

Is there a future for sharing? A comparison of traditional and new institutions

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Abstract. The sharing economy has raised hopes that online platforms will usher in a new era of sharing, even though economic theory suggests that income growth may reduce sharing in the long run. This paper presents evidence that high-income people are less likely than low-income people to use traditional institutions for sharing goods, including carpools, multi-person households, and garage sales. While it first appears that high-income people are equally likely to use new institutions, such as Craigslist, Airbnb, and Zipcar, this partly reflects the fact that many low-income households in the US still lack an internet connection. Conditional on having internet access, this paper finds that online sharing platforms are also disproportionately used by the poor. The future of sharing likely depends on countervailing forces. Economic growth may continue to dampen incentives to share goods, but this effect could be offset by the proliferation of institutions, norms, and preferences that facilitate sharing.

1. Introduction

Lodging, vehicles, and many household goods are somewhat non-rival in consumption, and companies like Airbnb, Zipcar, and Craigslist make money by helping people borrow, lend and exchange them. Some analysts argue that these new online platforms will usher in a new era of sharing (*The Economist*, 2013), but this prediction runs counter to neoclassical economic theory, which suggests that wage growth will lead people to shift away from time-intensive methods of acquiring the stuff of everyday life. Although forecasting is difficult, this paper provides a glimpse of the future by comparing the use of these new institutions for sharing with the use of traditional institutions for sharing, such as carpools, multi-person households and garage sales.

Research on the so-called sharing economy recognizes that sharing is nothing new (Schor, 2014; Sundararajan, 2016), but it seldom studies these new institutions in the context of the methods people have historically used to share non-rival goods. While some traditional sharing institutions, such as

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multi-person households, depend heavily on social preferences, others, like garage sales, operate mainly on the basis of self-interest. This is important to note upfront, because many people associate sharing with altruism. My conception of sharing is broad and includes a wide range of institutions that facilitate the *simultaneous* or *successive* use of goods, similar to Yates (2016). From this perspective, it is clear that market economies depend on private property as well as on numerous sharing institutions. For both selfish and altruistic reasons, people form households to share living space, organize carpools to share rides, and create neighbourhoods to share tools. These sharing institutions make significant contributions to our standard of living.

Despite the economic benefit of sharing goods, there is evidence that many traditional institutions for sharing are being eroded. We have no measure of the total level of sharing, just as we have no aggregate measure of institutions (Voigt, 2013), but we do have time-series data on a handful of specific forms of sharing. Households are shrinking as more people choose to ‘go solo’ (Klinenberg, 2012). Carpooling is in long-term decline (Ferguson, 1997). Neighbourhood ties may be weakening (Putnam, 2001). One interpretation of this trend is that income growth blunts individuals’ incentives to share goods and undermines sharing institutions. When people have the means to satisfy their needs and desires individually, they may choose to do so without relying on the generosity and cooperation of others. This interpretation is consistent with experimental evidence, which shows that people with more wealth are less apt to cooperate (Buckley and Croson, 2006; Cardenas, 2003).

A simple economic perspective suggests that the future of sharing is bleak. Even if online platforms create new ways of sharing goods, any temporary increase in sharing may ultimately be undone by the steady logic of shared economic growth.¹ If sharing goods is a chore, as neoclassical economics supposes, then rising affluence will eventually liberate us from the need to do it. But while this view suggests we are entering a world in which people increasingly satisfy their desires individually, proponents of peer-to-peer sharing argue that it can facilitate sharing in an affluent society. This paper sheds light on the future of sharing by analysing the relationship between income and the use of both traditional and new institutions for sharing goods.

The next section offers an economic theory of sharing that reconciles the dismal predictions from neoclassical economic models with more optimistic projections for sharing in the 21st century. Section 3 describes data on the use of ten institutions for sharing goods. The following section presents my results, which show that people with high incomes are significantly less likely than people with low incomes to use traditional institutions, like multi-person

¹ Economic growth would not significantly undermine sharing if all the gains from sharing were concentrated in the hands of, say, the richest 1%. While inequitable growth may be better for sharing, that is a poor argument for unbalanced growth.

households and carpools, for sharing goods. My initial results show that people of all incomes are about equally likely to make use of new institutions for sharing goods, such as Craigslist and Airbnb. However, after accounting for the fact that poor households are less likely to have internet access, the analysis finds that new institutions for sharing are still disproportionately used by the poor. [Section 5](#) concludes that the sharing economy has fundamentally changed the inverse relationship between income and sharing. While income growth may reduce the incentive to share, this effect could be offset by the development of institutions, norms, and preferences that facilitate greater sharing.

2. An economic theory of sharing

A neoclassical economic theory of sharing is perhaps best articulated in James Buchanan's [1965](#) paper, 'An economic theory of clubs'. Buchanan opens his paper by highlighting the pervasiveness of what Yochai Benkler ([2004](#)) calls 'shareable goods':

As an extreme example, take a good normally considered to be purely private, say, a pair of shoes. Clearly your own utility from a single pair of shoes, per unit of time, depends on the number of other persons who share them with you. Simultaneous physical sharing may not, of course, be possible; only one person can wear the shoes at each particular moment. However, for any finite period of time, sharing is possible, even for such evidently private goods. (Buchanan, [1965](#): 3)

Buchanan ultimately focuses on how formal clubs help people share goods like golf courses. He argues that clubs will accept new members until the cost of sharing the good with the marginal member exceeds the benefit of sharing the expense with the marginal member (Buchanan, [1965](#): 5). In this model, the market guides individuals to share non-rival goods efficiently through clubs. Although Buchanan focuses on the efficacy of private clubs, his theory outlines the economic rationale for all sharing institutions.

While Buchanan's model provides a neoclassical argument for why we have institutions for sharing non-rival goods, Gary Becker's [1965](#) paper 'A theory on the allocation of time' explains why people with higher incomes may be less likely to use these institutions. In Becker's model, households are 'small factories' that combine labour and intermediate goods, such as food and appliances, to produce final commodities, such as meals. Everything else being equal, individuals with higher wages will use production methods that are more goods-intensive and less time-intensive (Becker, [1965](#): 513). Becker argues that this model explains lifestyles in the US.

[Americans] are simultaneously supposed to be wasteful of material goods and overly economical of immaterial time. Yet both allegations may be correct and not simply indicative of a strange American temperament because the market

value of time is higher relative to the price of goods there than elsewhere. That is, the tendency to be economical about time and lavish about goods may be no paradox, but in part simply a reaction to a difference in relative costs (Becker, 1965: 514).

