., Schwartz, J., Ericson, K., Kessler, J. B., Bhargava, S., Hagmann, D., ... & Nussbaum, D. Behavioral Insights for Health Care Policy.
- Lunn, P., Bohacek, M., & Rybicki, A. (2016). An Experimental Investigation of Personal Loan Choices. *Economic and Social Research Institute (ESRI) Research Series*.
- Lurie, N. H., & Mason, C. H. (2007). Visual representation: Implications for decision making. *Journal of Marketing*, 71(1), 160-177.
- Lusardi, A., & Mitchell, O. S. (2011). Financial literacy and retirement planning in the United States. *Journal of Pension Economics & Finance*, 10(4), 509-525.
- Frederick, S., Loewenstein, G., & O'Donoghue, T. (2004). i O'Donoghue, T. 2002. *Time discounting and time*.
- Mayer, R. E. (2002). Multimedia learning. *Psychology of learning and motivation*, 41, 85-139.
- McCrudden, M. T., Schraw, G., Lehman, S., & Poliquin, A. (2007). The effect of causal diagrams on text learning. *Contemporary Educational Psychology*, 32(3), 367-388.
- McHugh, S., Ranyard, R., & Lewis, A. (2011). Understanding and knowledge of credit cost and duration: Effects on credit judgements and decisions. *Journal of Economic Psychology*, 32(4), 609-620.
- McHugh, S., & Ranyard, R. (2012). Credit repayment decisions: The role of long-term consequence information, economic and psychological factors. *Review of Behavioural Finance*, 4(2), 98-112.
- OECD. (2005). *Improving financial literacy: analysis of issues and policies*. Paris: OECD Publishing.
- Overton, A. A., & MacFadyen, A. J. (1998). Time discounting and the estimation of loan duration. *Journal of Economic Psychology*, 19(5), 607-618.
- Peirce, J. W. (2007). PsychoPy—psychophysics software in Python. *Journal of neuroscience methods*, 162(1), 8-13.
- Peirce, J. W. (2009). Generating stimuli for neuroscience using PsychoPy. *Frontiers in neuroinformatics*, 2, 10.
- Price, P. C. (1994, November). Installment framing: The mental aggregation and disaggregation of monetary cost over time. In *poster presented at the Annual Meeting of the Society for Judgment and Decision Making, St. Louis, MO*.

- Ranyard, R., & Craig, G. (1995). Evaluating and budgeting with instalment credit: An interview study. *Journal of Economic Psychology*, 16(3), 449-467.
- Ranyard, R., Hinkley, L., Williamson, J., & McHugh, S. (2006). The role of mental accounting in consumer credit decision processes. *Journal of Economic Psychology*, 27(4), 571-588.
- Schwartz, B. (2004). The paradox of choice.
- Shiv, B., & Fedorikhin, A. (1999). Heart and mind in conflict: The interplay of affect and cognition in consumer decision making. *Journal of consumer Research*, 26(3), 278-292.
- Sicilia, M., & Ruiz, S. (2010). The effects of the amount of information on cognitive responses in online purchasing tasks. *Electronic Commerce Research and Applications*, 9(2), 183-191.
- Simon, H. A. (1955). A behavioral model of rational choice. *The quarterly journal of economics*, 69(1), 99-118.
- Smith, B. A., & Stewart, F. (2009). Learning from the Experience of Organisation for Economic Co-operation and Development Countries: Lessons for Policy, Programs, and Evaluations. *Overcoming the Saving slump: How to increase the effectiveness of financial education and saving programs*, 345.
- Stango, V., & Zinman, J. (2009). Exponential growth bias and household finance. *The Journal of Finance*, 64(6), 2807-2849.
- Sunstein, C. R. (2011). Empirically informed regulation. *The University of Chicago Law Review*, 78(4), 1349-1429.
- Suter, J., Duke, C., Harms, A., Joshi, A., Rzepecka, J., Lechardoy, L., Hausemer, P., Wilhelm, C., Dekeulenaer, F., & Lucica, E. (2017). *Study on consumers' decision making in insurance services: a behavioural economics perspective*. Retrieved from the EU Law & Publications website: <https://publications.europa.eu/en/publication-detail/-/publication/b86d7f2d-9e77-11e7-b92d-01aa75ed71a1/language-en>
- Thaler, R. H. (1999). Mental accounting matters. *Journal of Behavioral decision making*, 12(3), 183.
- Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211(4481), 453-458.
- Ward, A., & Mann, T. (2000). Don't mind if I do: disinhibited eating under cognitive load. *Journal of personality and social psychology*, 78(4), 753.
- Wilson, C. M., & Price, C. W. (2010). Do consumers switch to the best supplier?. *Oxford Economic Papers*, 62(4), 647-668.

