Peer-to-Peer Rental Markets: Some Simple Economics of the "Sharing Economy"

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Abstract

Recently a number of computer-mediated peer-to-peer (P2P) rental markets in durable consumer goods have emerged. In this paper, I present a simple model where consumers that differ in their planned usage (and hence ownership decision) about goods creates the potential for P2P trades. I compare a short-run where existing owners can rent to non-owners and a long-run where all consumers can revise their ownership decisions. The model makes several predictions. First, to support a P2P rental market, product market prices have to be low enough that some people buy, but not so low that everyone buys: the existence of non-owners that still value that good is what generates the demand. Market clearing in the short-run comes from owners and renters economizing on use—though a glut is possible if spare owner capacity exceeds non-owner demand even when the rental rate is zero. Market clearing in the long-run comes as consumers revise their initial ownership decisions in light of the possibility of sharing. In long-run, consumers are indifferent between renting and owning—they consume the same amount of the good at the same cost. Most commentators have implicitly assumed that P2P rental markets will reduce total ownership, but a sharing economy "Jevon's paradox" is possible in which the emergence of P2P rentals stimulate greater ownership—namely if the short-run rental rate is greater than the product market price, consumers will be drawn into ownership. I also consider the comparative statics from technological innovations that reduce transaction costs and explore what goods are particularly amenable to rental.
JEL J01, J24, J3

1 Introduction

Peer-to-peer (P2P) rental markets have recently sprung up for a variety of durable goods: examples include cars, lodging, clothing, tools, bicycles, cameras, offices, parking spaces and so on. These new marketplaces are invariably computer-mediated, with the facilitating platform taking steps to reduce the transactions costs that presumably make these kinds of exchanges heretofore unprofitable to run. Perhaps the most prominent example of P2P rental markets is Airbnb, which allows individuals to rent out spare bedrooms, apartments or even entire homes.

These emerging P2P rental markets are viewed by some as a the first signs of a seachange in consumerism: this so-called "sharing economy" might expand access to goods, increase efficiency by increasing utiliziation, reduce ownership and provide more ways for individuals to earn an income. Aside

*Author contact information, datasets and code are currently or will be available at http://www.john-joseph-horton.com/.

Table 1: Sharing economy companies and the category of goods of services used

Good or Service	Company
Short-term lodging	Airbnb, VRBO, Couchsurfing
Cars	UberX, Lyft, RelayRides, Sidecar, Getaround
Parking	Park Circa, ParkatmyHouse, Parking Panda
Bicycles	Liquid
WiFi Router	Fon
Boat	Boatbound
Camera equipment	LensRentals
Household goods	SnapGoods
Kennel	DogVacay
Clothes	GirlMeetsDress

from the business interest (these sharing economy companies have received at least TK billion in VC investment), these companies have also attracted (mostly negative) policy interest. Critics charge that their primary competitive advantage of these peer-to-peer lenders is regulatory arbitrage: sellers in these markets—not subject to the same regulations as conventional firms—can price their goods artificially (and inefficiently) cheap.

The purpose of this paper is to explore these arguments through the lens of a simple model of a durable goods product market before and after the introduction of P2P rentals. In the model consumers decide whether to buy a good based on how much utility it would bring them. Utility in turn depends on how much the good would be used if purchased. I assume that all goods offer declining marginal utility from usage and that eventually utility would go below zero. If the utility from the optimal level of usage is greater than the purchase price, the consumer buys the good. Even in the absence of any direct marginal usage cost, individuals will generally not use a good 100% of the time. For example, a hobbyist guitar owner might play 5 hours a week, but few would play 50 voluntarily and 100 hours a week would for almost everyone be hellish. This aspect of ownership—a usage rate often (far) below 100%—combined with a sufficient number of non-owning consumers that still value the good—is what creates the economic rationale for P2P rental markets.

The general characteristic of goods that are "rentable" are those that are used infrequently but are expensive: cars and hotels in distant cities, tuxedos, certain tools, etc. However, these goods were usually offered by a company who owned the stock with the explicit purpose of renting. And although individuals are owned by at least some consumers who would have excess capacity, the transaction costs of facilitating peer-to-peer rentals would be prohibitive Simply finding an appropriate trading partner would be difficult, to say nothing of coming to terms, writing a contract, monitoring compliance, handling disputes, making payment and so on. Further, those individuals that owned a good despite the existence of a rental market were likely those with relatively little excess capacity to rent out.

There are several economic questions that this creation of peer-to-peer rentals raise. Does the product market demand for the durable good go up or down when P2P rental markets emerge? What determines the connection between the produce market price and rental rate in the long- and short-runs? How does the possibility of rental affect the elasticity of demand for the product? What are the welfare consequences for consumers? How does initial pattern of good ownership and how does it change? What goods are particularly amenable to sharing and why?

To answer these questions, I develop a simple model that starts with a collection of would-be con-

sumers for a good that make a purchasing decision before the possibility of rental. Consumers consider the indirect utility from their chosen level of intensive-margin consumption and compare it to the purchase price. Those whose indirect utility is increased buy the good, while those that do not go without. I assume that a technological shock creates the possibility of owners renting out their excess capacity to non-owners. This creates a "short-run" P2P rental market in which equilibrium is defined by a rental rate that clears the market among existing owners and non-owners. I consider a "long-run" where owners and renters can revise their purchase decisions. If the short-run rental rate is below the purchase price plus the costs of renting, then ownership is less attractive, which will reduce *purchase* demand for product, lowering prices. However, if the rental rate is above the purchase price plus the cost of renting, ownership becomes more attractive, increasing demand and raising purchase prices in the product market.

The revision in the ownership decision in the long-run potentially affects product market demand. I consider how these product price changes impact welfare and compare them to product market price changes in the absence of P2P rentals.

One issue that is initially ignored are transaction costs, reset costs and depreciation. I modify the basic framework to include these costs and consider how it changes the results. One of the main findings is that when transactions costs are sufficiently high, the P2P rental market cannot exist. This finding suggests that the technological changes—namely the maturation and increasing penetration of the Internet and web-based technologies—were the technological shock that made these P2P rental markets feasible.