Extrapolating Becker's argument to sharing, income growth will tend to reduce sharing, as long as sharing institutions are more time-intensive than private provisioning.

An array of cross-sectional, longitudinal, and qualitative evidence supports this theory that higher incomes cause lower levels of sharing. For example, Alejandrina Salcedo, Todd Schoellman and Michèle Tertilt's paper 'Families as roommates' models households as clubs, in which people live together only if the benefit of sharing the expense of household public goods outweighs the time cost of 'forming and maintaining relationships'. As wages increase, people are less inclined to pay that cost and share households. Salcedo *et al.* (2012) calibrate their model with current cross-sectional data from the Consumer Expenditure Survey and argue that income growth explains 37% of the decline in the number of adults in the average household from 1850 until 2000 (Salcedo *et al.*, 2012: 153). Using a very different methodology, Peter Menzel's book *Material World: A Global Family Portrait* provides striking visual evidence that people share more in poor countries than rich countries. The book collects photographs of families with all their possessions outside their homes. Perhaps the most striking pattern is that people in poor countries share cramped quarters and few goods with a large number of relatives, while people in rich countries live with just a handful of family members in huge homes with enormous mountains of stuff (Menzel, 1994). Finally, the surveys used in this paper find that saving money is a primary motivation for sharing. The CNADS reveals that 72% of Americans agree with the statement 'sharing saves money'. This is consistent with the NeighborGoods Survey (NGS), which finds that 'saving money' is a primary reason for using the sharing platform NeighborGoods, just below 'reducing waste' but well above 'helping others', 'building community' or 'meeting people'.

Even if sharing declines as income rises, it is possible that new institutions could bring forth a new era of sharing. Yochai Benkler (2004) vigorously challenges the idea that sharing is passé, but his thesis that sharing is emerging in the 21st century as a growing 'modality of economic production' is compatible with the neoclassical model articulated by Buchanan (1965) and Becker (1965). Benkler argues that new decentralized institutions for sharing goods are likely to become increasingly important, because they reduce participation costs in terms of time and commitment. He specifically contrasts his notion of decentralized sharing with Elinor Ostrom's (1990) concept of community governance.

'Community governance' ... gains robustness because it involves tightly connected social groups. But social sharing is a broader phenomenon, one that includes cooperative enterprises that can be pursued by weakly connected

participants or even by total strangers and yet function as a sustainable and substantial modality of economic production. Indeed, in the context of the digitally networked environment, it is this type of sharing and cooperative production among strangers and weakly connected participants that holds the greatest economic promise (Benkler, 2004: 333–4).

While traditional institutions for sharing goods depend heavily on recurrent interactions, Benkler stresses the ‘fluidity’ of participation in new institutions for sharing goods. Although he acknowledges that these new forms of cooperation may be less appealing to ‘communitarians’ who prefer the forms of cooperation found on hippie communes or in Amish communities, Benkler contends that this fluidity makes these decentralized institutions attractive to ‘many more people’ so that they are ‘likely to be more economically effective and efficient on a larger scale’ (Benkler, 2004: 343). Online platforms connect people to much larger networks of people and can potentially help people exploit many more opportunities to share non-rival goods. The sharing economy may lead to a resurgence of sharing among ordinary people in wealthy countries by changing how they share.

Benkler’s optimism is consistent with neoclassical models if new sharing institutions provide more convenient ways of sharing non-rival goods. When sharing is time-intensive, the cost of sharing is greater for high wage earners, and the wealthy will tend to use sharing institutions less than the poor. By reducing the time it takes to share items, online platforms make sharing more attractive to people of all incomes, but the effect is greatest for people with a high opportunity cost to time. A decrease in the time cost of sharing may make sharing less sensitive to income and more compatible with continued economic growth. The sharing economy may also change the relationship between income and sharing because purchasing second-hand goods on Craigslist or travelling on Airbnb or Couchsurfing does not create long-term commitments between participants. Although users can and do convert some pleasant interactions into lasting friendships (Lauterbach *et al.*, 2009), they can also avoid forming relationships and warn other group members about unpleasant experiences. The arm’s-length nature of social interactions in the sharing economy may significantly reduce the cost of sharing, particularly for people with high incomes who worry that traditional institutions create long-term responsibilities. By reducing the cost of coordinating beneficial peer-to-peer interactions, new institutions can potentially facilitate greater sharing in affluent societies.

Of course, there are reasons to be optimistic about the future of sharing without maintaining that online platforms will facilitate sharing among high-income people. For example, people may share more as sticky norms and endogenous preferences evolve to harness these new technologies (Fremstad, 2016). The rapid innovation of new sharing institutions may also lead to success. Elinor Ostrom and Xavier Basurto’s (2011) analysis highlights

that some institutions, including many traditional sharing institutions, evolve unconsciously, while others, including many new sharing platforms, consciously adapt to attract users. New institutions learn from the variation in rules across platforms, the publicness of these experiments, and the frequency of the problems that arise (Ostrom and Basurto, 2011). While there is early evidence that online platforms may increase some forms of sharing (Fremstad, 2017), the argument is largely theoretical in nature.

This paper tests the argument that new sharing institutions will succeed in part because they appeal to people of all incomes. I shed light on the future of sharing by combining new data on who uses traditional and new sharing institutions with the ‘Varian Rule’ that ‘a simple way to forecast the future is to look at what rich people have today’ (Krugman, 2015; Varian, 2011). While this analysis provides an imperfect view of the future, it has an empirical grounding. If the rich as well as the poor use online platforms to share goods, then the Varian Rule suggests that these institutions may remain economically important in the face of continued material growth. There is some preliminary evidence that new institutions do attract high wage earners. For example, users of the online encyclopaedia Wikipedia are disproportionately high-income (Zickuhr and Rainie, 2011), and contributors are disproportionately well-educated, perhaps due to the ‘ease’ of making contributions (Safner, 2016). While the approach in this paper is not fool-proof, it provides the first comprehensive empirical analysis of who uses a variety of sharing institutions, which can deepen our understanding of sharing today and may inform our expectations about the future.