Wonder, N., Wilhelm, W., & Fewings, D. (2008). The financial rationality of consumer loan choices: Revealed preferences concerning interest rates, down payments, contract length, and rebates. *Journal of Consumer Affairs*, 42(2), 243-270.

Yard, S. (2004). Consumer loans with fixed monthly payments: Information problems and solutions based on some Swedish experiences. *International Journal of Bank Marketing*, 22(1), 65-80.

Appendix A: Incentive System

The incentive scheme operated on a raffle system, such that each participant began with their name in the raffle for a €50 voucher once. On correctly answering a question, their name was added to the raffle one more time. Therefore, the better they performed in the MCQs, the greater their chance of winning the voucher. This form of incentivisation works well in that, rather than simply rewarding those with the highest score (which could demotivate those who expected not to perform well relative to others), it rewards every correct answer equally with an improved overall chance of winning. Therefore, the motivation of participants is more likely to remain constant and common across participants.

Appendix B: Initial Information Sheet

PCP

PCP Explained

A PCP is a Personal Contract Plan. It is a 2-3 year car finance package that enables people to obtain a new car for relatively low monthly payments, while also providing some flexibility regarding what to do at the end of the agreement.

Under a Personal Contract Plan, once you have chosen a new car, you pay a deposit percentage of between 10% and 30% of the Retail Price. One way of doing this is by trading in your existing car and paying the remainder in cash. Next, you agree a mileage limit to adhere to for the length of the agreement.

Finally, a portion of the car's value is deferred until the end of the agreement. This amount is the minimum value that the car dealership guarantees your car will be worth at the end of your agreement, your Guaranteed Minimum Future Value (GMFV). You then pay an agreed monthly instalment over 24-36 months to cover the remainder of the car's value at a set APR (Annual Percentage Rate).

At the end of your agreement you have the following three options:

Option 1: Renew your car

You can upgrade your car to a newer model. Any excess value of your car over the GMFV can be used as equity for a deposit towards your new PCP car.

Option 2: Return your car

As long as your car meets our fair wear and tear standards, is within the agreed mileage, and your account is up-to-date, there will be nothing further to pay. Additional charges will be made if you exceed the agreed mileage or if your car does not meet our fair wear and tear standards.

Option 3: Retain your car

Make a one-off final payment equivalent to the GMFV and take ownership of the car. You do not own the car until you make this final payment.

Hire Purchase

HP Explained

Hire Purchase is quite similar to a PCP agreement, in that you are financing the cost of your car over a period of time that you choose between 1 to 5 years. However, with HP, you are paying back the total cost of the car over the course of the agreement. After placing a deposit, equal monthly payments over the period of the agreement are agreed at a set APR (Annual Percentage Rate). Once all of the payments have been made, you become the owner of the vehicle.

Appendix C: List of vehicles

Classification of Car	Car Brand	Car Model
Small Hatchback	Ford	Fiesta
Small Hatchback	Nissan	Micra
Small Hatchback	Toyota	Yaris
Small Hatchback	Hyundai	i10
Small Hatchback	Volkswagen	Polo
Regular Hatchback	Ford	Focus
Regular Hatchback	Nissan	Pulsar
Regular Hatchback	Toyota	Auris
Regular Hatchback	Hyundai	i30
Regular Hatchback	Volkswagen	Golf
Saloon	Ford	Mondeo
Saloon	Nissan	Qashqai
Saloon	Toyota	Corolla
Saloon	Hyundai	i40
Saloon	Volkswagen	Passat
SUV	Ford	Kuga
SUV	Nissan	X-Trail
SUV	Toyota	C-HR
SUV	Hyundai	Tucson
SUV	Volkswagen	Tiguan

Appendix D: Adaptive Choice Task – Staircases

Ford Fiesta	Volkswagen Polo
	
Price: €23,250 Term: 36 Months Deposit: €3,000 APR: 0% GMFV: €7,750 Monthly Payments: €347.22 Cost of Credit: €0.00 Mileage: 20,000 km/year	Price: €23,250 Term: 36 Months Deposit: €3,000 APR: 0% GMFV: €7,750 Monthly Payments: €347.22 Cost of Credit: €0.00 Mileage: 20,000 km/year

Staircase 1: Bottom-Up APR Titration, with no starting difference between APR values.