After the theoretical analysis, I present some results from a survey designed to explore some of the assumptions and predictions of the model.

Goods with high purchase prices but low and predictable intensive margin usage are ideal for P2P rental markets: the purchase price is high enough that there are lots of would-be consumers with high willingness to pay and enough owners with excess capacity that the market-clearing rental rate is not prohibitively high. When produce market prices are low, there is no excess demand so nearly everyone buys the product, so even if the good is used infrequently, no rental market can exist. For example, there is no rental market in egg timers—although they are used infrequently and quite durable, there is neither supply (no one owning finds it worth the trouble to rent them out) nor demand (if one wants one, they go to the product market). Other goods are expensive but there is no excess capacity, as they are used more or less continuously. For example, there is and can be no P2P rental market in dentures. Other goods are used infrequently and are expensive but make poor sharing candidates because demand is so unpredictable. For example, a back-up gas-powered electrical generator is used infrequently but would be difficult to rent in a P2P market, as demand is likely to be correlated in space and time.

2 Consumer's decision about how intensively to use a good

Consider a consumer that has to decide how much of their time to allocate to the use of some purchased durable good. Their money-denominated utility function is

$$u(x) = 2\alpha x - x^2 \tag{1}$$

where $x \in [0,1]$ is the fraction of time they spend using the good, $\alpha \in (0,1)$ is a parameter for how much utility they derive from the good. Individual intensive margin "demand" is

$$x^* = \alpha \tag{2}$$

and indirect utility is

$$v(\alpha) = u(x^*) = \alpha^2. \tag{3}$$

The good costs p to own, and so a forward-looking consumer will buy if

$$\alpha^2 > p. \tag{4}$$

Note that for all $\alpha^2 > p \wedge \alpha < 1$, the consumer will have an amount of time $1 - x^*$ when they are not using the good.

2.1 Three consumption possibilities with two consumer types

Consider a marketplace with two consumer types that are equally common: α_H and α_L with $\alpha_H > \alpha_L$. For a given price p, there are three market possibilities: everyone buys: $\alpha_L^2 > p$; high-types buy but low-types do not: $\alpha_H^2 > p > \alpha_L^2$; and no one buys when $\alpha_H^2 < p$. This gives a market demand curve of

$$D(p) = \begin{cases} 0 & : p > \alpha_H^2 \\ 1 & : \alpha_H^2 \geq p > \alpha_L^2 \\ 2 & : p \leq \alpha_L^2 \end{cases} \tag{5}$$

Figure 1 illustrates the possibilities by plotting regions on the the space of $\alpha_H \in [0,1] \times \alpha_L \in [0,1]$ when $p = 0.5$. The upper-right triangle is the region where both consumer-types buy and the lower-left triangle where neither buy: the cross-hatched rectangle shows the area where high-types buy but low-types do not. In the cross-hatched rectangle where high-types buy and low-types do not, there is a possibility of mutually beneficial trade: the low-types here have $\alpha_L > 0$ and hence value the good and the high-types have $x^* < 1$, which gives them some excess capacity to rent out.

2.2 Short-run P2P rental equilibrium

We now suppose that through some technological advance, it becomes possible for the high-types to costlessly sell their entire excess capacity to the low-types. We will define the resulting P2P rental market as being in a short-run equilibrium, in that—at first—no consumer can revise their ownership decision. Before the possibility of rental, the high-types were simply consuming α_H, giving $1 - \alpha_H$ to rent out. If they owned the good, the low-types would consume α_L. However, with the new possibility of rental, each consumer's decision problem has changed. The new owner optimization problem—when the rental rate is r—is

$$\max_x \quad 2\alpha_H x - x^2 + (1-x)r - p, \tag{6}$$

whereas the renter optimization problem is

$$\max_x \quad 2\alpha_L x - x^2 - xr. \tag{7}$$

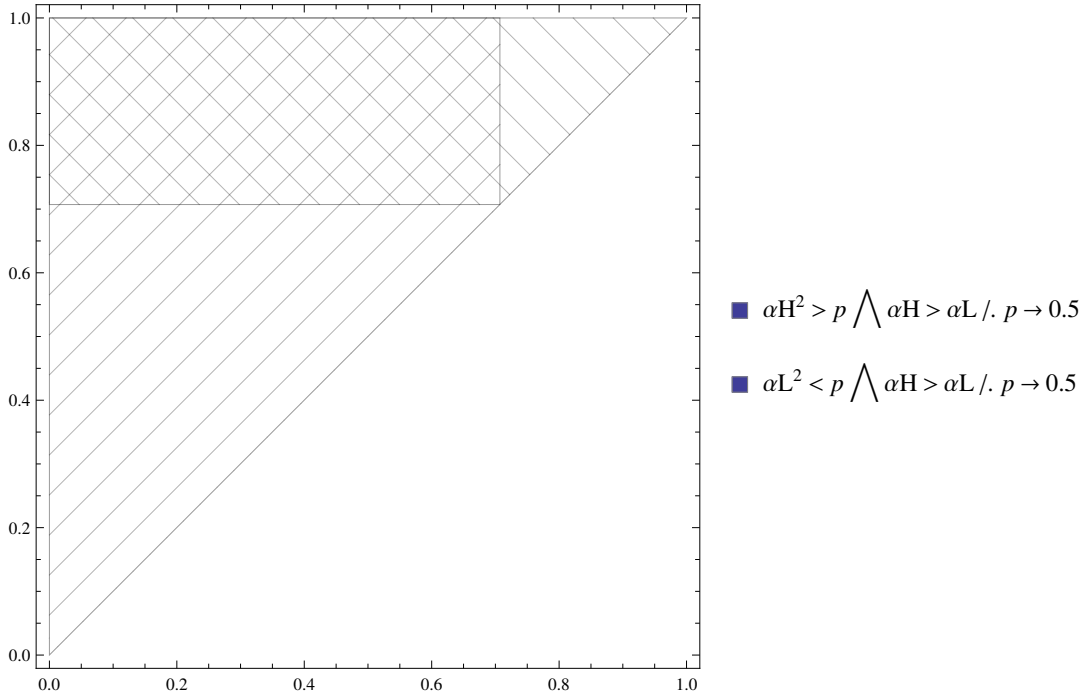
Both decision problems yield the same usage decision:

$$x_i^* = \begin{cases} \alpha_i - r/2 & : 2\alpha_i > r \\ 0 & : \text{else} \end{cases} \tag{8}$$