3. Data

This analysis of income and sharing uses data from the 2014 American Community Survey, a 2014 Center for a New American Dream Survey, and my own 2013 survey of NeighborGoods users. Each source provides data on the use of multiple methods of sharing. My six traditional institutions for sharing are carpooling, using thrift stores and garage sales, living with a non-relative (besides a partner), living in a multi-generational household, and sharing items with relatives, friends, and neighbours. My four new institutions for sharing are exchanging goods on used merchandise websites like Craigslist, using peer-to-peer lodging platforms like Airbnb or Couchsurfing, borrowing cars on Zipcar or RelayRides, and participating in bike-sharing programmes like New York City’s Citibike. In general, traditional forms of sharing are more time-intensive and rely on stronger social ties, while new forms of sharing are less time-intensive and function among loosely connected individuals. While all the traditional institutions operate without the internet, all the new institutions are built around it.

My first source of data is the 2014 American Community Survey (ACS). I use the Public Use Microdata, which provides information on nearly 2.3 million

Table 1. Use of various institutions for sharing goods

Dependent variables	Type	Source	Mean
Usually carpooled to work last week (among workers)	Traditional	ACS	0.09
Uses thrift stores or garage sales at least monthly	Traditional	CNADS	0.43
Lives with a non-relative (besides an unmarried partner)	Traditional	ACS	0.09
Lives in a multi-generational household	Traditional	ACS	0.08
Lends item to anyone at least monthly	Traditional	NGS	0.38
Borrows item from anyone at least monthly	Traditional	NGS	0.33
Uses used merchandise website like Craigslist at least monthly	New	CNADS	0.31
Uses peer-to-peer lodging services like Airbnb or Couchsurfing at least annually	New	CNADS	0.10
Uses car-sharing service like Zipcar or RelayRides at least monthly	New	CNADS	0.06
Uses bicycle sharing services at least annually	New	CNADS	0.09

Note: All summary statistics use population weights, except data from the NGS.

US adults. The ACS asks workers how they usually commuted to work in the previous week. Table 1 shows that 9% of workers report carpooling to work, about double the number who take mass transportation. The ACS also collects data on whether respondents live with non-relatives or live in multi-generational households, both of which may depend partly on economic factors. In the US, 9% of adults live with a non-relative besides an unmarried partner.² The ACS also reveals that 8% of adults live in a multi-generational households, and there is very little overlap between adults living with non-relatives and those living in multi-generational households.

My second source of data is a 2014 CNADS, which provides a unique look at how 1,646 Americans use one traditional institution and four new institutions for sharing goods. I use CNADS data on how often people use thrift stores and garage sales, online second-hand markets like Craigslist, peer-to-peer lodging platforms like Airbnb and Couchsurfing, car-sharing services like Zipcar and RelayRides and bike-sharing services like Citibike. Shopping at thrift stores and garage sales is quite time-intensive, and I view these as a traditional institution for sharing goods. On the other hand, the four new institutions are specifically designed to reduce the amount of time it takes to exchange used goods, find a place to spend the night or borrow a car or bike. Whether they facilitate peer-to-peer transactions, like Craigslist, Airbnb, Couchsurfing, and RelayRides, or more centralized forms of sharing, like Zipcar and Citibike, these new platforms all work to promote cooperation among loosely connected networks of people. For example, unlike car rental companies that clean and inspect their vehicles each

² I do not count unmarried partners as non-relatives in this paper, but including them does not change my results.

time they are returned, Zipcar asks its customers to keep them clean, transport pets in carriers, and promptly report damage, dirtiness, or low fuel (Zipcar, 2015).

My third data source is my own online survey of 298 NeighborGoods users, which provides information on how often people borrow and lend goods across households. NeighborGoods is an online platform for sharing household goods, like ladders and power drills. This paper simply uses the NGS for information on how often people informally share goods with others *off* the platform. The NGS suggests that 38% of adults lend out at least one item a month and 33% of adults borrow at least one item a month.

Table 1 lists the fraction of adults who report using each institution of sharing goods analysed in this paper. The ACS asks all respondents who they live with, and it asks workers how they usually commuted to work in the previous week. The NGS and CNADS ask respondents how frequently they use a given method of sharing goods. I construct binary variables specifying whether a given individual reports using a method of sharing at least once a month or at least once a year, depending on how commonplace it is. For example, I consider the probability that someone uses Craigslist at least monthly, but I consider the probability that someone uses Airbnb or Couchsurfing at least yearly. This reflects the fact that Craigslist's for sale section has changed how people acquire stuff day-to-day, while Airbnb and Couchsurfing has changed how people find lodging on their less frequent trips and vacations.

The ACS and CNADS are nationally representative surveys, which I analyse using the appropriate population weights. The NGS provides information on a smaller sample of NeighborGoods users. **Table 2** shows that the sample in the NGS is somewhat more male and somewhat younger than the adult American population as a whole. Despite these discrepancies, respondents report lending items to strangers at levels very similar to those found in the General Social Survey (Fremstad, 2016), so the patterns of sharing reported in the NGS may nevertheless be similar to the American population. The largest difference between these surveys is in household income. My measure of household income also varies across surveys. The ACS provides a continuous income measure with limited top-coding.³ The CNADS and NGS ask respondents to select their household income from a list of categories. CNADS respondents choose among seven income brackets, and NGS respondents choose among five income categories. I assume that the household income of CNADS and NGS respondents is equal to the mean income in each bracket in the ACS. **Table 2** shows that mean income in the CNADS is lower than in the ACS, but mean income in the NGS is higher than in the ACS. Since I focus on the relationship between income and sharing within each sample, differences across samples do not pose a serious problem for my analysis.

³ The highest household income in the 2014 ACS microdata is \$1.8 million.

Table 2. Comparison of common variables

	ACS	CNADS	NGS
Female	0.52 (0.50)	0.52 (0.50)	0.43 (0.50)
Age	47.20 (18.09)	46.0 (16.6)	41.0 (12.1)
White	0.75 (0.43)	0.77 (0.42)	NA
Bachelors	0.28 (0.45)	0.29 (0.29)	NA
Household size	3.03 (1.65)	2.67 (1.25)	2.60 (1.18)
Household income	84,910 (84,846)	59,062 (53,146)	92,574 (61,552)
Observations	2,291,701	1,646	298
Population weights?	Yes	Yes	No
Notes on income data	Household income	Household income based on ACS means for 7 brackets.	Household income based on ACS means for 5 brackets.

Note: Population means with standard deviations in parentheses.