Ford Fiesta	Volkswagen Polo
	
Price: €23,250 Term: 36 Months Deposit: €3,000 APR: 20% GMFV: €7,750 Monthly Payments: €464.54 Cost of Credit: €4,223.61 Mileage: 20,000 km/year	Price: €23,250 Term: 36 Months Deposit: €3,000 APR: 0% GMFV: €7,750 Monthly Payments: €347.22 Cost of Credit: €0.00 Mileage: 20,000 km/year

Staircase 2: Top-Down APR Titration, with large starting difference of 20% between APR values.

Ford Fiesta	Volkswagen Polo
	
Price: €28,750 Term: 36 Months Deposit: €5,750 APR: 4% GMFV: €9,500 Monthly Payments: €398.57 Cost of Credit: €848.66 Mileage: 25,000 km/year	Price: €28,750 Term: 36 Months Deposit: €5,750 APR: 4% GMFV: €9,500 Monthly Payments: €398.57 Cost of Credit: €848.66 Mileage: 25,000 km/year

Staircase 3: Bottom-Up Retail Price Titration, with no starting difference between Price values.

Ford Fiesta	Volkswagen Polo
	
Price: €34,150 Term: 36 Months Deposit: €5,750 APR: 4% GMFV: €9,500 Monthly Payments: €558.00 Cost of Credit: €1,188.12 Mileage: 25,000 km/year	Price: €28,750 Term: 36 Months Deposit: €5,750 APR: 4% GMFV: €9,500 Monthly Payments: €398.57 Cost of Credit: €848.66 Mileage: 25,000 km/year

Staircase 4: Top-Down Retail Price Titration, with large starting difference of €5,400 between Price values.

Ford Fiesta	Ford Fiesta
	
Price: €26,500 Term: 36 Months Deposit: €5,750 APR: 4% GMFV: €9,500 Monthly Payments: €332.14 Cost of Credit: €707.21 Mileage: 15,000 km/year	Price: €26,500 Term: 36 Months Deposit: €5,750 APR: 4% GMFV: €8,500 Monthly Payments: €361.67 Cost of Credit: €770.08 Mileage: 16,000 km/year

Staircase 5: GMFV titrated off against Mileage Limit.

Appendix E: Adaptive Choice Task – Staircase Procedure

- a) Staircase 1 (APR): In the first staircase, participants were initially presented with two identical deals for their first and second preference cars, with each deal offering an Annual Percentage Rate (APR) of 0%. On selection of their first preference car, the APR of this deal increased by 4%. Hence, the next time the participant was presented with a trial from Staircase 1, the finance deal for their favourite car was more expensive than the deal for their second favourite car, with Monthly Payments and Cost of Credit rising with the increasing APR. On selection of the second preference car, the APR of the first preference deal decreased by 4%. The prices displayed remained constant at €23,250, regardless of the cars displayed.
- b) Staircase 2 (APR): The second staircase operated as the opposite bracket of Staircase 1. Rather than presenting two identical trials with 0% APRs, this staircase presented the second preference car deal with an APR of 0%, while the first preference car deal had a considerably higher APR of 20%, along with correspondingly higher Monthly Payments and Cost of Credit. On selection of the second preference car, the APR of the first preference deal decreased by 4%, while it increased by 4% on selection of the first preference car. The prices displayed remained constant at €23,250, regardless of the cars displayed.
- c) Staircase 3 (RRP): The third staircase operated in a similar fashion to Staircase 1. However, rather than increase the APR of the first preference deal on selection, the retail price increased by a step of €900, along with correspondingly higher Monthly Payments and Cost of Credit. On selection of the second preference car, the price of the first preference deal would decrease by €900. The initial price displayed for each deal was €28,750.
- d) Staircase 4 (RRP): The fourth staircase operated as the opposite bracket of Staircase 3. Rather than presenting two identical trials, this staircase presented the first preference car deal with a retail price €5,400 higher than that of the second preference, along with correspondingly higher Monthly Payments and Cost of Credit. On selection of the second preference car, the price of the first preference deal decreased by €900, while it would increase by €900 on selection of the first preference deal. The initial price displayed for the second preference car on the right was €28,750, while the price for the first preference car was €34,150.
- e) Staircase 5 (GMFV / Mileage Allowance): The fifth staircase was presented exclusively to participants in the PCP condition, as GMFV and Mileage Allowances are not relevant factors in a standard, traditional Hire Purchase agreement. For those in the HP condition, they were simply presented with a number of dummy trials in order to ensure that the total number of trials presented to participants in both groups remained approximately equal.