For the rental market to clear

$$1 - x_H^*(r) = x_L^*(r) \tag{9}$$

Figure 1: Three consumer market possibilities in the absence of P2P rental with two consumer types



which implies that

$$r = \alpha_H + \alpha_L - 1. \tag{10}$$

Because only positive rental rates are possible, a glut can exist if $\alpha_H + \alpha_L < 1$: a negative rental rate would be needed to "clear" the market. In contrast, when $\alpha_H + \alpha_L > 1$, both owners and renters need to economize on their usage of the good until the market clears. Figure 2 illustrates market clearing: In the absence of the P2P rental market, each user consumes α according to their type. At first, the high-types user x^*, indicated with a light, 45 degree line . For short-run market clearing, the high-types economize on usage (heavy line) until $1 - x_H^*(r) = x_L^*(r)$.

Proposition 1. *If all consumers were allocated the good, if their cumulative usage would exceed the full utilization capacity of the actual stock of purchased goods, then a positive rental rate is needed to clear the market.*

Proposition 2. *If the marginal utility of either type goes up (α_H or α_L increase), short-run rental rates increase.*

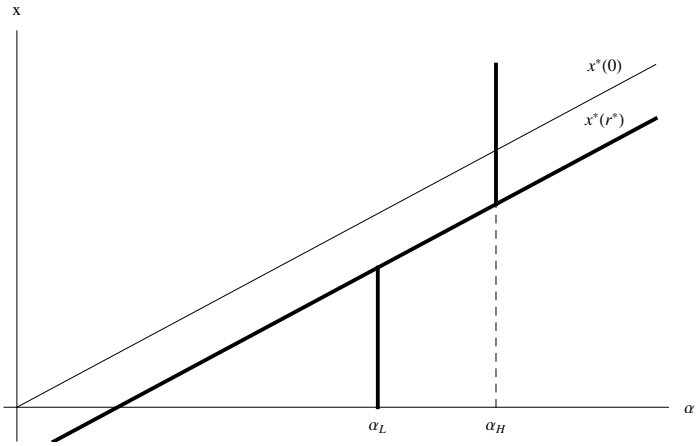
2.3 Consumer welfare in the short-run

For a renter, indirect utility under the short-run P2P rental equilibrium is

$$v_R(\alpha_L, r) = \frac{1}{4}(r - 2\alpha_L)^2 \tag{11}$$

$$= \frac{1}{4}[(1 - \alpha_H) + \alpha_L]^2 \tag{12}$$

Figure 2: Market clearing with two consumer types in a P2P rental market



which is always positive. Note further that the renter's increase in utility from the P2P-rental market is proportional to the square of their own (hypothetical) consumption and the high-types *non*-consumption in the absence of the rental market. In other words, for renters, the most value is unlocked when they had high latent demand unmet demand for the good and when there was a great deal of "wasted" excess capacity from the high-types. Not further than the most value is created for sellers when $\alpha_H = \alpha_L + \epsilon$ (since $\alpha_H > \alpha_L$) i.e., valuations are nearly identical, though this condition also makes it unlikely for a P2P rental market to emerge from an existing high-types buy/low-types do not because it requires p take a very specific value, namely $p \in (\alpha_L, \alpha_L + \epsilon]$.

For the owner of a good, their pre-rental market indirect utility was α_H^2. The increase in utility from the emergence of the P2P rental market, $\Delta v_O = v_O(\alpha_H, r) - \alpha_H^2$ is

$$\begin{aligned} \Delta v_O &= \left(\frac{3}{4}(1-\alpha_H) + \frac{1}{4}\alpha_L\right)(-1+\alpha_H+\alpha_L) && (13)\\ &= \left(\frac{3}{4}(1-\alpha_H) + \frac{1}{4}\alpha_L\right) r && (14)\\ &> (1-\alpha_H) r && (15) \end{aligned}$$

As we would expect, any increase in utility depends upon having a positive rental rate. We also know that this is only the case if $1-\alpha_H < \alpha_L$ and so $\Delta v_O > (1-\alpha_H) r$. In other words, the increase in utility for the owner is always greater than simply selling the $1-\alpha_H$ at r. The economic intuition is that when there is an excess of demand, the owner can optimally economize their own consumption to increase their utility beyond just not adjusting own-consumption and selling the excess.

Proposition 3. *An increase in α_H has an ambiguous effect on the increase in welfare from P2P rental.*

Proof. TK—weak. If $\alpha_L < 3/4$ and $\alpha_H > 1 - \frac{\alpha_L}{3}$, which implies that $\alpha_H > 3/4$, an even higher α_H implies a smaller increase in utility from the emergence of the P2P rental market. In other words, if there is relatively little latent demand (low α_L) and a high consumption utility for the high-types (high α_H), an increase in α_H reduces the gain: the utility from consumption is a wash and less can be sold, even though the rental rate is a bit higher. Alternatively, if $\alpha_L > 3/4$, a further increase in α_L does raise the rental rate more, but it also makes providing more supply costlier. □

Proposition 4. *An increase in α_L increases the owner's surplus from the emergence the P2P rental market.*

Proof. Unsurprisingly, an increase in α_L simply increases demand for the owner's excess capacity and so the increase in utility is proportional to the owner's capacity, $1-\alpha_H$ and the latent demand from the low-type, α_L.

$$\frac{\partial \Delta v_O}{\partial \alpha_L} = \frac{1}{2}\left[(1-\alpha_H)+\alpha_L\right] > 0. \tag{16}$$