4. Income and sharing

Using the data described above, I estimate the effect of household income on the likelihood that an American adult regularly uses each traditional and new institution for sharing goods using the following linear probability model:

$$\Pr(\text{sharing}_i) = \sum_{j=1}^7 \alpha_j \text{hh.inc}_i + \beta_1 \log \text{hh.size}_i + \beta_2 \text{age}_i + \beta_3 \text{female}_i + \beta_4 \text{white}_i + \beta_5 \text{bachelors}_i + \varepsilon_i \quad (1)$$

This equation estimates the probability that an individual makes use of a particular institution for sharing goods as a linear function of household income, log household size, age, whether the respondent is female, whether the respondent is white, and whether the respondent has at least a bachelor's degree.⁴ To highlight the relationship between income and sharing, I suppress the constant and centre my control variables at their respective means. As a result, estimates of α_j can be interpreted as the probability that an individual in each income bracket makes use of an institution for sharing goods, after controlling for household size, age, gender, race and education. Using data on the use of ten sharing institutions, I test the hypothesis that sharing declines with income.

⁴ This paper highlights estimates from my linear probability model, because they are the simplest to interpret. However, I reach similar conclusions estimating a logit model on a continuous measure of log household income. I briefly discuss these results in Section 4.

Table 3. Inverse relationship between income and the use of traditional sharing institutions

	Usually car- pooled to work last week (1)	Uses thrift store or garage sale at least monthly (2)	Lives with non- relatives (besides partners) (3)	Lives in a multi- generational household (4)	Lends item to anyone at least monthly (5)	Borrows item from anyone at least monthly (6)
Hh. income bracket 1	0.103*** (0.001)	0.487*** (0.032)	0.094*** (0.001)	0.077*** (0.001)	0.392*** (0.103)	0.433*** (0.100)
Hh. income bracket 2	0.102*** (0.001)	0.446*** (0.037)	0.087*** (0.001)	0.064*** (0.001)	0.462*** (0.074)	0.366*** (0.072)
Hh. income bracket 3	0.096*** (0.001)	0.499*** (0.034)	0.084*** (0.001)	0.067*** (0.001)	0.448*** (0.070)	0.386*** (0.068)
Hh. income bracket 4	0.087*** (0.001)	0.390*** (0.029)	0.080*** (0.001)	0.063*** (0.000)	0.404*** (0.051)	0.334*** (0.050)
Hh. income bracket 5	0.078*** (0.001)	0.380*** (0.035)	0.073*** (0.001)	0.061*** (0.001)	0.292*** (0.051)	0.255*** (0.050)
Hh. income bracket 6	0.070*** (0.001)	0.371*** (0.044)	0.068*** (0.001)	0.056*** (0.001)		
Hh. income bracket 7	0.062*** (0.001)	0.345*** (0.062)	0.065*** (0.001)	0.052*** (0.001)		
Log hh. Size	0.055*** (0.001)	0.081*** (0.031)	0.065*** (0.001)	0.205*** (0.001)	0.136** (0.062)	0.122** (0.060)
Age	-0.000*** (0.000)	0.001 (0.001)	-0.002*** (0.000)	0.002*** (0.000)	0.003 (0.002)	0.002 (0.002)
Female	-0.003*** (0.001)	0.044 (0.028)	-0.017*** (0.001)	0.024*** (0.000)	-0.083 (0.057)	-0.026 (0.055)
White	-0.021*** (0.001)	0.135*** (0.034)	0.003*** (0.001)	-0.039*** (0.001)		
Bachelors	-0.018*** (0.001)	-0.008 (0.028)	-0.008*** (0.001)	-0.029*** (0.000)		
Population weights?	Yes	Yes	Yes	Yes	No	No
Observations	1,354,437	1,646	2,330,815	2,330,815	298	298
R-squared	0.106	0.450	0.124	0.224	0.408	0.346

Note: Results from a linear probability model. I repress the constant and center the control variables at their respective means to ease the interpretation of household income (brackets 1–7).

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Traditional institutions for sharing

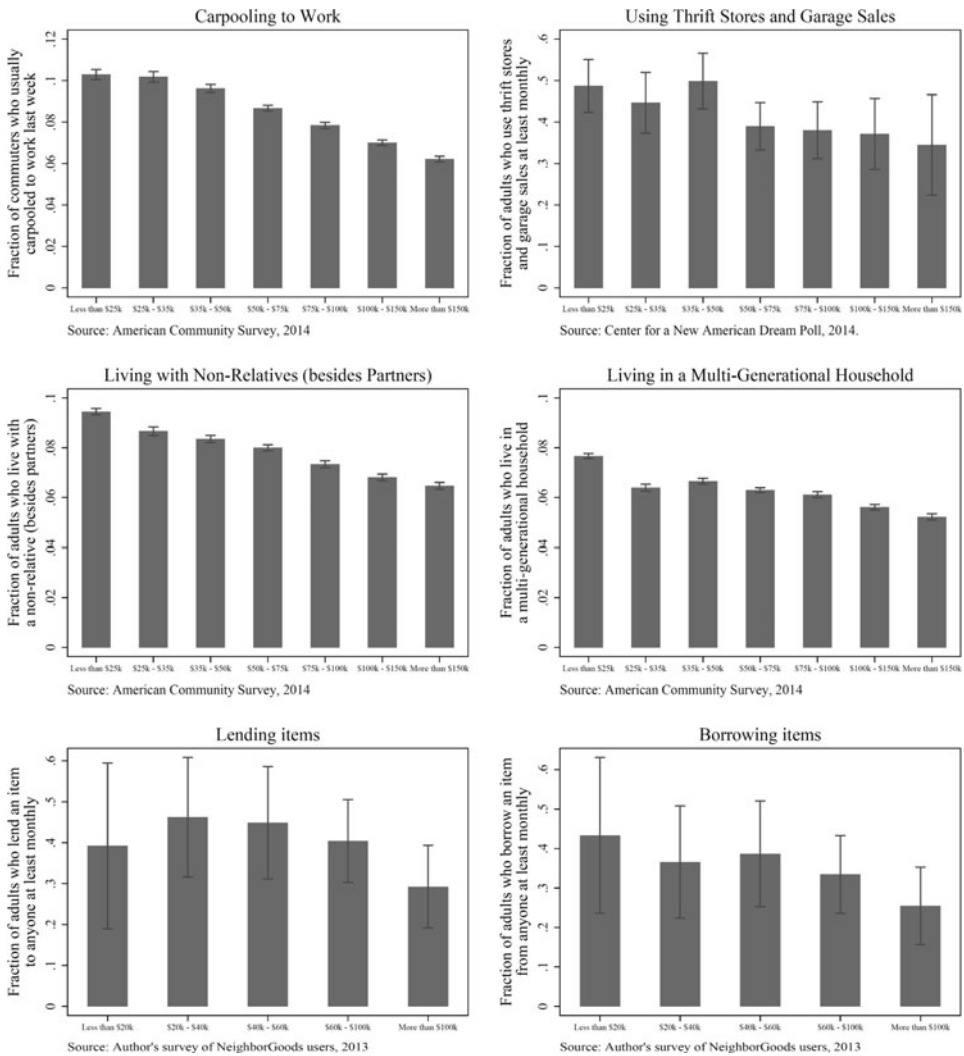
I first analyse how income affects the likelihood that individuals make use of traditional institutions for sharing goods, from carpools, thrift stores and garage sales, to living with non-relatives, living in multi-generational households, and sharing items across households. My estimates of Specification (1), which are shown in Table 3, provide no evidence that age, gender, race, or education has a consistent impact on individuals' propensity to use traditional institutions for sharing goods. However, I do find that individuals in larger households are