In this staircase, instead of the first and second preference cars, participants were shown their favourite car on each side of the screen, each with a different PCP offer. On the left, they were presented with a deal that had a slightly higher GMFV and a slightly lower annual Mileage Allowance than the deal on the right. As the GMFV was higher, this also meant that the Monthly Payments and Cost of Credit were lower on the left-hand side. The car on the left initially displayed a GMFV of €9,500 with a Mileage

Allowance of 15,000 km/year, while the car on the right displayed a GMFV of €8,500 with a Mileage Allowance of 16,000 km/year. On selection of the left-hand option, the left GMFV would increase by €2,000, with a decrease in Mileage Allowance of 2,500 km/year. On selection of the right-hand option, the left GMFV would decrease by €2,000, with an increase in Mileage Allowance of 2,500 km/year. The prices displayed remained constant at €26,500, regardless of the cars displayed.

Participants were shown trials from each of the five staircases in a semi-randomised order, in that the same staircase would not be shown twice in a row. The Adaptive Choice Task was terminated after the participant had made a minimum of two reversals on each of the five staircases (four staircases for those in the HP condition). For example, if the initial choice on Staircase 1 had been to choose the finance offer on the left, and the next choice on Staircase 1 had been to choose the offer on the right, this counted as one reversal. If they then decided to choose the offer on the left, this counted as a second reversal.

On committing one reversal on any staircase, that staircase was no longer presented to participants until a reversal was demonstrated on all but one of the remaining staircases. At this point, the reversed staircases would again begin to randomly appear. In a similar fashion, on committing a second reversal on any staircase, that staircase was no longer presented to them until a second reversal was demonstrated on all but one of the remaining staircases. At this point, the reversed staircases would again begin to randomly appear.

In the event that participants demonstrated no clear reversal points on a staircase (i.e. continuing to select their first preference car regardless of the increasing cost), they reached a ceiling point, at which stage the staircase in question would cease to appear.

Appendix F: Rating Scales – Price Distribution

The prices of the cars displayed were based on the average retail price of the cars in each category at the time of design. For example, the average Regular Hatchback price was taken from the average price of the Ford Focus, the Nissan Pulsar, the Toyota Auris, the Hyundai i30 and the Volkswagen Golf. In order to promote variation in rating scores, 3% of this average Regular Hatchback price was added to and subtracted from the average in order to create a higher and lower range of expense. In this way, two Regular Hatchback deals with a price of 3% below this average were presented, as well as two Regular Hatchback deals with a price of 3% above this average. This variation was also applied to the deals in the Saloon. In the Small Hatchback class, two cars with a price of 3% below this average were presented, while in the SUV class, two cars with a price of 3% above this average were presented.

Appendix G: Multiple Choice Questions (Phrasing 1)

1. In a PCP agreement, what is the APR (Annual Percentage Rate) charged on?
 - a) The Retail Price of the car minus the GMFV
 - b) The Retail Price of the car minus the initial Deposit
 - c) The GMFV (Guaranteed Minimum Future Value) of the car
 - d) **The Retail Price minus both the initial Deposit and the GMFV**

2. Assume the second hand car market has done well over the course of your PCP deal and the price of a second-hand car has generally risen:
 - a) **This could be good for you because you have a greater chance of having positive equity at the end of your deal**
 - b) This could be bad for you as you will need to pay more to purchase your car at the end of your deal
 - c) This has no relevance for you and your PCP agreement
 - d) I don't know

3. At the end of a PCP agreement, the dealer evaluates the market value of the PCP car. You can then use any positive equity on the car towards the final payment on the car in order to take full ownership:
 - a) True
 - b) **False**

4. When establishing the mileage allowance for a PCP deal, the higher the mileage:
 - a) **The lower your GMFV should be**
 - b) The higher your GMFV should be
 - c) Neither of the above
 - d) I don't know

5. At the end of a PCP deal, the dealer evaluates the market value of the PCP car. If you wish to move onto a second PCP deal, what aspect of your previous PCP deal can be put towards your new deposit?
 - a) Your original deposit from your first PCP agreement
 - b) The market value of your first PCP car
 - c) **The difference between the market value of your first PCP car and its Guaranteed Minimum Future Value**
 - d) The Guaranteed Minimum Future Value of your first PCP car

