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Collaborative property: P2P sharing as property system

Sally Zhu

1. Introduction

The sharing economy has drawn increasing attention from academic commentators in the last decade.¹ The definition I will use is peer-to-peer (P2P) sharing of access to tangible goods, including accommodation, for which the closest neologism is ‘collaborative consumption’.² There have been many claims of the potential efficiency and equity gains from sharing resources rather than owning them outright, most notably the reduction in waste and under-utilisation of existing resources, and the opportunity for consumers to access the utility of resources without the expense of ownership.³ For example, it is more efficient for some people to own cars and others to own lawnmowers, and to share the use of these assets when they are needed, rather than for everyone to own both a car and a lawnmower. Aside from the arguments from economic efficiency there are also considerations from sustainability, anti-capitalist sentiment and a suite of pro-social motivations.⁴ Yet there have been few attempts to analyse the sharing economy’s value system, namely how it creates and distributes economic resources, and how this compares with existing forms of resource production and distribution. In particular, the various forms of mixed commons, which are property systems characterised by co-extensive private and common rights and uses over resources, which sharing resembles in many ways.⁵ Explicating the value structure of sharing is important for evaluating how well it can achieve the merits and gains ascribed to it by its proponents.

I will advance the argument that sharing constitutes the archetype of a new property system, which I term ‘collaborative property’

(hereafter CP) after the recognition of the collaborative nature of sharing.⁶ I will address primarily the case of peer-to-peer exchange of tangible resources, including both personal and real property, without the transfer of ownership.⁷ I am agnostic on the organisational form, which can be online platforms, community libraries, social media groups and other similar forms, and whether the exchange involves money, in-kind benefits, or is simply gratuitous.⁸ CP has a set of distinctive features embodied in its archetype which enables it to retain the advantages of private property while simultaneously partaking in some of the advantages of common property.

In section 1, I discuss how sharing can be understood as an entire property system consisting of production, distribution and governance, and how the CP it engenders compares with other models of mixed commons and peer-production systems. Section 2 delineates the essential features of CP, in particular the transactional structure used for CP which I argue is its most distinctive aspect. In section 3, I explore how these features of CP enable it to emulate the benefits of a commons while managing the collective governance problems that arise from commoning.⁹ Finally, section 4 briefly discusses the trade-offs and limitations of CP.

2. Sharing as a property system

I will briefly expand on how P2P sharing can constitute a distinctive property system, by which I mean a system for producing, distributing and managing economic value.¹⁰ I use the term ‘sharing’ here to denote the suite of actual economic practices that constitute P2P access to tangible goods, and CP to denote the property and value dynamics which constitute the essential features of the practice. It might seem that P2P sharing, whereby the use of a tangible resource is transferred to or accessed by a party who is not the owner, constitutes a simple exchange of existing utility of the shared good between owner and user. Nothing new is produced, the transfer of value is limited to the transacting parties and does not benefit anyone else, and sharing is simply another extension of private ownership and market exchange, like buying and selling, or renting. However, commentators have argued that sharing creates benefits which these more familiar forms of exchange do not.¹¹ I argue that while sharing is not a novel or unique economic activity, it does present distinct characteristics which enable it to produce, distribute and manage resources in a way that is different from other property paradigms.

Sharing enables new ways of distributing and consuming resources. Instead of having to purchase and own an asset to access its function, a consumer now has the option of renting it through a sharing platform. The distribution and consumption of resources no longer depends on the user owning it, which effectively separates the utility provided by a resource from its costs of ownership. Kreiczer-Levy has argued that sharing also presents a different form of property use compared with renting and leasing, since instead of being tied to any specific object of property, even temporarily, access connotes a stream of services delivered by a revolving suite of objects.¹² This means consumption of goods no longer necessitates the geographical and relational stability conventionally associated with owning tangible goods.¹³ Furthermore the advent of widespread P2P sharing also changes the economic possibilities of private ownership, which need not entail exclusive possession and consumption of goods, but is inflected by the possibility of using goods for other purposes.¹⁴

Sharing also implicates a way of producing resources, specifically producing the under-utilised portion of existing resources.¹⁵ This can be analysed through Ostrom's matrix of resource system and resource unit,¹⁶ coupled with Benkler's notion of granularity.¹⁷ Ostrom defines a resource system as a system which supports a stream of resource units, it being the units which are appropriated for consumption. Most P2P sharing involves resources which are typically owned for the purposes of personal consumption. This means they are usually taken out of circulation in the marketplace and their utility is reserved for the sole use of the owner to the exclusion of other potential users. If these resources are not shared, they will not generally be made available for other people's consumption through another method, such as through a long-term lease.¹⁸ For example, a personal car when it is unused is simply unused; its downtime denotes utility which might have been realised but was not. And for tangible goods which can only support a limited number of users at any time, and have a limited lifetime utility, the resource units which remain unconsumed are lost. So, an owner by opening access to assets which would otherwise be for their exclusive use, 'produces' the utility which would otherwise have been wasted.¹⁹ The utility of a car can also be produced in a different way. Whenever a car owner makes a journey, the empty seats are potential utility for anyone travelling in the same direction, and which are not made available for consumption because the owner is not running a bus service.²⁰ Like downtime or unused mileage, empty seats are a resource unit which can be produced for sharing. Thus, sharing differentiates the different resource units that are produced by a resource system and enables these to be consumed separately.²¹

This potentially increases the amount and variety of consumption a resource system can support, and improves on the allocative efficiency of existing resource systems, particularly for those composed of resource units with fast rates of decay.²²

Finally, sharing represents a new way of contributing to and maintaining resources. Widening access to resources which would otherwise be ring-fenced by private ownership enables greater distribution of labour through the shared objects. As owners provide their private property for others to use, they produce not only its inherent use value, but also the labour they have hitherto invested in the property, such as purchasing, storing, and otherwise maintaining it. This value accrues to subsequent users of shared property, who during their use and possession also have the opportunity to invest similar labour which accrues to the owner and to subsequent users after them.²³ In other words, opening up access to goods not only gives non-owners the opportunity to share in their benefit, but also gives them the opportunity to share in their maintenance. Keeping goods clean and functional, storing them, or potentially even improving them, may seem to be mundane and negligible actions, but together they constitute a necessary and not inconsiderable flow of labour. Sharing enables this labour to flow to others, creating a mesh of value transmitted through tangible resources across the boundaries of private ownership.

2.1 Sharing as commons

This shows that sharing is much more than a method of consumption, but encompasses all the central elements of a property system: production, distribution, and governance. It also shows how sharing enables the realisation of benefits beyond those possible in straightforward private ownership: more flexible property use, less wasted utility and the chance to benefit from another's labour. Doing so requires the cooperation of multiple peer participants, leading some to observe that sharing resembles a commons where resources are pooled and accessed by a community.²⁴ Here I delineate how CP resembles two approaches to commons, mixed commons and peer-production, and how it can address some of the gaps in this area.

