Referee Report
The Flat Rental Puzzle

Let me begin by saying that I like this paper. I think the paper documents and analyses an interesting phenomenon – the ``flat rental puzzle'' - and employs both good data and methodology in the analysis. I also believe the paper gains from its focus on policy implications, and from moving away from the assumption that firm behavior is optimal. Nonetheless, I have an extensive set of comments and critiques, which I hope will be constructive. I have six main comments under the following headings:

1. Contribution to the literature

I am concerned that the focus of the paper with respect to the literature is somewhat unclear. Is the contribution the documentation of this puzzle, and showing by estimation and simulation that the firm could do better? Or is it in the theory of the general equilibrium relationship between used car and rental prices? Or is it in the estimation methodology? My sense is that it is in the former, but an explicit attempt to link the paper to existing literature in the introduction may prove useful.

2. Consumer Heterogeneity

The theory presented in section 2 assumes that consumers are homogenous not only with respect to their ``taste for newness'', but also with respect to their taste for renting versus owning their vehicles. Yet one can easily imagine situations in which consumers are not homogenous in this respect. One example is a model with hidden consumer types and moral hazard. To take another example, firms often rent cars for their employees to use when traveling, and may insist on higher quality; whereas private individuals often purchase their cars, perhaps because they are relatively less concerned about quality and adverse selection problems. In such a case, the taste for quality in the rental market may be systematically higher, and thus car rental firms could be justified in getting rid of old cars.

This is obviously pure speculation, but I would be interested in knowing: (a) if the results of the model change when I allow for correlated consumer heterogeneity in both taste for rentals and taste for ``newness''; (b) empirically, what the observed structure of the rental market is, relative to the used car market – private consumers versus firms. Even very aggregate data (the fraction of consumers that hold more than one rental at a time, say) may help to allay concerns that consumer heterogeneity is driving the results.

3. Unobserved Vehicle Heterogeneity

Many of the results in the data such as duration dependence and the variance in the observed policy of the firm can be explained by unobserved vehicle heterogeneity. It would not be surprising if the worst quality vehicle on unobservable dimensions is the one never rented out unless all the others are; or is the one sold early. This leaves me with two questions. First how should I interpret your optimal policy results, given that they are based on a model that does not account for unobserved vehicle heterogeneity? Second, can you test for this in your data somehow?

4. Calibration

You make two pessimistic assumptions for the purposes of simulation. It would be preferable to calibrate those assumptions off of actual data. Presumably one could acquire data on the rate at which maintenance costs are expected to increase over the life of a typical used car (many online sites give such data), and arguably one could assume that the same rate applies to rental cars. Likewise the data from the previous pricing experiment gives you some idea on the rental rate decreases necessary. Even if you don't use these figures in the calibration of the model, perhaps because they are insufficiently pessimistic, it would be useful in quantifying how pessimistic you are being.

5. Style

In my opinion, the style of the paper is somewhat didactic and repetitive. I think it may benefit from being rewritten in a crisper and more succinct style. For example, the defense of the structural methods used in the paper on pp 20 seems unnecessary, given that one of the main goals is a simulation of the optimal policy rule, and this clearly demands estimation of the underlying structural parameters.

6. Structure

You have made the choice to refer readers to another paper for the semi-Markov econometric model. This seems problematic – how should the reader assess the goodness of fit claims (pp 23) without having any idea how flexible you have been in the estimation procedure? A short discussion of the model, possibly in an appendix, seems necessary.

I also have a number of more specific comments, which follow below:

- pp 6 – last word should be Genosove. There are various other typos scattered in the paper.
- pp7 – you're arguing that maintenance costs are flat, and this is a puzzle. But at first you seem to present the naïve argument that they are entirely flat, not merely flat over a firm-selected range. Although you resolve this later, it confused me initially.
- pp 11 - Consumer heterogeneity is important – see comments above, and also the paper by Hendel and Lizzeri (1999). In particular, I don't see why a rental car market should exist at all in the equilibrium you present – consumers are indifferent between renting and owning, and both provide the same flow of utility – so heterogeneity seems necessary for a convincing explanation of what is going on here.
- pp 16 – what data / evidence support the chosen extrapolation?
- What are "predicted odometer" levels? (pp 18) Does this mean you don't observe the actual odometer?
- You don't model consumer choice of the type of rental vehicle – you should provide a brief discussion of why this omission is unimportant for the results.
- Some of the fits (pp 24) are much better than others – the blanket statement "the econometric model provides a good approximation" seems disingenuous. Which features of the data are important to match? Why? Do you match on those?
- What is an Erlang distribution? (pp 29)
- Why are there upward sloping regions in the top two panels of the decision rules (pp 32)?
- I am confused as to why you argue that the depreciation in a vehicles rental value estimated by the model is not an artifact, to some extent, of the pessimistic assumptions you have made regarding maintenance costs and rental rates (pp 34). Surely the slope of the decline depends on the rate at which future values decrease, and this in turn depends on the assumptions on costs and rates?
- What accounts for heterogeneity in the observed resale policy (pp 39)? Perhaps unobserved vehicle heterogeneity, see above.