6. At the start of a PCP deal, the higher your GMFV:
 - a) **The lower your monthly payments**
 - b) The higher your monthly payments
 - c) Neither of the above
 - d) I don't know

7. At the end of a PCP agreement, the dealer evaluates the market value of the PCP car. If I choose to walk away and not purchase the car or enter into a second PCP

agreement, I am not entitled to be rewarded or make use of the positive equity on my PCP car for returning it in good condition:

- a) **True**
 - b) False
8. At the start of a PCP deal, the lower your GMFV:
- a) The lower your chances of having positive equity at the conclusion
 - b) **The higher your chances of having positive equity at the conclusion**
 - c) Neither of the above
 - d) I don't know

Appendix H: Multiple Choice Questions (Phrasing 2)

1. The APR is applied to what component of the total price in a PCP agreement?
 - e) The Retail Price of the car minus the GMFV
 - f) The Retail Price of the car minus the initial Deposit
 - g) The GMFV (Guaranteed Minimum Future Value) of the car
 - h) The Retail Price minus both the initial Deposit and the GMFV**

2. Assume the second hand car market has done poorly over the course of your PCP deal and the price of a second-hand car has generally risen:
 - e) This could be good for you because you have a greater chance of having positive equity at the end of your deal
 - f) This could be bad for you as you will need to pay more to purchase your car at the end of your deal**
 - g) This has no relevance for you and your PCP agreement
 - h) I don't know

3. At the end of a PCP agreement, the dealer evaluates the market value of the PCP car. You cannot take advantage of the good condition of your car as a contribution towards the final balloon payment required to purchase the car:
 - c) True**
 - d) False

4. When establishing the mileage allowance for a PCP deal, the lower the mileage:
 - e) The lower your GMFV should be
 - f) The higher your GMFV should be**
 - g) Neither of the above
 - h) I don't know

5. If you wish to switch to a second PCP deal at the end your first deal, your deposit for the second deal can be a combination of cash and which aspect of your first PCP deal?
 - e) Your original deposit from your first PCP agreement
 - f) The market value of your first PCP car
 - g) The difference between the market value of your first PCP car and its Guaranteed Minimum Future Value**
 - h) The Guaranteed Minimum Future Value of your first PCP car

6. At the start of a PCP deal, the lower your GMFV:
 - e) The lower your monthly payments
 - f) The higher your monthly payments**
 - g) Neither of the above
 - h) I don't know

7. At the end of a PCP agreement, the dealer evaluates the market value of the PCP car. If you choose to walk away and not purchase the car or enter into a second PCP

agreement, you are entitled to be rewarded with positive equity as compensation if you return the car with a market value greater than that of the GMFV:

- c) True
 - d) **False**
8. At the start of a PCP deal, the higher your GMFV:
- e) **The lower your chances of having positive equity at the conclusion**
 - f) The higher your chances of having positive equity at the conclusion
 - g) Neither of the above
 - h) I don't know

Appendix I: Textual Intervention (TI) Document

What You Need to Know about PCP Deals

Pros

- ✓ Low monthly repayments
- ✓ Small deposit
- ✓ A choice of what to do at end of repayment term
- ✓ Quick and easy to arrange

Cons

- ✗ Mileage and condition of car affects the costs
- ✗ Have to pay the Guaranteed Minimum Future Value (GMFV), a large final payment to own the car at the end of the contract
- ✗ You don't own the car until you make this final payment
- ✗ May not be able to afford repayments in the future if your circumstances change
- ✗ You need permission from the finance company (owner) if you need to sell the car during the term of the contract
- ✗ Final payment or GMFV may not be an accurate reflection of future market value of the car

Many car dealers are now offering finance in the form of a Personal Contract Plan (PCP) to consumers when they are buying a car. PCPs can appear very attractive because of the low monthly repayments and the convenience of being able to buy your car and sort out your finance in the same place. However, it is important to understand how these products work before you sign a PCP contract.

How does a PCP work?

A PCP is a type of hire purchase contract. You don't own the car until you have made the final payment. With a PCP, payment is broken down into three parts:

The deposit – the deposit is typically between 10% and 30% of the value of the car, depending on the finance provider. Your deposit can be paid in cash or if you already own a car, you can trade this in for part or all of the deposit, depending on its value.

Monthly repayments – PCP contracts are usually made for terms of at least three to five years. PCPs generally have low monthly repayments, which can make them seem more affordable compared to other forms of finance.