□

Proposition 5. *An owner's utility is increasing in the α and increasing in the rental rate, r.*

Proposition 6. *Regardless of the rental rate, an owner has a higher utility with the existent of the P2P rental market assuming there is no change in the product market price for the good.*

2.4 Long-run P2P rental equilibrium

In the long-run equilibrium, all parties can revise their ownership decisions. The return to owning is

$$v_O = 2\alpha_i x^* - x^{*2} + (1-x^*) r_{LR} - p \tag{17}$$

whereas the return to renting is

$$v_R = 2\alpha_i x^* - x^{*2} - x^* r_{LR}. \tag{18}$$

Proposition 7. *In the long-run P2P rental equilibrium, the rental rate equals the product market purchase price and ownership does not depend on usage patterns.*

Proof. The first order condition in both scenarios is $2\alpha_i - 2x_i - r_{LR} = 0$ and so $x^* = \alpha_i - r/2$. Using this solution to compute the indirect utility, we get $v_O = \alpha^2 - p + \frac{r^2}{4} - \alpha r + r$ and $v_R = \frac{1}{4}(r-2\alpha)^2$. Setting $v_O = v_R$, the α term drops out and we are left with $p = r$. □

Proposition 8. *The fraction of consumers owning in the long-run is the average usage rate in the population.*

Proof. Let γ be the fraction of consumers that purchase the good in equilibrium. For the market to clear,

$$\gamma\left[(1-x_H(p))+(1-x_L(p))\right] = (1-\gamma)\left(x_H(p)+x_L(p)\right) \tag{19}$$

which simplifies to

$$\gamma = \frac{x_H(p)+x_L(p)}{2}. \tag{20}$$

□

The new long-run product market demand curve is thus

$$D(p) = \alpha_H + \alpha_L - p. \tag{21}$$

Before the short-run equilibrium arose, when high-types bought and low-types did not, demand was 1. $\alpha_H^2 > p$ and $\alpha_L^2 < p$.

2.5 Sharing economy ownership "paradox"

Jevon's paradox was based on the empirical observation that increased demand tended to, in the long-run, decrease prices. There is the possibility of analogous "paradox" can occur with the sharing economy, in that the existence of a competitive P2P rental market can stimulate *ownership*. For economic intuition, consider the couple that decides to purchase a second home with the expectation that they can partially recoup their outlay via Airbnb or VRBO.

To see whether the emerging of P2P rentals will increase or decrease total ownership, we need to consider whether the short-run rental rate defined by Equation 10 is greater than or less than the purchase price.

Proposition 9. *If the market-clearing short-run rental rate is above the purchase price, ownership will increase, otherwise decrease.*

Proposition 10. *An increase in the product market price reduces owner welfare with and without the P2P rental market, but the reduction in welfare is smaller in magnitude in the P2P rental case than in the non-rental case (where the reduction is 1 for 1).*

Proposition 11. *Sufficiently high usage valuations and a sufficiently low product market purchase price can cause total ownership to increase with the introduction of P2P rental markets.*

Proof. In terms of the model, an increase in ownership occurs when the short-run rental rate is greater than the purchase price, or $r_{SR} > p$. This occurs when $r_{SR} = -1 + \alpha_H + \alpha_L > p$. We can re-write the paradox condition as

$$\alpha_H > 1 + p - \alpha_L \tag{22}$$

which is more likely to be satisfied with higher valuation parameters and lower purchase prices. □

The economic intuition for Proposition 11 is straightforward: with high values of α_H and α_L, there is a higher level of demand (from the low-types) and less supply (from the high-types), which makes ownership more attractive. A higher purchase price makes the paradox less likely for the simple reason that a purchase is more expensive. Note that the paradox cannot occur regardless of the purchase price is $\alpha_H + \alpha_L < 1$, which means that the high-types must—in the absence of the P2P rental market—use the good more than 1/2 the time. This is partly due to our modeling convention of their being equal numbers of both types—if low-types were far more numerous, then the equivalent paradox condition could be more easily met: consider that there are far more people that take vacations than their are people considering owning a second home.

2.6 Consumer welfare under changes in the product market price

If the conditions specified in Proposition 11 are satisfied, then demand in the product market increases. This higher product market price could undo some of the welfare gains from P2P rentals. Let p_0 be the original purchase price and $p_1 = p_0 + \delta p$ be the new product market-clearing price. In the long-run equilibrium, this is also the rental rate.

If the short-run rental rate is greater than the purchase price and ownership increases, pre-P2P owners could be made worse-off: if supply in the product market is sufficiently inelastic, then increase product market prices could offset owner gains from sharing, though TK these would partially be passed through in higher rental rates.

$$\alpha_H^2 - p_0 > v(\alpha_H, r) - p_1 \tag{23}$$

2.7 Changed product market demand curve

Previously, there were "kinks" in the product market demand curve at α_H^2 and α_L^2. In the long-run P2P rental equilibrium, product demand now varies continuously, with $D(p) = x_H(p) + x_L(p) = \alpha_H + \alpha_L - p$. Point elasticity of demand is now

$$\epsilon = \frac{-1}{\alpha_H + \alpha_L - p} \tag{24}$$

2.8 Sharing and market existence

Prior to sharing, a sufficiently high product market price prevented a market from forming: if $p > \alpha_H^2$, no consumer purchases the good. With P2P rental, does the lowest price at which some of the good is sold change? Proposition 12 shows that it does. Intuitively, if a would-be owner can monetize their unused portion, then purchasing becomes more attractive.

Proposition 12. *A higher product market price is supportable with the existence of the P2P rental regime that without.*

Proof. If $p > \alpha_H^2$, no one buys the product and the market fails to exist. The highest possible price that can support a market is $\bar{p}_{NS} = \alpha_H^2$. In the long-run P2P market, $D(p) = \alpha_H + \alpha_L - p$, and so $\bar{p}_S = \alpha_H + \alpha_L$. Since $\alpha_H > \alpha_H^2$ and $\alpha_L > 0$, $\bar{p}_S > \bar{p}_{NS}$. □

2.9 Can for-profit capital-owning firms compete?

In the long-run P2P rental market equilibrium, there are no profits from owning to simply rent-out. However, owners and non-owners alike get a surplus. This suggests that firms that derive no consumption value from the good can not compete: because the consumer has excess capacity after satisfying their own consumption, they can "profitably" sell their excess capacity at any price and still have positive utility. A firm owning simply to rent would make zero profit.