more likely to use all six traditional institutions for sharing goods. This may be because living with others is itself a form of sharing (Salcedo *et al.*, 2012) and individuals who share their homes with ‘roommates’ are also more inclined to engage in other forms of sharing. It may also simply reflect the fact that, controlling for household income, people living in larger households have lower per capita incomes and are less likely to use traditional sharing institutions.

Figure 1 illustrates the relationship between income and the use of six traditional institutions for sharing goods. The bar graphs show my estimate of the likelihood that a person in each household income bracket uses a particular institution for sharing goods, after controlling for household size, age, gender, race and education. The whiskers depict the 95% confidence intervals of my estimates. The first panel clearly shows that adults with higher household incomes are less likely to carpool to work. About 10% of workers in the poorest households carpool to work compared to only about 6% of workers in the richest households, and these differences are statistically significant. This result is consistent with the economic model of sharing to the extent that carpooling is an institution that allows users to substitute time for money, making it particularly attractive to low-income people. The point estimates suggest that affluent Americans are 60% as likely to carpool as low-income Americans.

The remaining panels in Figure 1 present evidence that this inverse relationship between income and sharing holds across all six traditional institutions. The effect of income on sharing is more statistically significant in the forms of sharing observed in the ACS, where I can analyse over one million respondents, but the magnitude of the effect is similar across all forms of sharing. The second panel suggests that people in the highest income bracket are about 71% as likely as people in the lowest income bracket to make use of thrift stores or garage sales on a monthly basis. Although the CNADS is smaller than the ACS and the confidence intervals of my estimates are wider, the difference between low-income households and high-income households remains statistically significant. The ACS also provides strong evidence that poorer individuals are more likely to live with non-relatives or with multiple generations. Compared to people in the lowest income bracket, the point estimates in the third and fourth panels show that people in the highest income bracket are 69% as likely to live with a non-relative and 68% as likely to live in a multi-generational household, after controlling for household size and other variables. These results suggest that the decision to share a home with a non-relative or with one’s extended family is partly an economic decision, consistent with Salcedo *et al.*’s (2012) model. There is also evidence in the NGS that people with higher household incomes are less likely to share items with people who do not live with them. My point estimates suggest that, compared to people living in households earning less than \$40,000 a year, people living in households earning over \$100,000 a year are 74% as likely to lend goods and 59% as likely to borrow goods each month.

Figure 1. Inverse relationship between income and use of traditional sharing institutions



Note: This figure illustrates estimates from a linear probability model on the likelihood that someone in each category of household income regularly using a particular institution for sharing goods, after controlling for household size, age, gender, race, and education. The bar graph illustrates point estimates and the lines mark the 95 percent confidence intervals.

Due to the small sample size of the NGS, though, these differences are not very statistically significant. Taken together, **Figure 1** suggests that high incomes reduce the likelihood of using traditional institutions for sharing.

Table 4. No relationship between income and the use of new sharing institutions without accounting for differential internet access

	Uses used merchandise websites like Craigslist at least monthly (1)	Uses websites like Airbnb and Couchsurfing at least once a year (2)	Uses a car-sharing service like Zipcar or RelayRides at least monthly (3)	Uses a bike-sharing service at least once a year (4)
Hh. income bracket 1	0.296*** (0.030)	0.093*** (0.021)	0.070*** (0.018)	0.067*** (0.017)
Hh. income bracket 2	0.361*** (0.036)	0.102*** (0.025)	0.045*** (0.017)	0.102*** (0.024)
Hh. income bracket 3	0.316*** (0.034)	0.131*** (0.025)	0.096*** (0.024)	0.090*** (0.020)
Hh. income bracket 4	0.253*** (0.026)	0.085*** (0.018)	0.045*** (0.012)	0.108*** (0.018)
Hh. income bracket 5	0.279*** (0.033)	0.109*** (0.023)	0.067*** (0.018)	0.099*** (0.022)
Hh. income bracket 6	0.319*** (0.040)	0.086*** (0.025)	0.038** (0.015)	0.091*** (0.025)
Hh. income bracket 7	0.341*** (0.055)	0.106*** (0.038)	0.049 (0.030)	0.041** (0.020)
Log hh. Size	0.038 (0.030)	-0.015 (0.023)	0.010 (0.016)	-0.010 (0.018)
Age	-0.005*** (0.001)	-0.003*** (0.001)	-0.001 (0.001)	-0.002*** (0.001)
Female	-0.008 (0.026)	-0.013 (0.019)	-0.008 (0.015)	-0.045*** (0.016)
White	-0.010 (0.034)	-0.021 (0.026)	-0.034* (0.021)	-0.026 (0.023)
Bachelors	0.014 (0.026)	0.033* (0.018)	0.002 (0.013)	0.019 (0.015)
Population weights?	Yes	Yes	Yes	Yes
Observations	1,646	1,646	1,646	1,646
R-squared	0.342	0.128	0.076	0.114

