Referee Report for "The Free Installment Puzzle," by Sungjin Cho and John Rust for *Econometrica*, March 2012

This is an incredibly poorly written paper. The introduction reads like a step-by-step walk through a variety of loosely related and poorly conceived empirical exercises.

- The exact nature of the data set is completely opaque. Basic questions for which I cannot find answers anywhere in the paper include: What country is being studied? What are the basic characteristics of the borrowers being studied? What items are purchased in typical transactions of various types? Is the sample randomly drawn from the company's customer base?

- A central substantive question is never defined. The title would suggest that the main contribution of the paper is in shedding light on consumer behavior regarding free installment plans, but the opening several pages of the introduction describe the authors' journey through their attempts to estimate demand for credit and the following statement is made on Page 2: "The main goal of this paper is to use these data to try to infer the *credit demand function* and determine its elasticity with respect to the interest rate charged."

- The paper seems to have been written in a vacuum with respect to the existing literature. While it may very well be the case that the data set has unique features relative to those that have been analyzed before, there is a huge literature on the market for credit that is ignored entirely by this paper. Many attempts have been made to estimate credit demand, for example, yet the paper makes no mention of these. In fact, only nine references in total are included in the paper. Just because the data have a unique structure does not imply that the paper makes a fundamentally new contribution.

The rest of the paper carries on the same frustrating, meandering style. The data section is twenty pages long and includes over twenty figures, but many of the most basic features of the data and data set are never discussed. After twenty pages, I remain unsure of what facts are critical for the analysis ahead – it's definitely not all 22 figures.

Meanwhile, having read a 20-page data section, I still have no idea where the data come from and when free installment plans are offered (are these for certain kinds of purchases, certain kinds of merchants). This is incredibly important, because the authors describe the use free (vs. non-free) installment plans for smaller purchases as a consumer choice (see description on page 16) and therefore a puzzle. But, my guess is that these free installment promotions are likely limited in some way to lower cost items. Again there is no detail in the paper.

There is also no detail in the paper about how in practice consumers make the choice regarding installment plan length. Is this made at the time of purchase, at the

time of the first bill, etc.? It seems suspicious to me that there is a huge mass at 3 months (over 60% of installment payment plans of both types) and almost no mass at 12-months. This leads me to believe that consumers may not have an unrestricted choice of any installment length between 2-12 months, as the authors seem to assume, but may instead be restricted in the length of time – especially for certain promotions. Without a clearer understanding of these features of installment plans, (when promotions are offered, under what restrictions, etc), I am completely unconvinced that the "free installment puzzle" is based on anomalous, unconstrained consumer choices and am very worried that it is an artifact of the authors' lack of complete understanding of the data that they are working with.

Section 3 of the paper turns to the exercise of estimating the "conditional" demand for credit – conditional that is on having decided to make a purchase. The authors never justify why estimating conditional demand is important – for most empirical questions, the unconditional demand would be the critical object of interest. The one argument that I can see for analyzing conditional demand is that it might reveal anomalous behavior inconsistent with standard economic models. Section 3 reports the results of a number of poorly conceived reduced-form approaches for estimating conditional demand. It is hard to see any serious researcher thinking that any of these seriously addresses the myriad of endogeneity problems, so there inclusion in the paper seems spurious. Moreover, if the authors were willing to make the exclusions restrictions that they make in the context of the structural model (see below), why not use these in an analogous reduced-form analogous. This would at least provide more justification for Section 3.

The narrative of the author's walk through their empirical work continues in the beginning of Section 4, as they describe their efforts to "think outside the box". On page 34, they describe an experiment that a credit card company might be convinced to do – although not one that has actually been done in the data described in this paper. In the analysis that follows, however, the authors essentially assume that the credit card company does something that resembles this experiment. – i.e., randomly sets the time and place interest-free installment promotions. In particular, they assume:

> the z variables that affect the probability of being offered a free installment opportunity do not enter the choice probabilities P_+ and P_0. This is because z contains dummy variables for merchant codes and calendar time intervals that are relevant for predicting whether a free installment is offered but do not seem directly relevant for predicting a consumer's choice of installment term. Conversely, the customer specific variables x do enter these choice probabilities but can be plausibly excluded from the probabilities that a customer would be offered a free installment opportunity.

In the United States, interest free promotions and related programs are certainly not randomly offered, but are instead tied to cyclical economic conditions. Moreover, where these are offered would almost certainly be correlated with the characteristics of the customers of that retailer. If this occurs in the data set analyzed here, these core assumptions will be extremely problematic.

I could go on and on with other issues in the paper, and there is certainly some value in some of the exercises that the authors conduct, (although this paper would be a lot better if it was half the length and much more focused), but the bottom line is that I am entirely unconvinced by the handling of the data in the paper and the assumptions needed to estimate the model. This coupled with the extremely poor writing and the complete lack of a fair characterization of the existing literature and the specific contributions of this paper make a recommendation of rejection a no-brainer.