2.10 Taste for diversity

In some formulations of the consumer problem, consumers consume some positive amount of every good offered. For example, a Cobb-Douglas utility function has no corner solutions—every good is consumed at least a little bit. This is obviously a large departure from empirical reality if we draw find-grained distinctions between "goods." For example, Amazon.com currently lists 6,238 results for "blender" in the Home & Kitchen category: presumably most households own far fewer than this, with most owning 1 or 0. The reason for this pattern in the language of this model is clear: a consumer's α for Blender 2 *conditional* upon owning Blender 1 is quite low and so another blender is not purchased. There are numerous goods that have highly negative cross price elasticities but that would not in a world of perfectly competitive rental markets in all goods. Very few people rent the same car they drive or vacation in their home towns.

3 Transaction costs and depreciation

Note that in the short-run, r did not depend directly on p, but in the long-run they are linked. Let r_{SR} be the short-run rental rate and let r_{LR} be the long-run rental rate. Let p_{SR} and p_{LR} be the short- and long-run product prices, respectively.

If $r_{SR} > p_{SR} + \gamma$, there were excess profits available to being an owner. As such, in the long-run, demand in the product market will go up, raising p_{LR} and lowering r_{SR}. In this case, the emergence of the sharing economy causes a Jevon's paradox of increased usage. Producer surplus rises, but the effect on consumers is ambiguous. Long-run non-sharers are made strictly worse-off, as they now face a higher price in the product market. All consumers that would not have purchased under the pre-sharing regime are better off, as they consumer some of the good.

TK—Prior owners now sharing have an ambiguous outcome—they consumer less and pay a higher purchase price but do receive offsetting rental income.

On the contrary, if $r_{SR} < p_{SR} + \gamma$, ownership is less attractive and in the long-run, fewer goods will be purchased, lowering prices. In this case, the introduction of the sharing economy is Pareto improving with respect to consumers. Owners that do not rent out their good get a price reduction; former non-owners get to consume some of the good. For owners that rent out the good, they could consumer their old x (pre-sharing) at a now-lower purchase price and so are strictly better off.

Many goods have "missing" rental markets despite generating usage far below $x = 1$ because the rental rate r required to cover the added transaction costs of renting would be too high to create a viable rental market.

Suppose it costs the firm γ to full rent-out an owned product and suppose rental goods have to be purchased in the product market. No arbitrage would mean that $p + \gamma = r$.

Proposition 13. *Higher prices in the product market make the maximum transaction cost that would still permit a rental market to be lower.*

When opportunity costs are greater, people want to consumer less of each particular good, making renting relatively more attractive, meaning that a rental market can still exist with higher transaction costs.

3.1 What determines the fixed costs of renting?

Technology can reduce some of the fixed costs of renting. The thicker the market, the easier it is to fully make use of the excess supply. Goods with predictable or easily adjustable usage patterns are more likely to be P2P rental. Owners of vacation homes can schedule their own usage easily.

Some goods are used infrequently, but all consumers will likely want to use them at the same time. A back-up generator—while infrequently used—is unlikely to make a good P2P rental candidate, as demand spikes are likely to be correlated in both space and time.

Reset costs presumably differ by good. Most things—apartments, cars, clothes etc., need to be cleaned and or serviced before they can be rented again. However, other goods like jewelry presumably have little reset cost.

Goods that have a high novelty value are particularly amenable to renting: This explains why rentals or lending of videos and books are/were commonplace.

Goods that are difficult to transport but need to be used in a different locations will be hard to share. However, goods that can be used on-site by different people are more shareable. For example, yachts are relatively difficult to transport long distances, but there is a thriving P2P rental market in boats where many want to sail on vacation: in the British Virgin islands charter yachts are owned by individuals.

If transaction costs are sufficiently high, then the rental rate would be too high to support a market (even though the high rental rate would tend to stimulate supply).

4 Empirical investigation

In conventional consumer theory, preferences over goods are assumed—the theory focuses on how those preferences are translated into purchases in light of the consumer's budget and market prices.

Table 2 shows that TK.

Table 2: Estimated product usage and ownership

	Dependent variable:		
	Item is owned		
	OLS		*linear mixed-effects*
	(1)	(2)	(3)
Usage index	0.112***	0.111***	0.110***
	(0.021)	(0.021)	(0.021)
Income index		0.060***	0.061**
		(0.021)	(0.025)
Constant	0.461***	0.465***	0.467***
	(0.021)	(0.021)	(0.024)
Observations	532	527	527
R^2	0.050	0.064	
Adjusted R^2	0.049	0.061	
Log Likelihood			−371.983
Akaike Inf. Crit.			753.966
Bayesian Inf. Crit.			775.302
Residual Std. Error	0.487 (df = 530)	0.484 (df = 524)	
F Statistic	28.121*** (df = 1; 530)	17.947*** (df = 2; 524)	

Notes: Here are some notes.

Table 3 explores how the perceived usage attributes of the good are related to the ownership decision. My hypothesis was that goods with an unpredictable usage pattern and/or whose usage was spread out over many small chunks would necessitate ownership. In Column (1), we see that the less predictable perceived usage, the more likely the good is to be owned. In Column (2), the more granular usage is, the more likely the good it to be owned.

In this model presented in this paper, preferences are still primitives of the model, but they are modeled as differences in planned *usage* of the good.