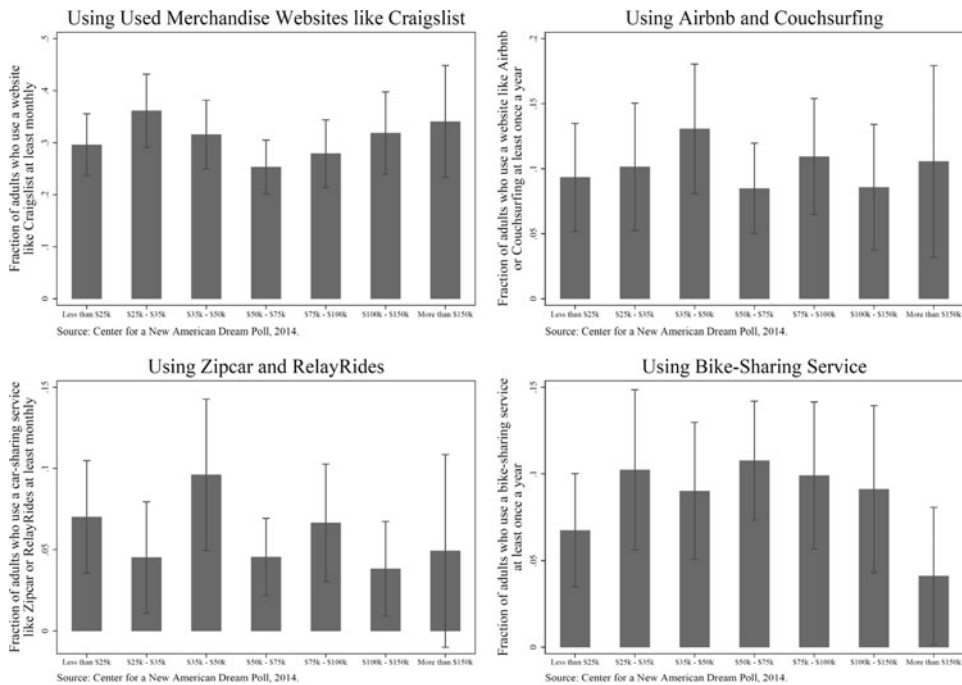
Note: Results from a linear probability model. I repress the constant and center the control variables at their respective means to ease the interpretation of household income (brackets 1–7).

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

New institutions for sharing

Next, I investigate the relationship between income and the use of new institutions of sharing goods, such as Craigslist, Airbnb and Couchsurfing, Zipcar and RelayRides, and Citibike. My estimates of Specification (1) are shown in Table 4. Again, there is no indication in my results that gender, race, or education have consistent effects on the propensities to share. However, these results do show that young people are more likely to use these new platforms than

Figure 2. No relationship between income and the use of new sharing institutions without accounting for differential internet access



Note: This figure illustrates estimates from a linear probability model on the likelihood that someone in each category of household income regularly uses a particular institution for sharing goods, after controlling for household size, age, gender, race, and education. The bar graph illustrates point estimates and the lines mark the 95 percent confidence intervals.

their older counterparts. The results suggest that every 10 years in age reduces the likelihood that an individual regularly uses a website like Craigslist by about 15%. Assuming that young people today continue to use sharing platforms at similar rates in the future, this suggests that new institutions for sharing goods will become relatively more important as younger cohorts replace their older counterparts.

In the long run, the future of sharing probably depends on whether new institutions can appeal to high-income people. Figure 2 reveals little relationship between income and the use of these new methods of sharing goods. The point estimates suggest that people in the richest households are sometimes more likely and sometimes less likely to use new institutions for sharing goods as people living in the poorest households. The confidence intervals of my estimates of the impact of household income on an individual's propensity to use new institutions for sharing are considerably wider than they are for most of the traditional forms of sharing observed in the ACS, because the CNADS has a much smaller sample size. The combination of similar point estimates and the large

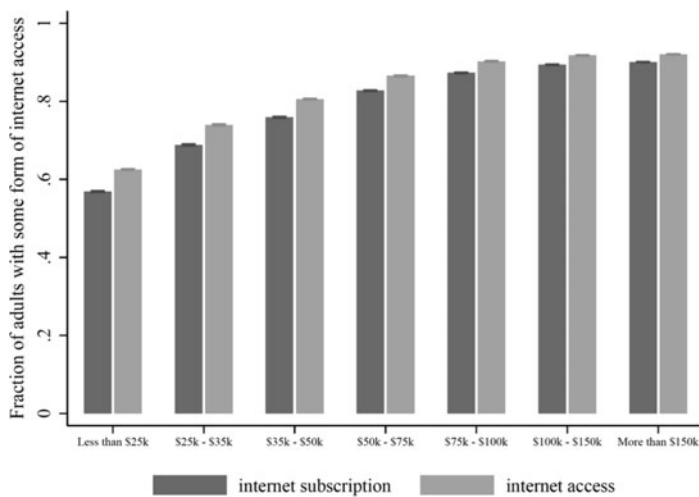
standard errors means that the linear probability model provides no evidence of statistically significant differences in the use of new institutions for sharing across income. The reason for this could be that new institutions for sharing are not as time-intensive as traditional institutions, making them attractive to both low- and high-income people, consistent with Becker's (1965) model. Sharing goods among fluid networks of loosely connected individuals might also be attractive to a wider range of people, as Benkler (2004) argues.

While there is clear evidence that traditional forms of sharing decline with income, it appears that Americans with higher incomes are no less likely to use new services like Craigslist, Airbnb, Zipcar, or Citibike. The reason for this may be that these forms of sharing are less time-intensive than more traditional forms of sharing. These preliminary results also suggest that the sharing economy may succeed in increasing sharing levels over the long run, even in the face of continued economic growth.

Accounting for internet access

Although the above analysis suggests that high-income people are no less likely than low-income people to make use new institutions for sharing, such as Craigslist, Airbnb or Zipcar, it ignores the important fact that people need reliable internet access to effectively share goods using online platforms. If low-income people have worse access to the internet, that could explain why they appear no more likely to use traditional institutions for sharing goods than high-income people. I consider this possibility using ACS data on whether respondents live in a household that subscribes to some form of internet service, such as a cable, DSL or mobile broadband plan, or whether it accesses the internet in some other way. Using my linear probability model, I estimate the likelihood that a person in any income bracket has home internet service. As shown in Figure 3, the digital divide remains stark. Whereas 92% of people living in households earning over \$150,000 have internet access, only 62% of people living in households earning under \$25,000 do. Given the large sample size of the ACS, these estimates are extremely precise so that the 95% confidence intervals are barely visible in Figure 3. For example, the estimates imply that there is a 95% chance that the true percentage of people with some form of internet access among the poorest households is between 62.3 and 62.7%.

Unfortunately, the CNADS does not ask respondents about whether they have internet access, so I cannot simply restrict my analysis to respondents with internet access in Specification 1. Nevertheless, the ACS data on the digital divide allows me to disentangle the true relationship between income and sharing in the CNADS. I reweight the CNADS survey by multiplying the survey weight by the probability that the respondent lives in a household with internet access. Under the assumption that anyone who regularly uses any of the online sharing platforms *must* have internet access, I assign a weight to non-users such that the probability that a CNADS respondent in each income bracket has internet access

Figure 3. Internet subscriptions and internet access across income

Source: American Community Survey, 2014

is consistent with the probability that an ACS respondent in the same income bracket has internet access. Using these weights, I then re-estimate the effect of income on whether people use new institutions for sharing. The purpose of this exercise is to investigate the relationship between household income and the use of new institutions for sharing goods among people who can access these online platforms.