The central aim of CP is to construct a system of property which can realise some advantages from both private property and commons and also overcome their respective drawbacks. It shares this aim with many theories of mixed commons, most pertinently Smith's 'semicommons' and Dagan and Heller's 'liberal commons', which use similar strategies of using coextensive private and collective incentives to manage common

property.²⁵ However most mixed commons involve either legal co-ownership or situations of physical or relational proximity. Land and housing are the single most used examples of common resources,²⁶ while often cited forms of collectivity include marriage, close corporations and trusts, all of which involve either legal or equitable joint ownership. All of these evince a sense of participants being bound together, whether by ties of legal rights as in the case of trusts, or by relational proximity as in the case of marriage or inheritors, or in the case of neighbouring landowners, enforced physical proximity which makes each vulnerable to the actions of their neighbours.²⁷

In contrast, the urgency to cooperate through sharing is much lower. Sharers have little opportunity to affect the interests and rights of others, and they are not dependent on cooperating to realise a necessary benefit, unlike owners in semicommons or housing complexes. Indeed the allure of sharing is how it enables participants to choose their level of commitment to the common project on a flexible basis. Owners can choose how little or often to share their property, their conditions of allowing access, and how to use their property when it is not being shared. For example, hosts on Airbnb can freely set their availability and are not obliged to accept all booking requests.²⁸ Airbnb hosts, for all intents and purposes, retain full control over their property while accessing the common benefits of being part of an online sharing platform, such as economies of scale in marketing and insurance. Like mixed commons the level of commitment to the commons is a sliding scale, and sharing, and by extension CP, offers a more flexible and granular basis for fixing the level of commitment. But unlike mixed commons, where participants begin from a position of interdependence and must cooperate to solve collective problems, CP begins from the opposite position, of creating interdependence between private owners in order to solve problems pertaining to private ownership, such as wastage, under-utilisation and high costs.

2.2 Sharing as peer-production

Another important feature of CP is its continual process of production. Unlike land and housing, there is no identifiable object of CP outside of the sharing process itself. There is no common pool of objects except that participants continue to contribute resources and exchange with each other, and once the process stops the structure reverts to one of discrete private ownership. Insofar as CP denotes a method of organising labour and resources to achieve beneficial outcomes, it can be seen as a

production system comparable to peer-based production and urban commons.²⁹ The similarities between these models are that they diverge from the traditional categories of market and firm, and their participants are 'peers' or self-selecting non-professionals. Peer-based production and urban commons claim to realise benefits and efficiencies which escape markets and firms, and some have argued the same for the sharing economy.³⁰ Some have analysed the conditions which are conducive to the emergence of peer-to-peer sharing markets,³¹ and I agree that while sharing offers efficiency gains over outright ownership, these do not materialise in all situations. It makes sense to share assets with high value and low use frequency, such as cars and spare rooms, but not smartphones which are frequently used, or clothes which are sufficiently inexpensive that the costs of owning them are not offset by the benefits of sharing.

Like peer-based production, sharing depends on the contribution of spare time and resources by parties who are highly dispersed and loosely connected. Both models are examples of what Benkler calls 'barn raising'.³² They integrate granular inputs of labour to produce an output with considerable commercial or economic value, labour which would otherwise have a relatively low opportunity cost. Benkler gives the example of the NASA Clickworkers project, in which laypersons can visit a website and search for craters on Mars. Most contributions came from one-time visitors who spent a few minutes on the task, time which they would likely otherwise have spent on leisure. Yet the agglomeration of these few minutes achieved a task which would have required the full-time employment of a specialist.³³ A similar logic applies to goods-sharing; the car which is not used would be parked on the driveway, and the spare room would be left unused. However the analogy is inexact, as while Benkler's examples of NASA Clickworkers and Wikipedia face the difficulty that they require gratuitous labour, they also benefit from being public goods which can only be added to but cannot be exhausted.³⁴ In contrast, sharing can harness the incentives of private property and profit making,³⁵ but its resources are private goods which are rival and subtractable.³⁶ If contributions and appropriations are not carefully managed, CP will be susceptible to tragedy.

This sets up the challenge for CP. Its distributed and ad hoc mode of production enables it to realise value that is not realisable in other ways and gives it greater flexibility compared to traditional or mixed commons. CP realises value through incentivising owners to open their property for common use, but because it involves tangible resources, it faces the problems of over-use and free-riding which plagues any commoning of private goods. Moreover, the usual solutions of privatising costs and

benefits,³⁷ or binding participants to common interests and governing through strong norms³⁸ potentially undermine the first condition of preserving the distributed base of cooperation. How can CP enable property-based cooperation without binding participants together, while also managing the risks of over-use, will be the subject of my analysis. And I aim to show that it is the transactional structure of CP which makes this possible.

3. Features of collaborative property

Here I delineate the distinctive features of CP as a value structure, by looking at how resources are owned and controlled, how these are distributed and exchanged, and what form of economy this produces. These three aspects of CP are deeply intertwined, but I will analyse them separately for clarity.

3.1 Privately owned private goods

I have stated frequently that the underlying ownership structure of CP is private ownership, so here I will be brief. Private ownership denotes the paradigm of legal rights which gives individuals exclusive control over and entitlement to the benefits of resources they own.³⁹ Sharing a resource presumes that the sharer has both the ability and authority to allow access to the resource, which requires having a legal interest that enables them to shift possession temporarily to the user. The immediate sharer need not be the owner of the resource, such as if they are a lessee of the owner and have the latter's permission to allow others to use the resource. So, while the host on Airbnb need not own the accommodation, such as if they are a tenant or a property management company, I will presume that they have the same authority to share as if they were the owner.⁴⁰

3.2 Transactional collaboration

The second and most distinctive feature of CP is the transactional structure of its cooperation. Reasoning forward from the first feature, that CP is based on private ownership, means that any transaction cannot entail transfer or exchange of ownership. This is not simply a matter of form. Preserving the initial structure and distribution of ownership means cooperation depends on the continuing willingness of participants to engage in the collaborative transaction. This process of contribution both

constitutes and sets the limits of CP. I have stated that CP is more akin to a process of commoning, and there is no enduring or identifiable object of property outside of the value that is produced through the sharing process. Without ongoing cooperation, CP reverts to straightforward private ownership. This leads to three important observations.