Guaranteed Minimum Future Value (GMFV) , a large, final payment, is how much it will cost you to own the car at the end of the contract. It takes into account such things as, the car you are buying, length of the contract, the condition of the car at the end of the contract and your annual

mileage. This final payment is set at the beginning of the contract, based on the finance company's estimate of the future value of the car. If you are entering into another PCP the GMFV is subject to you meeting all the terms and conditions, including any mileage restrictions, you agreed at the start.

When your contract ends

At the end of the PCP contract, there are a number of options:

Pay the GMFV, to own the car. There may be other fees associated with buying the car for example acceptance fees or completion fees which should be outlined in your PCP contract. You could also refinance the GMFV by taking out a new finance contract as the GMFV can be a large sum of money. This would mean you are entering into another financial contract

Hand the car back. Be aware that if you do decide to hand the car back, while you generally don't have to pay the dealer anything, you might end up having to pay a penalty if you have not met all the terms and conditions, for example, if you have exceeded any mileage restrictions agreed at the start of the contract or if there is excessive 'wear and tear' on the car. You also will no longer have the car.

Enter into another PCP contract to buy a new car. It is important to be aware that the deposit you put down for the first car will not be given back to you. If the market value of the car from your first/previous PCP contract is greater than the GMFV, then you may have equity to put towards a deposit on the new car. However this will depend on the market value of the car at the time so you may need to pay a new cash deposit, depending on the difference between the GMFV on the first car and its market value at the end of the contract. You should check the contract or ask the dealer for details on what happens if you decide to enter into another PCP contract in the future.

Comparing a PCP with a personal loan

The main difference between a PCP and a personal loan is that with a personal loan you borrow the money, pay for your car, and own it immediately. With a PCP contract you don't own the car, you are essentially hiring it for an agreed period of time, typically three to five years. You only own it if you pay the GMFV. This is important because if you were to run into financial difficulty during the term of your contract you would need permission from the finance company to sell the car to pay off your debt, as they are the legal owner of the car.

How flexible is a PCP?

These contracts are among the least flexible forms of finance. Because the repayments are fixed for the term of the contract, you usually cannot increase your repayments each month if you wish to do so. If you want to extend the term, you may be charged a rescheduling fee.

What to watch out for

Before you sign up to a PCP make sure you know who is providing you with the finance, that you fully understand the terms and conditions attached and you know what other things you need to look out for such as:

Mileage: At the outset you agree the number of kilometres you are going to clock up over the period of the contract. If you keep to this, the car will have a GMFV at the end of the contract. If you exceed the agreed annual mileage you may find that you owe more on the final payment than you think – even if you were to hand the car back it would cost you money. This is often charged at a set fee per kilometre over the agreed limit.

Difficulty making repayments: You may be allowed to sell the car to clear the debt but you will need to get permission from the finance company to do this. Hire purchase contracts, which include PCP, allow you to end your contract and give back the car once you have paid half the hire purchase price – this is called the [half rule](#). Because a lot of the cost of the car is deferred to the end with PCP, you may be close to the end of the contract by the time you reach the halfway point but ending your contract in this way may be an option.

Small print: At the beginning of the contract you will agree to a number of different terms and conditions. For instance, the cap on the number of miles/kilometres you are allowed to clock up over the period of the contract. You may also be asked to commit to certain car servicing requirements. Always read the small print before you sign up.

Finance options: When comparing finance options, take the time to compare the total amount payable on a personal loan ([cost of credit](#)) with the PCP cost (the deposit, plus monthly repayments and final payment). Use our [personal loan cost comparison](#) to help you. Make sure you also compare the terms and conditions of each option.

Fees and charges: Always ask about any additional fees and charges. You are entitled to a list of all additional charges and fees, so ask the garage for this before you sign up to any contract. For instance, ask if there is any documentation fee for setting up the contract, missed repayments fees or repossession charges.

Outstanding finance: It is worthwhile [checking the registration documents](#) of a second-hand car to make sure that it is not already owned by a finance company, in which case the person trying to sell you the car does not actually own it and may not have the right to sell it to you.

How is interest charged?

If interest is charged, the rate on PCPs will vary depending on the finance company and the car you are financing. Interest is calculated at a fixed rate on the total amount you borrow for each year of the contract. If you pay off the contract earlier than planned, this will often work out more expensive than if you had taken out a variable rate personal loan. Also, the deposit you pay at the beginning of the contract will have an impact on the amount of interest you pay.

Can your car be repossessed?