My estimates of the probability that people with internet access make use of new institutions for sharing goods across household incomes are shown in Table 5 and Figure 4. The first column of Table 5 addresses whether people use online markets for second-hand goods, such as Craigslist. Among people with internet access, the point estimate suggests that 47% of individuals living in the poorest households use websites like Craigslist at least monthly, compared to 36% of individuals living in the richest households. Using the adjusted weights, my point estimates all suggest that affluent people are less likely to use new sharing institutions than the poor: people in the highest income bracket are 78% as likely to use websites like Craigslist, 77% as likely to use platforms like Airbnb or Couchsurfing, 47% as likely to use services like Zipcar and RelayRides and 40% as likely to use bike-sharing systems. These estimates are not very precise, and the 95% confidence intervals for these two income categories overlap much more than the confidence intervals presented in Figure 1. In the following section I address the statistical robustness of this negative relationship between income and new forms of sharing.

Table 5. Inverse relationship between income and the use of new sharing institutions, when accounting for differential internet access

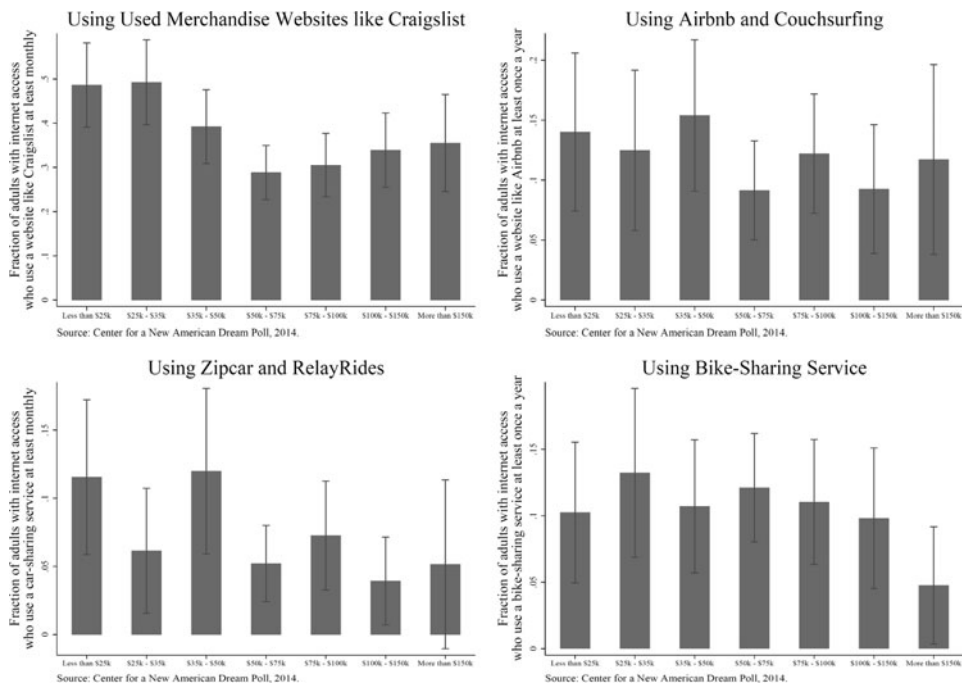
	Uses used merchandise websites like Craigslisat least monthly (1)	Uses websites like Airbnb and Couchsurfing at least once a year (2)	Uses a car-sharing service like Zipcar or RelayRides at least monthly (3)	Uses a bike-sharing service at least once a year (4)
Hh. income bracket 1	0.465*** (0.037)	0.145*** (0.031)	0.110*** (0.027)	0.105*** (0.025)
Hh. income bracket 2	0.483*** (0.039)	0.134*** (0.032)	0.061*** (0.023)	0.135*** (0.030)
Hh. income bracket 3	0.391*** (0.037)	0.161*** (0.030)	0.118*** (0.029)	0.111*** (0.024)
Hh. income bracket 4	0.292*** (0.029)	0.098*** (0.020)	0.053*** (0.014)	0.124*** (0.020)
Hh. income bracket 5	0.306*** (0.035)	0.120*** (0.025)	0.073*** (0.020)	0.109*** (0.024)
Hh. income bracket 6	0.343*** (0.042)	0.092*** (0.027)	0.040** (0.016)	0.098*** (0.027)
Hh. income bracket 7	0.364*** (0.056)	0.112*** (0.041)	0.052 (0.033)	0.042* (0.022)
Log hh. Size	0.052 (0.032)	-0.017 (0.028)	0.014 (0.019)	-0.011 (0.023)
Age	-0.005*** (0.001)	-0.003*** (0.001)	-0.000 (0.001)	-0.002*** (0.001)
Female	-0.011 (0.029)	-0.017 (0.023)	-0.011 (0.018)	-0.057*** (0.020)
White	-0.012 (0.036)	-0.025 (0.030)	-0.041* (0.025)	-0.031 (0.027)
Bachelors	0.021 (0.028)	0.042** (0.021)	0.004 (0.016)	0.025 (0.018)
Population weights?	Yes	Yes	Yes	Yes
Observations	1,646	1,646	1,646	1,646
R-squared	0.430	0.158	0.096	0.138

Note: Results from a linear probability model. In this model, I weight the CNADS data by the probability that each respondent has internet access, as described in the text. I repress the constant and center the control variables at their respective means to ease the interpretation of household income (brackets 1–7). Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5. Robustness

To my knowledge, these are the first published estimates showing that people with high incomes are less likely than people with low incomes to use both traditional and new institutions for sharing goods. Although the differences in the probability that individuals use institutions are not always statistically

Figure 4. Inverse relationship between income and use of new sharing institutions when accounting for differential internet access



Note: This figure illustrates estimates from a linear probability model on the likelihood that someone with internet access in each category of household income regularly using a particular institution for sharing goods, after controlling for household size, age, gender, and race. The bar graph illustrates point estimates and the lines mark the 95 percent confidence intervals.

significant across income categories, my finding that high-income people are less likely to use all sharing institutions is reasonably robust.