First, collaboration which is grounded in private ownership facilitates the flow of labour-service. I have argued elsewhere how labour and its fruits are transferred through physical objects to accrue to subsequent users of those objects.⁴¹ The labour that an owner has invested in a resource, obtaining, maintaining and otherwise ensuring its ongoing functionality accrues to users of that resource. For the duration of sharing the owner is relieved of some of these labours, such as storing, keeping safe and cleaning, which passes to the user with physical possession of the resource. However, those labours which remain with the owner, such as the responsibility to repair any damage and to bear risks for malfunction and loss, represent their ongoing labour in the resource and hence their ongoing contribution to the collaborative transaction. This is grounded in their ownership rights and duties and is what makes sharing, constituted by the flow of labour-service between a revolving set of individuals through myriad objects, different from the labour flows of selling or donating.⁴²

Secondly, that collaboration is constituted by the transaction and limited by its terms and boundaries means participants can choose the level of commitment they are willing to bring to the collaborative exchange. Unlike mixed commons or co-ownership where commitment tends to be either the default position or a long-term proposition, participants can choose how long and how much to commit by changing the terms of the transaction itself. In other words, the transaction can be seen as the most basic unit of commitment. The extent of commitment can be as limited as a one-off transaction, wherein all anticipated benefits and costs are priced into the exchange and participants owe no obligations beyond the terms of the transaction. Most P2P rentals on digital platforms such as Airbnb or Turo are examples of this type. Or it can be a more extensive and prolonged transaction, such as banking contributions in a community to spend later or committing resources on a long-term basis, in other words whenever there is a lag between contribution and appropriation. Time-banks, memberships, token systems and libraries are all examples of such transactions. There is infinite gradation and possible configurations of collaborative transactions, sometimes even within one organisation. For example, it used to be that Homeaway, a P2P accommodation sharing platform, offered users the option of transacting either in

money or in tokens.⁴³ Users who chose the former option would conform to a one-off transaction structure, whereas those who chose the latter would have committed themselves to making some future contribution to the platform by virtue of being locked-in through the token system.

Using transactions as the base unit for commoning enables different possibilities of configuring contribution beyond the conventional methods of either committing in units of time, or labour, or amount of resources. It allows CP to be much more flexible than other forms of commons, as participants can choose what they are willing to stake every time they participate in sharing. This preserves the range of activities a resource can support, as in-between sharing the owner has discretion on how to use his property and can commit it to other uses or even other sharing communities. It also protects the owner's positive ongoing choice and autonomy; rather than a mere 'right to exit',⁴⁴ the owner exercises a right to share by engaging in transactions.⁴⁵ His obligations cease as soon as the transaction ends, and the owner is restored in his ability to choose his next transaction.

That owners retain their full ownership rights and can configure the extent of their commitment does not mean they retain full control over the terms of transactions. Instead, the level of control is inflected through the extent rules of the organisation sharing is intermediated through. The transactions are usually one-offs, as participants agree to commit to the duration, terms and responsibilities necessary to the immediate exchange but no more, such as if a homeowner agrees to host a guest for two nights' stay on Airbnb in exchange for a sum of money. But a multitude of similar and repeated transactions can aggregate into something more cohesive.

This leads to the third important aspect of transactional collaboration, which is the change in character of the resource system. For one-off transactions at the discretion of the owner the resource system is the asset being shared, and the resource unit is the use and general utility the asset can support. But for a multitude of similar and repeating transactions, the resource system is no longer limited to the discrete assets being shared, but the pool of resources that are committed to being shared, and the unit is the utility the pool of assets can support. This shift from discrete resources to a pool of resources is not an empirical transition, but an emergent one. The common pool emerges from the ongoing and future transactions between participants, regardless of their identities or the substance of their exchanges.⁴⁶ This is what differentiates CP from other forms of commons or co-owned property. Commons are concerned mostly with how to govern property so as to maximise its efficiency or longevity. In contrast for CP the governance of property is in service of the

promotion of transactions, meaning to increase the likelihood and incidence of transactions in the future. Examples of ways CP governance might achieve this is to ensure faster and safer transactions between parties, to alleviate their fears, promote mutual trust and thereby increase the chance that the parties will engage in more sharing in the future. More transactions signal more commitment and more property being made available for sharing.⁴⁷

3.3 Dual level of cooperation

The assertion that a multitude of discrete one-off transactions can create an emergent commons dovetails with the third feature of CP, which is how it operates on two scales of cooperation. There is the transaction level where the actual exchange of value occurs, and the market or community level where pooling of resources and collectivisation of costs and benefits occurs. This dual level of operation explains how CP can emulate the dynamics of a commons from a base of private ownership and transactional exchange.

When participants contribute assets or money to sharing transactions, they effectively create a market.⁴⁸ By engaging in actions such as listing their property on a platform, communicating with potential counter-parties, maintaining their property in anticipation of further sharing, or simply maintaining an account on a platform, participants are signalling their commitment and availability to engage in sharing. Their market-making actions consist of the labours of ownership discussed previously, plus the additional labour involved in bringing goods to market.⁴⁹ In short it consists of the same flow of labour-service through resources prepared and offered for sharing. As noted by economists, having a deep and active market can significantly reduce transactions costs such as searching for and negotiating trades.⁵⁰ Indeed it is only with the advent of advanced information communication technology that P2P sharing markets are viable at all, where before sharing private possessions was limited to a close circle of friends and family.⁵¹ While the role of the platform or intermediary is important in coordinating market-making, it must also be recognised that much of the costs and labours fall onto owners who effectively act as suppliers and managers of the inventory of goods available on a platform. Insofar as the market may be constituted as a network of labour-service supplied by owners of assets through contributing their private property, and this very act of market making brings tangible benefits to all participants, we may view this as an act of commoning, and the market as a pool of resources.

The distinction between transactions and the market should not be overstated. Although signalling availability may be enough to create the semblance of a market, actual transactions are necessary to constitute and maintain the market pool of resources. Goods which are signalled as being available for sharing will presumably be shared so long as the conditions for access, such as price, duration and other terms, are satisfied. If there are too few choices and transactions occurring, then the market is illiquid and shallow which undermines the valuable network effects that keep contributions growing.⁵² Moreover the benefits of market making can only be captured through making transactions. While it is convenient to have a pool of resources to choose from, neither the owner nor the consumer will gain access to the benefit of sharing unless and until they engage in an exchange, at which point the utility and labour-service flows through the shared object. Thus, the market which emerges through transactions also realises its benefits through facilitating more transactions.

This does not mean that the tangible benefit of having a market or sharing community is limited to coordinating supply and reducing transaction costs. It also presents opportunities for economies of scale not realisable at the transaction level (economies of scale being defined as falling average fixed costs per-unit at the margin). Smith has argued that by putting neighbouring lands to the common use of grazing while keeping the parcels private for farming, semicommons is able to operate on two economies of scale. Commoning for grazing enables the commoners to achieve something which their parcels individually could not, namely rearing animals which requires large land tracts. But for the activity of farming, each commoner can farm his own parcel productively. By proceeding on different property systems for different activities, semicommons captures the economies of scale for both. Farming benefits from the productivity and investment incentives of private property, while grazing benefits from the distribution of risk of common property.⁵³

CP exhibits a similar dynamic. Private ownership gives owners incentives to use and maintain their property productively, while sharing gives them the option of more efficient use as owners trade their otherwise unused resources for those they have need of. CP also presents more opportunities for benefits to flow between the different activities. The care and investment owners put into their property, typically for their own benefit, flows directly to users in the form of labour-service and increases the utility for both parties. These are benefits realised at the transaction level which are made possible by the underlying structure of

private ownership in sharing. More important are the benefits which can only be realised at the market level, which I will discuss in the next section.