Kuziemko et al. (2013)

I asked a sample of respondents on Mechanical Turk various questions about a particular good:

- Does your household own a { good }? (yes, no)
- Have you ever lent your { good } to someone else? (yes, no, n/a)

Figure 3: Fraction of respondents owning various quasi-durable goods

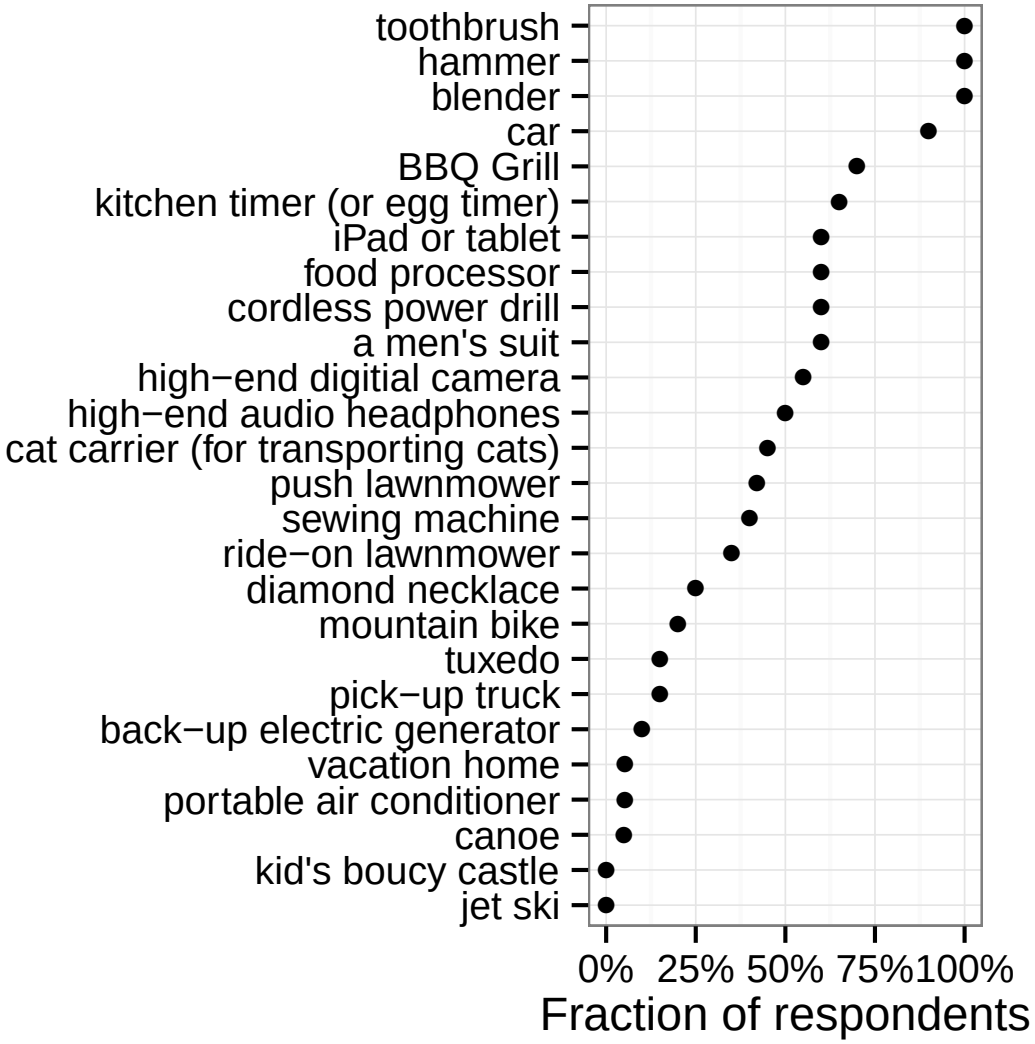


Table 3: Good attributes and ownership—usage predictibility and granularity

	Dependent variable:		
	Item is owned		
	(1)	(2)	(3)
Unpredictability index (UI)	0.062^{***}		0.035
	(0.022)		(0.022)
UI x GI			-0.014
			(0.019)
Granularity index (GI)		0.123^{***}	0.111^{***}
		(0.021)	(0.022)
Constant	0.457^{***}	0.455^{***}	0.458^{***}
	(0.021)	(0.021)	(0.022)
Observations	531	532	527
R^2	0.015	0.061	0.065
Adjusted R^2	0.013	0.059	0.060
Residual Std. Error	0.495 (df = 529)	0.483 (df = 530)	0.483 (df = 523)
F Statistic	8.182^{***} (df = 1; 529)	34.342^{***} (df = 1; 530)	12.175^{***} (df = 3; 523)

Notes: Here are some notes.

- Have you ever rented a { good }? (yes, no, n/a)

Does planned low-usage predict non-ownership? If demand is not predictable, is it difficult to borrow the good? If a good is not owned but amenable to sharing, it is more likely to be rented? Do income effects matter?

Figure 4 shows the

4.1 Reasons for non-ownership

5 Conclusion

In the very long-run, product differentiation could move towards making sharing more attractive. Individuals will purchase more durable goods to reduce the frequency of replacement. Goods with broad appeal will see an increase in demand compared to more idiosyncratic goods that cater to the owner's taste (similar to how re-sale value enters into some consumers decisions now). There will be a shift towards products that are more easily shareable. For example, locks on cars and houses that allow remote entry will be more appealing.

On-going technological developments should reduce the costs of sharing. The Internet-of-Things will make it easier to identify goods that are not being used at a moment in time. It will also permit more instrumentation which in turn should facilitate contracting. For example, many goods might make a high resolution video, with precise time-tracked location of how they are being used, reducing concerns about moral hazard. As more of economic and social life are computer-mediated, platforms will use this information to verify the identify and reputation of buyers and sellers, mitigating moral hazard and adverse selection.

Product market producers will subsidize sharing of experience goods, say by offering them at a discount to known-sharers.[1].

For goods for which Jevon's paradox does not hold, marketing will be re-directed towards encouraging ownership. Barring that, advertisers will trumpet the rental stream income from a purchase and highlight the advantages of residual control rights. We might see more B2B rentals, particular among companies that have similar inputs but are not competitors in the product market. Goods with declining real prices are unattractive for sharing businesses, as the trend will be towards ownership.