First, the magnitude of the estimates is quite similar across all ten institutions for sharing goods. The point estimates in Table 3 suggest that Americans in the highest income bracket are about 67% as likely as people in the lowest income bracket to use traditional sharing institutions. Meanwhile, the point estimates in Table 5 suggest that, after accounting for differences in internet access, rich people are about 61% as likely as poor people to use new sharing institutions. These differences in use between high- and low-income people are much more statistically significant for forms of sharing that are observed in the ACS, but this mostly reflects the fact that the ACS covers 1,000 times as many people. As more data become available on who uses new online platforms, researchers will be able to estimate the relationship between income and sharing with greater precision, but current data suggest that the relationship is similar across all forms of sharing.

Second, although the differences between how much people in the highest and lowest income categories share goods are not always statistically significant, this is partly due to the fact that I divide my sample into five to seven income categories. As a robustness check, I simply divide the CNADS into two groups of roughly equal sizes: people with household incomes below \$50,000 and people with household incomes above \$50,000. I find statistically significant evidence that low-income people are more likely to use three of the new institutions for sharing. Specifically, I reject the proposition that the rich and poor are equally likely to use websites like Craigslist at the 1% level, Airbnb and Couchsurfing at the 10% level and Zipcar and RelayRides at the 5% level. This test does not show a statistically significant difference in use of bike-sharing services, which Figure 4 suggests are quite popular among people with incomes between \$50,000 and \$150,000, but much less popular among people with incomes above \$150,000. The inverse relationship between income and sharing is clearest on Craigslist, which is the most popular platform analysed by CNADS.

Third, an alternative specification suggests that the negative relationship between income and sharing is statistically significant for five traditional institutions and two new institutions. Section 4 presents estimates for a linear probability model, but I reach similar conclusions when I use a logit model to estimate the likelihood that a person regularly uses a sharing institution as a function of log household income.⁵ In the case of traditional institutions for sharing, I find strong evidence (statistically significant at the 1% level) that people in more affluent households are less likely to carpool, shop at thrift stores or garage sales, and live with non-relatives, and weaker evidence (statistically significant at the 10% level) that they are less likely to borrow and lend items across households. When I ignore differences in internet access, I find no statistically significant relationship between income and the use of new institutions for sharing. However, once I reweight the data to reflect the probability that any individual has home internet access, all my point estimates suggest that people in affluent households are less likely to share, including strong evidence (statistically significant at the 1% level) that the affluent are less likely to use Craigslist and weaker evidence (statistically significant at the 10% level) that the affluent are less likely to use Zipcar or RelayRides. This paper focuses on the results from my linear probability model, because they are simpler to interpret, but the key results are consistent with the results from a logit model. The relationship between income and sharing should be re-examined as

⁵ My logit model estimates the following model: $\ln\left[\frac{\Pr(\text{sharing}_i)}{1 - \Pr(\text{sharing}_i)}\right] = \beta_0 + \beta_1 \log hh.inc_i + \beta_2 \log hh.size_i + \beta_3 age_i + \beta_4 female_i + \beta_5 white_i + \beta_6 bachelors_i + \varepsilon_i$ where the probability that an individual uses each sharing institution is a function of log household income (rather than income categories) and my control variables. These results are not published in this paper, but they are available on request.

more data become available, but the evidence presented in this paper suggests that people with higher incomes are less likely to use both traditional and new institutions for sharing goods.

6. Conclusion

This paper finds evidence that the use of six traditional institutions for sharing goods declines with income. Although it first appears that the use of four new institutions for sharing goods is relatively constant across income, I show that this actually reflects the fact that low-income Americans are much less likely to have access to online platforms like Craigslist, Airbnb or Zipcar because they do not have an internet subscription. These findings are consistent with an economic theory of sharing in which, everything else being equal, people with higher incomes share less.

This paper suggests that, going forward, the aggregate level of sharing depends on conflicting forces. Steady income growth may further erode the incentive for people to engage in both traditional and new forms of sharing. My point estimates imply that moving an individual from the lowest income category to the highest income category decreases the probability of regularly using new sharing platforms by nearly 40%. Consider how this dynamic could affect sharing over the next 35 years, if everyone in the US gained internet access and if shared economic growth increased all incomes by 2% a year. My results suggest that, everything else equal, universal internet access would increase regular sharing by less than 10%, while doubling real incomes would reduce regular sharing by about 20%.

Of course, everything else is not equal, and an analysis of current data cannot prove that the future of sharing is bleak. Institutions, norms and preferences may evolve in a way that sharply reduces the cost of sharing goods over time (Fremstad, 2016). From this perspective, the future of sharing may depend on a race between wage growth and improvements in how we share. Over the last couple of decades, platforms like Craigslist and Airbnb have been very successful in fostering new forms of sharing, but it remains to be seen whether harnessing the internet to share non-rival goods can offset or even reverse the decline in many traditional institutions. The data analysed in this paper provide some reason to be pessimistic about the future of sharing. Combined with the Varian Rule, my statistical results suggest that shared income growth will slowly undermine new sharing institutions in the same way as it undermines traditional institutions. Even if they shed little light on the future of sharing, my findings cast doubt on the notion that online platforms make sharing much more appealing to affluent people.

There are many opportunities to build on this paper. Although I argue that the use of both traditional and new institutions for sharing goods declines with income, my statistical results are not definitive. Going forward, better

data will allow researchers to estimate the effect of income on sharing with greater precision. If lack of internet access is an important constraint to using new institutions for sharing, then it would be helpful for surveys on the sharing economy to ask respondents not only whether they use platforms associated with the sharing economy, but also whether they have internet access.

This paper also underscores the need to bridge the digital divide in the US. Americans need internet access to stay informed, find jobs and engage in the political process. Increasingly, they also need internet access to effectively share goods. The ability to exchange second-hand goods on Craigslist, share lodging on Airbnb or Couchsurfing and avoid the costs of car ownership on Zipcar has the potential to expand the economic opportunities of low-income people. The sharing economy provides yet another argument for guaranteeing that all people have reliable and affordable internet access.

Finally, this paper highlights the similarities between traditional institutions for sharing goods such as multi-person households and garage sales, and new institutions for sharing goods, like Craigslist and Airbnb. For the sake of brevity, I ignore the important role of public institutions for sharing goods, such as libraries, parks, and mass transportation. Unlike sharing economy platforms, which often charge users to access goods, public institutions often make goods available for free or at subsidized rates. Despite this, data suggest that high-income people make greater use of libraries, parks and mass transit than their low-income counterparts. My preliminary analysis suggests that this reflects the fact that public institutions for sharing goods focus on serving high-income areas. Further work could investigate the political economy of public institutions for sharing goods.

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