4. Harnessing the benefits of private property and common use

Here I outline how the essential features of CP, namely private ownership, transactional structure and dual level cooperation, allow it to successfully realise benefits of collectivity and also to ameliorate the intractable problems of common property systems.

4.1 Rational decision making

Private ownership structure coupled with the transactional structure of CP enable it to build a resilient and distributed value system in which each unit transaction maintains a minimum level of economic net utility. The costs and benefits of resource control and management are internalised through the mechanism of private ownership.⁵⁴ Private owners bear the full costs of purchasing and maintaining the property and its relevant risks, in return for accessing the full benefits of using and exchanging the good. Whatever use the property is put to, the outcome, whether beneficial or adverse, may be attributed wholly to the owner. Thus, assuming that owners act as economically rational agents, there is minimal level of guaranteed utility as owners may be presumed to take actions which they think are of net benefit to them. And the relatively discrete yet distributed structure of costs and benefits mean the market itself is potentially more resilient, as there is less room for systemic risk and no single point of failure. So, barring an earthquake that affects an entire city, it is safe to assume there will always be a supply of Airbnb accommodation, or Turo cars, or Uber rides in an area.

Likewise the power of decision making is also structured by private ownership, which reduces the number of decision makers for each resource while increasing the number of decision makers overall and potentially making the entire structure more distributed.⁵⁵ Concentrating the rights of control in one entity has been argued to reduce transaction costs, as it obviates the need for collective bargaining and agreement.⁵⁶ While this is largely a matter a degree, in the case of most tangible goods used for sharing the owner will have unilateral and exclusive decisional power over the good.⁵⁷ Owners can unilaterally decide whether or not to share their property and the conditions of access, which leads to more

flexible supply as owners can decide whether or not to contribute depending on their own utility calculations, and more resilient supply as there will always be some owners willing to share their property given a set of conditions. It also means greater choice and opportunity for consumers; even if a consumer cannot accept one owner's terms, chances are there will be other options which are acceptable.⁵⁸ Furthermore both the provider and the consumer have unilateral power to commit themselves to the sharing arrangement, there is no need to consult other providers or consumers in the sharing platform or community as to the permissibility or desirability of their transaction.

4.2 Over-use, under-investment and free-riding

Over-use, under-investment and free-riding are specific behaviours which often arise in situations involving common tangible resources. Briefly, if a resource is open-access, there is no incentive for any user to invest in maintaining or protecting the resource, as they cannot ensure their investment will not be exploited, or free-ridden upon, by another user. It also means users do not need to bear the whole cost of their use, because they cannot be prevented from taking as much as they wish from the resource, whether by paying a fee or having to bear the cost of replenishing it.⁵⁹ These behaviours collectively result in a tragedy of the commons.⁶⁰

CP's two economies of scale allows it to mitigate the problems of over-use and under-investment and the risk of free-riding behaviour without jeopardising its distributed contribution structure described above. Most commons systems solve these problems by tying in commitment from members and communally monitoring and sanctioning defection.⁶¹ These measures have been shown to be costly and often precarious, as perpetrators are difficult to identify and there is always the temptation to free-ride on others' labour.⁶² In contrast CP is able to utilise its two economies of scale to internalise the cost and benefits of monitoring and sanctioning at the transactional level, while integrating information about defectors at the commons level. I will proceed to explain how this is achieved.

CP *prima facie* does not suffer from the problem of under-investment because resources are privately owned and the decision of how much to invest and transact is the sole discretion of the owner. Investing in CP means improving and maintaining a resource which is subsequently made available for others to use. If the owner is only sharing ad hoc, then the incentive to invest comes mainly from 'self-service' to improve property for their own use, a boon which is then infrequently accessed by others.⁶³

The infrequency of sharing means the disincentive to invest which arises from the possibility of free-riding behaviour is low, as the owner is unlikely to refrain from improving their property which they mainly use for personal consumption on the off-chance that their labour could be exploited by another use. In contrast if the owner is sharing regularly, then their motivations for sharing will likely factor into their investment calculation. Someone who shares with a view to profit would likely be incentivised to increase the value of their property by the higher payout on the market.⁶⁴ Someone who shares gratuitously would likely be motivated by pro-social incentives, which suggests they are willing to take some economic loss in return for social gains, so will not be put-off from investing in sharing by the possibility of free-riding behaviour.⁶⁵ Private ownership enables owners to calibrate their investment according to their expected payoff, so each transaction is presumably efficient. In short, CP does not suffer from the problem of under-investment because owners can be relied upon to invest up to a level they find utility maximising.

CP is however susceptible to problems similar to over-use and free-riding behaviour. The labour and value invested in shared property is made available to parties who do not have the same incentives to maintain it. A consumer who uses shared property without care, causing damage or otherwise diminishing its utility, has free-ridden on the owner's labour-service provided through the resource, by exploiting the benefit provided without bearing the cost which accrues to the owner. They have also free-ridden on the common labour of other participants in sustaining the pool of resources, by benefiting from the willingness of others to share without observing the norms of commoning. In other words such a user has defected from the norms which incentivise sharing, and in doing so has potentially diminished others' incentive to participate and by extension the amount of contribution and transactions occurring in the future.⁶⁶

Monitoring and sanctioning of these dangers in CP proceeds on its two levels of scale, the transactional level and market, or commons, level. At the transactional level participants police the behaviour of their counter-party, which is both feasible given the discrete and bounded nature of transactions, and self-sustaining as both parties have strong incentives to ensure the other is not defecting on their agreement. Monitoring is performed by parties who have the most intimate knowledge of the transaction, who are invested in the behaviour of the counter-party to the extent they have staked money, time and resources in the transaction, and who reap the full benefit of property performance and bear the whole cost of defection. In other words, both the incentive and the ability to monitor

is internalised. Sanctioning is slightly different, with the intermediary (platform or community) playing a larger role as in prototypical commons.⁶⁷ The rules enforced on many sharing platforms are similar and roughly track the balance of obligations imposed at common law; generally a consumer is strictly liable for damage to shared goods.⁶⁸ Most platforms operate dispute resolution processes to settle disputes and facilitate compensation, but the scope of relevant information and interested parties is generally limited to a particular transaction. This reduces the costs of sanctioning by reducing the amount of information processed and the number of parties involved, so can be seen as an economy gain from operating on a small scale.