Digital goods are incredibly attractive for P2P "rental" but since a single owner can meet all the demand among non-owners, the rental rate is zero. The reason is that even if the owner uses x, 1 is still available to the person "rented" to. Of course, this is just piracy.

Sinai and Souleles (2005) Ikkala and Lampinen (2014) Varian (2000) Byers et al. (2013) Becker (1965)

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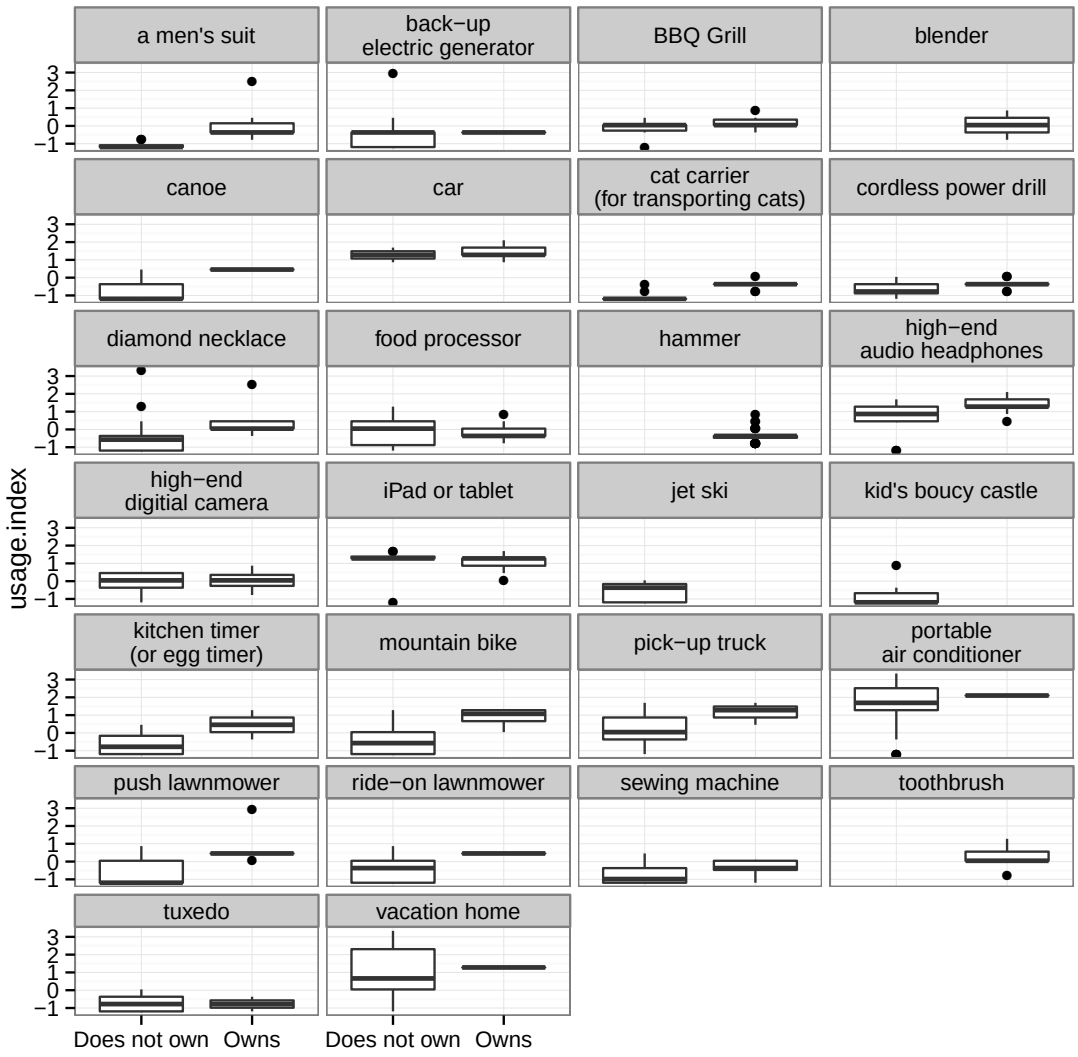
[1] GM is already doing this with RelayRides

Figure 4: Distribution of usage indexes by ownership



Notes: Here are some notes.