With a PCP, your car can be repossessed if the terms of the contract are broken, for example, by missing repayments. If you have paid less than one-third of the purchase price, the car finance company can take back your car without taking legal action against you. If you have paid more than one-third of the purchase price, a lender cannot repossess the car without taking legal action. In addition, the car cannot be repossessed from your home, regardless of how much money you've paid back.

If your car is repossessed, the finance company will generally sell the car and the money goes towards the outstanding debt, but you will still have to make repayments until the entire debt is paid off.

Appendix J: Graphical Intervention (GI) Document

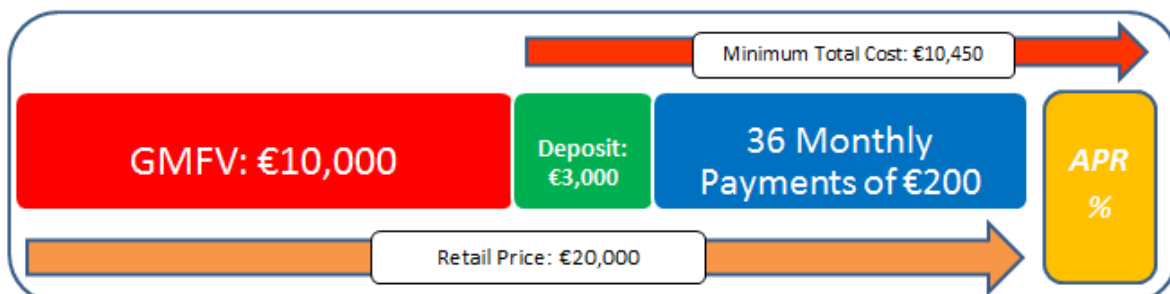
What You Need to Know About PCP Deals

A PCP (Personal Contract Plan) is a type of hire purchase contract. However, it is **fundamentally different** from a standard, traditional hire purchase agreement. This is because you are not paying off the full cost of the car through monthly repayments. Rather, you are paying off the difference between the Retail Price and the predicted future value of the car at end of the deal. You don't own the car until you then make a final payment equal to the GMFV. What you pay is broken down into three parts:

1. **The deposit** – the deposit, paid at the start, is typically between 10% and 30% of the value of the car. Your deposit can be paid in cash or if you already own a car, you can trade this in for part or all of the deposit, depending on its value.
2. **Monthly repayments** – PCP contracts usually last at least two to three years. PCPs generally have low monthly repayments, which can make them seem more affordable compared to other forms of finance.
3. **Guaranteed Minimum Future Value (GMFV)** - a large, optional final payment. This is how much it will cost you to own the car at the end of the contract. This final payment is set at the beginning of the contract, based on the finance company's estimate of the future value of the car. It takes into account such things as; the car you are getting, the length of the contract and a set annual mileage limit.

See the examples below of a PCP deals for a car with a retail price of **€20,000** on a three year contract with a fixed APR (Annual Percentage Rate) of 4% and a Mileage Allowance of 20,000 km/year.

In this example, the car has a GMFV of €10,000. With a deposit of €3,000, this leaves the remaining amount (displayed in blue) to be paid through monthly instalments.



How do the factors of a PCP deal interact?

Deposit: The higher your Deposit (€3,000 in the example above), the more you paying upfront for the car, so the less you are borrowing and paying back over the course of the deal. Therefore, the less you are required to pay through Monthly Instalments (€200 per month in the example above).

GMFV: The higher your GMFV (€10,000), the lower the proportion of the total cost of the car you are paying off through monthly instalments. In other words, the higher your GMFV, the lower your Monthly Payments will be. However, remember that a higher GMFV means a larger final payment to actually buy the car at the end of the deal.

Monthly Payments: The more you pay in monthly instalments, the more you are “borrowing” over the course of the deal. As it is this “borrowed” amount that the APR is charged on, the higher your monthly payments, the more interest you will be charged. This increases both the Minimum Total Cost and the overall Cost of Purchasing the PCP car (€20,450).

Minimum Total Cost: This is the minimum amount that you are agreeing to hand over to the dealer, even if you decide not to pay the GMFV at the end of the deal. It is the sum of the Deposit and all of your Monthly Payments.

Mileage: If you select a higher annual Mileage Allowance (20,000 km/year) for the term of the deal, it is expected that the car will have more miles on the clock at the end of the deal, which will reduce what it is worth. Therefore, the higher your Mileage Allowance, the lower the GMFV.

When happens when your contract ends?