At the commons level, I have already mentioned rule-setting as one major component of monitoring and sanctioning.⁶⁹ The other component is integrating the information gained through past disputes to moderate future transactions and prevent free-riding at the commons level. This is necessary because the discrete nature of transactions means defection which is sanctioned within one exchange is not readily apparent to other participants in the group, so the defector can avoid bearing the adverse effects of his action by simply engaging with different counter-parties. The most common method for monitoring behaviour in the commons is a transparent peer rating system, whereby bad past behaviour is reflected in a rating which is publicly accessible. This ensures that a party who defects in one transaction will find their ability to engage in future transactions curtailed, and so cannot escape the costs of their actions at the commons level.⁷⁰ The system also gains in credibility with more reviews which means its value increases with scale. Moreover, the additional cost of coordinating this system is minimal, as the labour of monitoring and reviewing participants has already been expended at the transaction level, and information communication technology advancements enables the storing and communication of information at very low marginal cost. Sanctioning is also straightforward; as participants are not bound by co-ownership or physical or relational proximity, it is easy to exclude defectors from some or all future sharing without disrupting future contributions. This may be achieved through de-prioritising listings or forced delisting by the platform, or social exclusion by other sharers on the basis of bad reviews.

This is not to say that peer reviews are always fair or accurate; indeed studies show that inflating ratings, malicious reviews and other defecting behaviour are common.⁷¹ There is also the pressing concern of discriminatory reviews which prejudice certain users based on their race or socio-economic position.⁷² In response platforms have introduced

countermeasures to build trust among users, such as verifying users' identities to ensure their veracity and guard against false accounts,⁷³ and discouraging providers from choosing their consumers to guard against discrimination.⁷⁴ So while the review system is not perfect, it serves a valuable function and has a real effect on users' choices.

This process not only takes advantage of two economies of scale, but also separates the two types of resources and subjects them to the property system which best maximises their net utility. Like semicommons, CP allows resources to be utilised for one purpose, namely owning and up-keeping, in a way that incentivises its productive use, which is how CP avoids the problem of under-investment. It simultaneously allows resources to be commoned for a different purpose which the units cannot individually achieve efficiently. But whereas semicommons runs into the problems of provisioning and free-riding in common-use, CP avoids this because a major feature of its common-use is the market and the information it coordinates. Markets and information are by nature public goods and therefore not subject to the same dynamics as private goods. Rather they are closer to information or cultural goods which, as Benkler analysed, have a positive correlation between number of units and total utility, and no upper limit on scale.⁷⁵

This means a CP system does not face the same constraint as other forms of commons which must balance the number of participants and amount of resources it can support with the costs of coordinating, monitoring and sanctioning.⁷⁶ In CP coordination operates at the market level, which Benkler, Evans and Schmalensee and others have asserted benefits from very large scales (although they disagree on the upper limit). I have shown how monitoring and sanctioning conform to the same dynamic, whereby the 'goods' being provided are information which are then used to allocate tangible private goods more efficiently.⁷⁷ In other words the provisioning and use of the common good is subjected to an open-access system which maximises its utility, while the benefits of the common good are captured through private goods. This is made possible by parcelling participants and resources into transactions rather than agglomerating them. While this might mean frequent transactors may miss out on opportunities to scale down costs or scale up production, it also ensures that each transaction is at least net positive utility irrespective of the other transactions on the market. CP as a property system can capture some of the benefits Benkler observes in information goods, because it consists of modular units (transactions) which can be cheaply and easily integrated into a whole (market) that produces real benefits (transparency in monitoring and sanctions).

4.3 Managing risk

Finally, a salient problem facing any commons is how to manage adverse events and their subsequent effects. Many adopt some form of egalitarian distribution and share the burden of loss across all participants, particularly when the resources are communally owned or at least are not clearly divided into individual lots.⁷⁸ In doing so they are operating a system akin to insurance, by spreading a loss that would be catastrophic for a participant to bear individually across the community. Risk spreading presents certain economic and social gains,⁷⁹ and in common ownership systems risk sharing is arguably the default position, which means they avoid the further costs of risk shifting incurred in private ownership systems. But in return it requires measures to prevent participants from withdrawing, and to compel them to continue contributing when things are difficult. This is often achieved through formal ties of ownership or dependence through physical or relational proximity, and at the expense of choice and flexibility. Here I will discuss how CP, a fundamentally private ownership system, can collectivise and spread risk while retaining the flexibility to exit.

Risk, understood as the measure of uncertainty through probabilistic functions, is an integral aspect of any property system which generally determines how the costs of adverse events are assigned. The private ownership structure of CP means the risks associated with sharing, namely property damage and liability, are the sole responsibility of the owner by default. This entails owners either self-insuring or purchasing insurance cover for their sharing activities, both of which can be prohibitively costly and inefficient.⁸⁰ They can pass some risks to the user by simply transferring possession, thereby achieving a measure of risk sharing at the transaction level. But the bilateral scope of the transaction and the relatively similar financial position of the parties means there is little scope for economies of scale. In response, sharing platforms have engineered their own risk management schemes, either by negotiating new insurance policies with external partners on behalf of their users,⁸¹ or insuring some risks themselves by acting as guarantor or operating an internal insurance scheme.⁸² These schemes provide participants with insurance cover they could not procure individually, or at potentially lower cost, by using the platform's greater economic clout and centralised coordinating role to organise what is effectively a group insurance cover.

Although formally participants are shifting risk to insurance companies through platform as agent, the dynamic can also be seen as

risk collectivisation. Participants contribute to the insurance pool by paying fees, and appropriate from the pool when they suffer an insured loss. This achieves economies of scale by taking advantage of the law of large numbers and spreading risk across a large number of transactions.⁸³ The 'insurance pool' is an artifice to designate the dynamic (platform providers will not realistically set aside funds specifically to indemnify users), but it shows clearly how participants share common risk management by indirectly contributing to insure each other. Furthermore this need not be facilitated through money. A token system which replaces money on the platform, or an in-kind exchange whereby participants receive access to others' property in return for providing their own can also achieve a similar effect.⁸⁴ If by contributing resources the owner is 'paid' in tokens or in entitlement to access others' resources, then in the event their own property is damaged and can no longer support utility, the owner can still spend their token or entitlement to access the utility of other resources. Basically, the owner contributes to the common pool, whether that be a fund or a pool of fluctuating resources, and appropriates from the common pool when they suffer a loss.

Managing risk by tying together contribution with appropriation is characteristic of prototypical commons, wherein risk is by default collectivised and apportioned in the same way as benefits, by a reduction in the amount of units appropriated and a share of the responsibility in remedying the loss, usually according to communally determined proportions. The difference lies in the flexibility offered by CP by virtue of its transactional structure. There is no need to determine commitments, instead they are automatically included through each transaction. There is also the option to separate risk from benefit, such as platforms which use insurance mechanisms allowing participants to privatise the benefits accruing to their property while collectivising their risks. Thus, the transactional structure of CP offers an alternative method for addressing one of the most intractable problems of any common property system, by firstly internalising risk through private ownership, then collectivising risk using the principles of insurance, to achieve considerable economies in risk management.