Figure 5: Reasons given for non-ownership

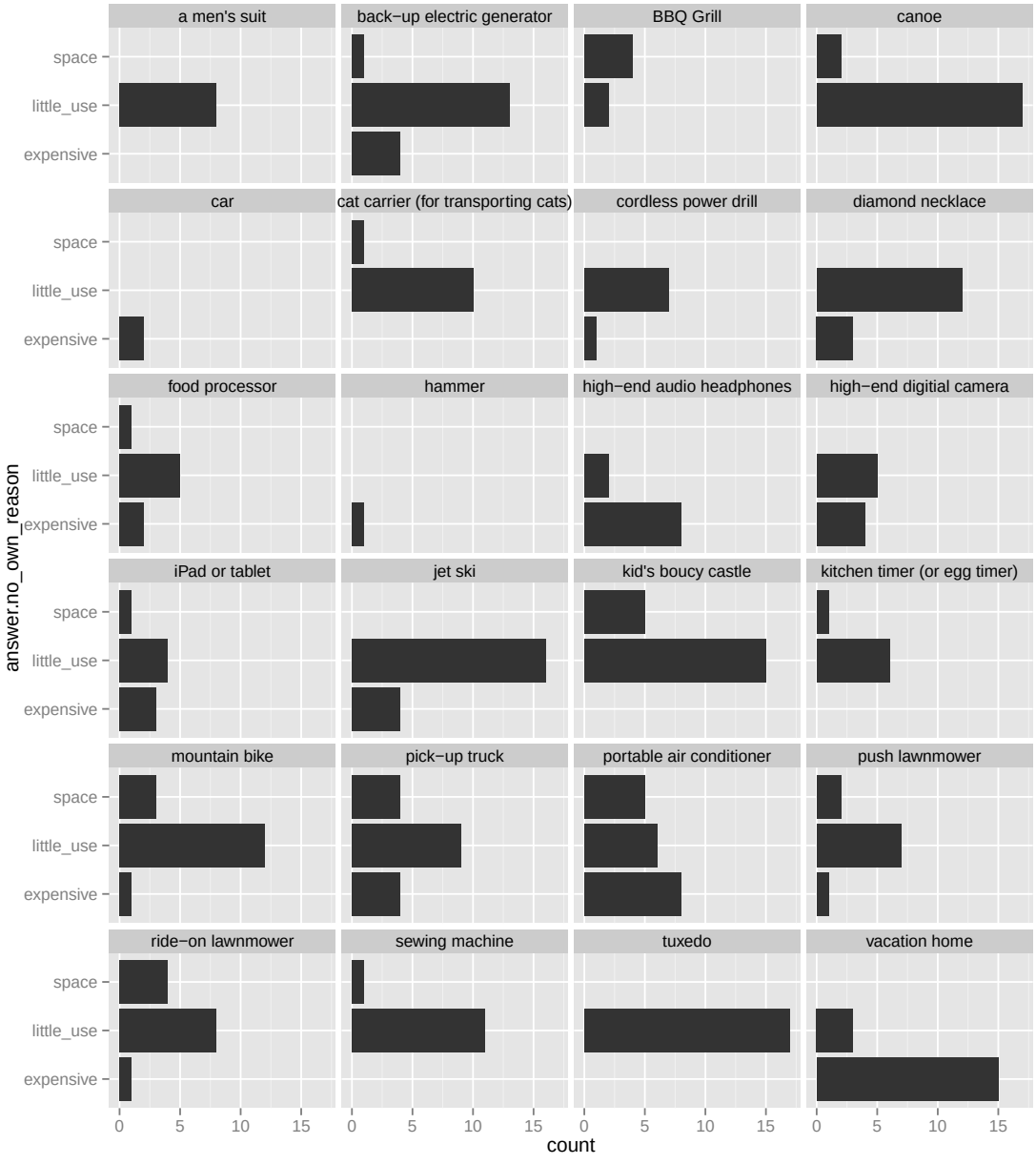
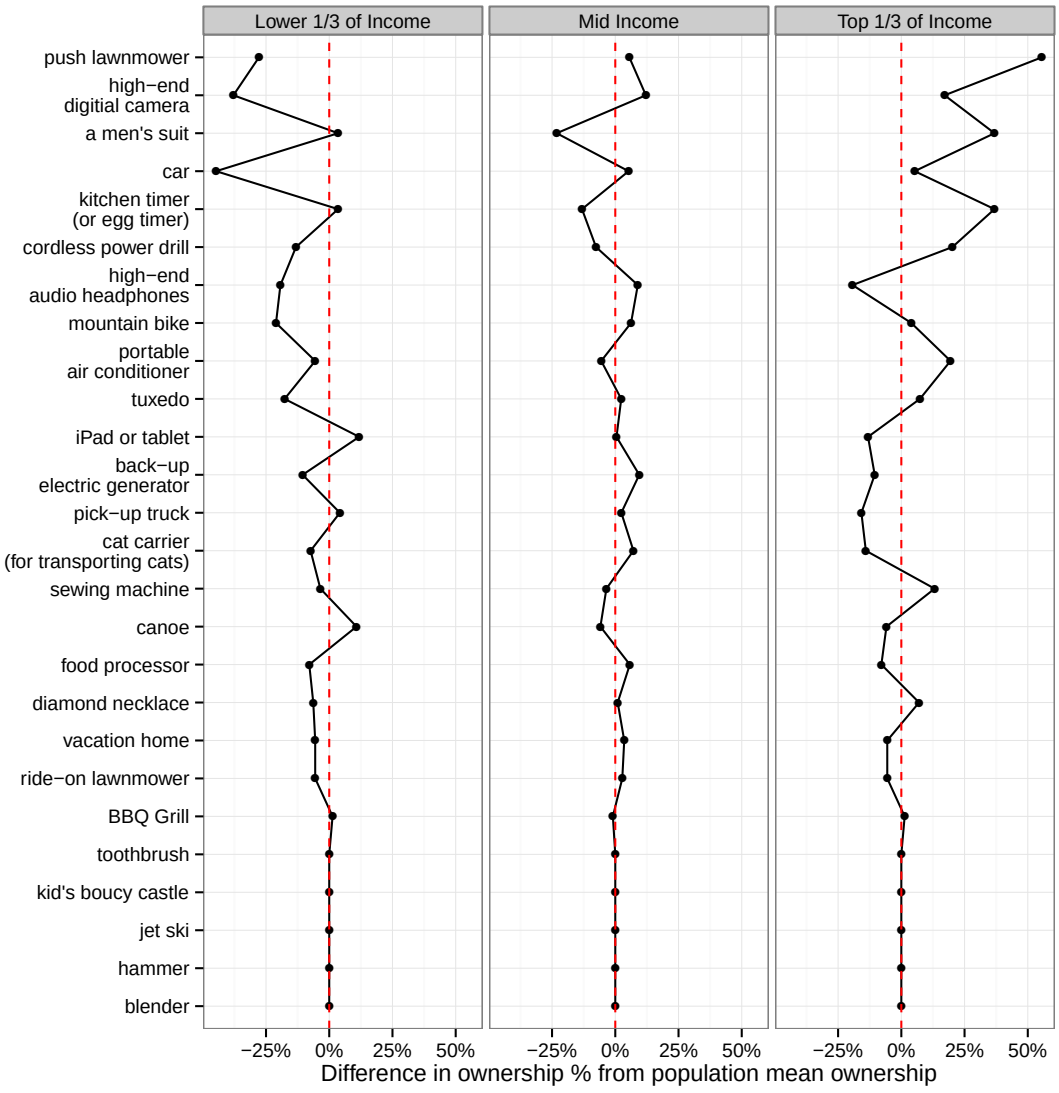


Figure 6: Ownership fractions by family income quartiles



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