At the end of the PCP contract, there are a number of options:

1. Pay the GMFV to own the car.

2. Hand the car back.

In this scenario you will have paid to rent a car for three years. Provided you have not exceeded your mileage allowance and the car does not have excessive wear and tear, you can simply return the car and walk away. However, if you have exceeded the agreed annual mileage limit you will have to pay a fine, generally at a set fee per kilometre over the agreed limit.

3. Enter into another PCP contract to get a new car.

The difference between the market value of a car and its GMFV is referred to as ‘equity’. For example, if the market value of a car is €12,000 and the GMFV for that car is €10,000, then you have ‘positive equity’ of €2,000.

Your potential equity depends on the condition of your car (wear and tear / mileage) and what the second-hand market for that car type looks like at the end of the contract.

If you have positive equity, you can put this towards a deposit on the new PCP deal. This is the *only* guaranteed way to use any positive equity from your existing PCP deal.

However, if the market value falls below the GMFV, you will not have any equity to contribute to the deposit on a new PCP contract, and you may be required to pay off this 'negative equity' (if you have not abided by the mileage and wear & tear allowances).

How are the monthly payments calculated?

The total amount you borrow is the Retail Price of the car minus both the Deposit and the GMFV. Interest is calculated at a fixed APR on this amount. This is then divided by the length of your contract, giving you your monthly payments. The higher the APR, the more interest you will be charged.

What's the difference between a PCP deal and a personal loan?

The main difference between a PCP and a personal loan is that with a personal loan you borrow the money, pay for your car, and own it immediately. With a PCP contract you don't own the car, you are essentially hiring it for an agreed period of time, typically two to three years. You only own it if you pay the GMFV. This is important because if you were to run into financial difficulty during the term of your contract you would need permission from the finance company to sell the car to pay off your debt, as it is the legal owner of the car.

How flexible is a PCP?

These contracts are among the least flexible forms of finance. Because the repayments are fixed for the term of the contract, you usually cannot increase your repayments each month if you wish to do so. If you want to extend the term, you may be charged a rescheduling fee.

What should I watch out for?

Before you sign up to a PCP make sure you know who is providing you with the finance, that you fully understand the terms and conditions attached and you know what else you may need to look out for such as:

Mileage: At the outset you agree the number of kilometres you are going to clock up over the period of the contract. If you keep to this and the car is kept in good condition, it will have a minimum value equal to the GMFV at the end of the contract. If you exceed the agreed annual mileage you may find that you owe more on the final payment than you think – even if you were to hand the car back it would cost you money. This is often charged at a set fee per kilometre over the agreed limit.

Year	Number	Title/Author(s)
2017		
	585	Analysing long-term interactions between demand response and different electricity markets using a stochastic market equilibrium model <i>Valentin Bertsch , Mel Devine , Conor Sweeney , Andrew C. Parnell</i>
	584	Old firms and new products: Does experience increase survival? <i>Martina Lawless and Zuzanna Studnicka</i>
	583	Drivers of people's preferences for spatial proximity to energy infrastructure technologies: a cross-country analysis <i>Jason Harold, Valentin Bertsch, Thomas Lawrence and Magie Hall</i>
	582	Credit conditions and tenure choice: A cross-country examination <i>David Cronin and Kieran McQuinn</i>
	581	The cyclicity of Irish fiscal policy ex-ante and ex-post <i>David Cronin and Kieran McQuinn</i>
	580	Determinants of power spreads in electricity futures markets: A multinational analysis <i>Petr Spodniak and Valentin Bertsch</i>
	579	Gifts and inheritances in Ireland <i>Martina Lawless and Donal Lynch</i>
	578	Anglers' views on stock conservation: Sea Bass angling in Ireland <i>Gianluca Grilli, John Curtis, Stephen Hynes and Paul O'Reilly</i>
	577	The effect of Demand Response and wind generation on electricity investment and operation <i>Sheila Nolan, Mel Devine, Muireann Á. Lynch and Mark O'Malley</i>
	576	Determinants of residential heating system choice: an analysis of Irish households <i>John Curtis, Daire McCoy, Claudia Novielli</i>
	575	Estimating, and interpreting, retirement income replacement rates <i>Alan Barrett and Sanna Nivakoski</i>
	574	Sea bass angling in Ireland: A structural equation model of catch and effort <i>Gianluca Grilli, John Curtis, Stephen Hynes and Paul O'Reilly</i>

For earlier Working Papers see <http://ww.esri.ie>