5. Tradeoffs and limitations

The above discussion on risk collectivisation reveals an inherent tradeoff between the different advantages of CP, namely the features associated with flexibility, choice and control and the ability to realise economies of

scale. To realise economies of scale a certain function or control must be ceded to the market or community and away from the individual. For example, collectivising risk can reduce a participant's costs of risk management, but it also implies the participant will be subsidising other people's losses and risky behaviours. Or owners can lower storage and maintenance costs by giving possession of their property over to be managed by an external party, like in a library or By Rotation's wardrobe management service, but that necessitates losing on-demand access to their property.

This is related more generally to the transactional structure of CP, and the limitations associated with it. Internalising certain costs and benefits within transactions presents benefits, but it also prevents greater economies from being gained. As long as transactions remain discrete there will likely be duplication of effort and cost somewhere. This is the difference between lending books P2P and going to a library, where the former requires the labour of multiple parties to coordinate sending and returning books, and the latter requires the labour of maintaining a library. Which model is more efficient depends on context, but it is clear to see how a library system will have scale advantages in the areas of purchasing power, storage and supporting a high frequency of lending. I have stated the advantage of transactions is it allows participants to choose their level of tradeoff by altering the boundaries of their transactions, but the tradeoff remains as an inherent limitation of CP. The advantages I have argued for CP depends on transactions being discrete events, as participants' ability to unilaterally choose and manage their sharing requires clearly demarcating relevant information and limiting decision-makers. In short, it seems inevitable that CP must accept some level of inefficiency in transactions in return for the advantages discussed above.

Another limitation is the lack of analysis of the organisational form of CP in this paper. As the discussion has shown, the intermediating organisation plays a crucial role in facilitating the transactions which constitute CP. Transactions are not spontaneous events but require very specific conditions in place before they become viable. That the very P2P sharing transactions which form the archetype for CP have not been widely possible until the late 2000s is a strong testament to the precariousness and fragility of sharing as an economic phenomenon. Therefore, the specific terms of a sharing organisation, whether that be a commercial platform like Airbnb or a community Facebook page like Hoffice, are central to the value structure of that CP system. I have referred frequently to how participants benefit from economies of scale through commoning. What was not mentioned is how these economies of scale are made possible through organisation. As an empirical matter,

it is platforms who provide the ICT tools, guarantee payments and negotiate everything from insurance cover to logistics on behalf of their users.⁸⁵ The savings made by participants have not disappeared, they were merely shifted onto the platform which used its size and central authority to scale necessary functions. As an analytical matter, this dynamic is arguably the same in all property systems, with markets, firms and communities taking the place of platforms as organising intermediaries.

However, this limitation does not change what I perceive to be the features of CP as a property system, and which differentiate it from other forms of private and common property. The element of labour-service, and the fundamentally transactional structure of exchanging private value, producing common value and appropriating common value, are all distinctive of CP. Particular organisational forms will change the terms of and extent to which these features are present; for example Airbnb seeks to maximise the exchange of private value and limits commoning mainly to activities of market-making, whereas Couchsurfing seeks to maximise commoning by building a community of gratuitous sharers. But the dynamics I have analysed remain present in all instances.

6. Conclusion

I have presented how P2P sharing constitutes a new property paradigm called collaborative property that is based on transactional collaboration and labour-service. I have detailed how these features enable CP to combine the benefits of private ownership with the economies of scale of common property, in a way that addresses the challenges which mixed commons and peer-based production systems cannot. In particular I have raised risk management as a matter for which CP can offer a unique solution to, by internalising the benefits of managing risk at the transaction level to and taking advantage of parties' incentives and ability to mitigate, while spreading the costs at the commons level to achieve a measure of risk sharing which is potentially more equitable and less expensive.

An important concern that remains unaddressed is the potential for sharing to exacerbate existing inequalities in property ownership, particularly for high value resources such as real property, by enabling owners greater opportunity to monetise their assets at the expense of non-owners.⁸⁶ A related concern is that sharing may exacerbate erosion of private ownership, and in the long-run transfer greater economic power to property owners, particularly if those owners are ultimately corporate entities. These are legitimate societal concerns which should be considered when designing regulatory measures for the sharing economy.

I will only state that in relation to my conception of CP, the base of private and distributed ownership is posited as a necessary feature in order for the other benefits, such as wider distribution of labour-service, to materialise. As such, the features of CP which I have enumerated do not *prima facie* apply to a situation involving business to peer rentals. It is also important to recognise that these concerns do not detract from the potential for new forms of cooperation which sharing has showed us is possible. The sharing economy is still nascent, and its long-term economic viability remains uncertain, but one potential path of development is towards greater collaboration in producing and distributing resources in a community.

Notes

- 1 In spite of this the very definition of 'sharing economy' remains highly contested, with different aspects emphasised by different commentators. For an overview of the concept, see K Frenken and J Schor, 'Putting the Sharing Economy into Perspective' (2017) 23 *Environmental Innovation and Societal Transitions* 3.
- 2 Rachel Botsman and Roo Rogers, *What's Mine Is Yours: How Collaborative Consumption Is Changing the Way We Live* (Collins 2011).
- 3 Botsman and Rogers, *What's mine is yours* (n 2); Liron Einav, Chiara Farronato and Jonathan D Levin, 'Peer-to-Peer Markets' (2016) 8 *Annual Review of Economics* 615; A Sundararajan, *The Sharing Economy: The End of Employment and the Rise of Crowd-Based Capitalism* (MIT Press 2016); T Schaefer, SJ Lawson and M Kukar-Kinney, 'How the Burdens of Ownership Promote Consumer Usage of Access-Based Service' (2016) 27 *Marketing Letters* 569; S Moeller and K Wittkowski, 'The Burdens of Ownership: Reasons for Preferring Renting' (2010) 20 *Managing Service Quality: An International Journal* 176.
- 4 See LK Ozanne and PW Ballantine, 'Sharing as a Form of Anti-consumption? An Examination of Toy Library Users' (2010) 9 *Journal of Consumer Behaviour* 485; E McArthur, 'Many-to-Many Exchange without Money: Why People Share Their Resources' (2015) 18 *Consumption Markets & Culture* 239; H Guyader, 'No One Rides for Free! Three Styles of Collaborative Consumption' (2018) 32 *Journal of Services Marketing* 692.
- 5 For an historical overview of the trends in commons literature in the context of law and economics, see Carol M Rose, 'Left Brain, Right Brain and History in the New Law and Economics of Property' (2000) 79 *Oregon Law Review* 479.
- 6 Botsman and Rogers, *What's Mine is Yours* (n 2). Cf A Huber, 'Theorising the Dynamics of Collaborative Consumption Practices: A Comparison of Peer-to-Peer Accommodation and Cohousing' (2017) 23 *Environmental Innovation and Societal Transitions* 53.
- 7 I am only addressing P2P transfers here because this model best reflects the 'collaborative' nature of the sharing economy, compared with other models such as business-to-consumer, hybrid private-public ventures, and community-based projects, all of which involve greater centralisation of ownership and other economic functions related to sharing. These categories are taken from Shelly Kreiczer-Levy, *Destabilized Property: Property Law in the Sharing Economy* (CUP 2019), who provides a comparison between the legal and economic dynamics of these various models. I also confine my inquiry to tangible as opposed to intangible property, such as information goods or money, because of the differing economic dynamics affecting tangible goods. Briefly, tangibles are susceptible to 'tragedy', hence their organisation into common forms of governance is much more controversial and problematic compared to intangibles. I will address these issues in more detail in section 3.
- 8 The organisational form is highly significant in structuring the terms of P2P sharing: Steven Vallas and Juliet B Schor, 'What Do Platforms Do? Understanding the Gig Economy' (2020) 46 *Annual Review of Sociology* 273. However the aim of this paper is to explore the basic value

and economic dynamics of P2P sharing, and space precludes me from exploring the organisational aspect in any greater detail.

- 9 It has been increasingly recognised that 'commons' need not denote a discrete resource to which multiple parties have access to, but is a process by which parties contribute resources for common use. See the literature on urban commons, K Bradley, 'Open-Source Urbanism: Creating, Multiplying and Managing Urban Commons' (2015) *Footprint* 9(1); SR Foster and C Iaione, 'The city as a commons' (2016) *Yale Law & Policy Review* 34(2) 281. More generally, see J Euler, 'Conceptualizing the Commons: Moving Beyond the Goods-based Definition by Introducing the Social Practices of Commoning as Vital Determinant' (2018) *Ecological Economics* 143, 10–16.
- 10 'System' is used to denote the complete suite of both norms and economic practices which constitute the process for producing, distributing, and otherwise managing a resource. Penner describes property law as a 'normative system' by which he means a suite of legal rules which have internal coherence and serves a particular purpose: James E Penner, *The Idea of Property in Law* (OUP 2000) Ch 2. Due to the nascent nature of sharing, there are very few legal rules which explicitly govern it, so my discussion will primarily focus on actual economic practices and their effects.
- 11 Y Benkler, 'Sharing Nicely: On Shareable Goods and the Emergence of Sharing as a Modality of Economic Production' (2004) 114 *Yale Law Journal* 273; Sundararajan, 'Crowd-based Capitalism' (n 3).
- 12 Kreiczer-Levy, *Destabilized Property* (n 7).
- 13 Kreiczer-Levy *Destabilized Property* (n 7) is concerned with showing how instead of being tied down to a place or identity through physical possessions, sharing enables people to flexibly explore different forms of interaction with the world and other people, using an inconstant revolving suite of property as the platform for interaction. Cf J Rifkin, *The Age of Access: The New Culture of Hypercapitalism, Where All of Life Is a Paid-for Experience* (JP Tarcher/Putnam 2001).
- 14 I am making the argument from actual use, rather than property rights. The owner retains the right to exclude others, but the point is that the owner chooses not to when they share, and with the advent of the sharing economy this choice becomes more feasible and frequent. One possible effect has been to increase consumption on the expectation that costs can be recouped through rental: B Parguel, R Lunardo and F Benoit-Moreau, 'Sustainability of the Sharing Economy in Question: When Second-Hand Peer-to-Peer Platforms Stimulate Indulgent Consumption' (2017) 125 *Technological Forecasting & Social Change* 48. The power to share and allow access has always been open to legal owners, and indeed sharing depends on this legal power: Daniel B Kelly, 'The Right to Include' (2014) 63 *Emory Law Journal* 857. While this has traditionally been possible in the context of land, it has not always been feasible to do so on a large scale and with net economic benefit outside of real property, as the transaction costs of doing so were prohibitively high: Farronato, Einav and Levin, 'Peer-to-Peer Markets' (n 3).
- 15 This aspect, which relates to the sharing economy's claim to sustainability, is highly contested in the literature: Andrea Geissinger and others, 'How Sustainable Is the Sharing Economy? On the Sustainability Connotations of Sharing Economy Platforms' (2019) 206 *Journal of Cleaner Production* 419. Some argue that sharing exacerbates over-consumption and existing shortages, particularly in the housing market: Chris J Martin, 'The Sharing Economy: A Pathway to Sustainability or a Nightmarish Form of Neoliberal Capitalism?' (2016) 121 *Ecological Economics* 149. Others contend that sharing does enable more sustainable use of existing resources: Botsman, *What's Mine is Yours* (n 2). While the jury is still out on the empirics, the potential for a sustainable system of CP is possible for the reasons I will set out in the succeeding pages.
- 16 E Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (CUP 1990) 30–31.
- 17 Benkler, 'Sharing Nicely' (n 11).
- 18 This presumption holds better for resources that are not housing, as the swathe of literature on how Airbnb diverts housing stock from the long-term rental market to the short-term rental market, and the considerable incidence of illegal sub-letting indicates. It is feasible to buy or lease real estate for the purpose of short-term rental, but not as feasible to buy or lease a car in the hopes of earning arbitrage.
- 19 Hence the concepts of 'prosumption' and 'co-production'. Botsman and Rogers, *What's Mine is Yours* (n 2).

- 20 Benkler, 'Sharing Nicely' (n 11).
- 21 Car-sharing produces the entire asset, as the users access both mileage and seating capacity. Ride-sharing such as Uber produces mileage, as the consumer determines the journey and pays for it accordingly regardless of how many seats are taken up. And car-pooling such as Blablacar produces empty seats. Many other assets such as real estate and tools can also be analysed in similar fashion; Hoffice allows real estate owners to share their space on a flexible hourly basis, Airbnb and Vrbo allows sharing of spare rooms or entire properties, Shareshed offers the use of tools while Taskrabbit also includes the service.
- 22 Benkler, 'Sharing Nicely' (n 11).
- 23 Sally Zhu, 'Sharing Property Sharing Labour: The Co-Production of Value in Platform Economies' (2020) *Laws* 9(4) 24.
- 24 K Bradley and D Pargman, 'The Sharing Economy as the Commons of the 21st Century' (2017) 10 *Cambridge Journal of Regions Economy and Society* 231.
- 25 Henry E Smith, 'Semicommon Property Rights and Scattering in the Open Fields' (2009) 29 *Journal of Legal Studies* 131; Hanoch Dagan and Michael A Heller, 'The Liberal Commons' (2001) 110 *Yale Law Journal* 549.
- 26 Smith, 'Semicommon' (n 25) 134–37 talks about farming land; GS Alexander, *Governance Property* (2012) 160 *University of Pennsylvania Law Review* 1853, discusses housing, as do Dagan and Heller, 'Liberal Commons' (n 25). This focus on land and housing as the subject of commons also holds in other literature, such as urban commons: see SR Foster and C Iaione, 'The City as a Commons' (2016) 34 *Yale Law & Policy Review* 281. And property law: see C Geisler and G Daneker, *Property and Values: Alternatives To Public And Private Ownership* (Island Press 2000).
- 27 Smith 'Semicommons' (n 26) expanded his concept of the semicommons to other forms of property such as water: Henry E Smith, 'Semicommons in Fluid Resources' (2016) 20 *Marquette Intellectual Property Law Review* 195, and telecommunications: Henry E Smith, 'Governing the Tele-Semicommons' (2005) 22 *Yale Journal on Regulation* 289. But water is physically bounded like land, so it is physical proximity which makes each user or owner vulnerable to the actions of their neighbours. Telecommunications are intangible, and while they are rival they are not subtractable, so not subject to the same dynamics as the tangible resources I am concerned with. The model of semicommons, while enlightening, does not provide a full explanation of sharing.
- 28 Although there are strong pressures to do so, and hosts must comply with non-discrimination policies. See U Gunter, 'What Makes an Airbnb Host a Superhost? Empirical Evidence from San Francisco and the Bay Area' (2018) 66 *Tourism Management* 26. See also D Das Acevedo, 'Unbundling Freedom in the Sharing Economy' (2018) 91 *Southern California Law Review* 793 on algorithmic management.
- 29 Benkler, 'Sharing Nicely' (n 11); E Katrini, 'Sharing Culture: On Definitions, Values, and Emergence' (2018) 66 *Sociological Review* 425; K Bradley, 'Open-Source Urbanism: Creating, Multiplying and Managing Urban Commons' (2015) 9 *Footprint* 91.
- 30 Sundararajan has argued that platforms may be seen as a new hybrid organisational form in-between market and firm in Sundararajan *The Sharing Economy: The End of Employment and the Rise of Crowd-Based Capitalism* (n 3) 77–84. Cf R Dyal-Chand, 'Regulating Sharing: The Sharing Economy as an Alternative Capitalist System' (2015) 90 *Tulane Law Review* 241, who argues that platforms are closer to coordinated market economies. Both authors agree that platforms are a species of market-based exchange.
- 31 Y Benkler, 'Coase's Penguin, or, Linux and "The Nature of the Firm"' (2002) 112 *Yale Law Journal* 369; Sundararajan, *The Sharing Economy* (n 2) 65; L Gansky, *The Mesh: Why the Future of Business Is Sharing* (Portfolio 2010); Jeremiah Owang, 'Quick Guide: The Collaborative Economy Body of Work for Corporations', <www.web-strategist.com/blog/2013/08/22/table-of-contents-the-collaborative-economy> accessed 5 September 2022.
- 32 Benkler, 'Sharing Nicely' (n 11).
- 33 Benkler, 'Coase's Penguin' (n 31).
- 34 Benkler, 'Coase's Penguin' (n 31).
- 35 Zhu, 'Sharing Property' (n 23).
- 36 Ostrom, *Governing the Commons* (n 16) 30–31.
- 37 H Demsetz, 'Toward a Theory of Property Rights' (1967) 57 *American Economic Review* 347.
- 38 Ostrom, *Governing the Commons* (n 16) 88–100.
- 39 James E Penner, 'The "Bundle of Rights" Picture of Property' (1996) 43 *UCLA Law Review* 711; Jeremy Waldron, *The Right to Private Property* (Clarendon 1988).

- 40 This condition of legal authority and title is required both by statute regulating the supply of goods (Sale and Supply of Goods Act 1982 s 2) and by user agreement contracts on various platforms (see Turo's Terms which state 'You will not offer any vehicle or optional Extra that you do not yourself own or have authority to share . . .', <<https://turo.com/gb/en/policies/terms>> accessed 7 September 2022).
- 41 Zhu, 'Sharing Property' (n 23).
- 42 Zhu, 'Sharing Property' (n 23).
- 43 The platform has since been rebranded as VRBO and operates an almost identical system to Airbnb.
- 44 Dagan and Heller, 'Liberal Commons' (n 26).
- 45 DJ Kochan, 'I Share, Therefore It's Mine' (2017) 51 University of Richmond Law Review 909. Cf Kelly, 'The Right to Include' (n 13); EM Penalver, 'Property as Entrance' (2005) 91 Virginia Law Review 1889.
- 46 Similar to how Kreiczer-Levy *Destabilized Property* (n 7) envisions 'access'.
- 47 Such is the nature of multi-sided businesses which are sustained by market depth and network effects; see DS Evans and R Schmalensee, *Matchmakers: The New Economics of Multisided Platforms* (Harvard Business Review Press 2016).
- 48 Sundararajan, *The Sharing Economy* (n 30) 77–78. Similar to Benkler's idea of networks; Y Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (Yale University Press 2006).
- 49 Zhu, 'Sharing Property' (n 23).
- 50 Evans and Schmalensee, *Multisided Platforms* (n 47).
- 51 R Belk, 'Sharing Versus Pseudo-Sharing in Web 2.0' (2014) 18 Anthropologist 7.
- 52 Evans and Schmalensee, *Multisided Platforms* (n 47).
- 53 Smith, 'Semicommon' (n 25).
- 54 Demsetz, 'Property Rights' (n 37).
- 55 RH Coase, 'The Problem of Social Cost' (2013) 56 Journal of Law & Economics 837; Waldron, *Private Property* (n 39).
- 56 Coase, 'The Problem of Social Cost' (n 55); Demsetz, 'Property Rights' (n 37).
- 57 A Perzanowski and JM Schultz, *The End of Ownership: Personal Property in the Digital Economy* (MIT Press 2017).
- 58 But see the empirical studies suggesting market uniformity and systemic discrimination against certain classes; J McCloskey, 'Discriminatorybnb: A Discussion of Airbnb's Race Problem, Its New Anti-Discrimination Policies, and the Need for External Regulation' (2018) 57 Washington University Journal of Law & Policy 203; JB Schor and W Attwood-Charles, 'The "Sharing" Economy: Labor, Inequality, and Social Connection on for-Profit Platforms' (2017) 11 Sociology Compass. While discrimination does exist on platforms, it must be remembered that they also exist in non-platform exchanges, possibly with much greater frequency and less transparency.
- 59 Dagan and Heller, 'Liberal Commons' (n 25) discuss these factors in the context of liberal commons.
- 60 G Hardin, 'The Tragedy of the Commons' (1968) 162 Science 1243.
- 61 Ostrom, *Governing the Commons* (n 16) 94–102; Dagan and Heller, 'Liberal Commons' (n 25).
- 62 Often construed as a prisoners' dilemma situation.
- 63 Zhu, 'Sharing Property' (n 23).
- 64 E Bucher, C Fieseler and C Lutz, 'What's Mine is Yours (for a Nominal Fee) – Exploring the Spectrum of Utilitarian to Altruistic Motives for Internet-Mediated Sharing' (2016) 62 Computers in Human Behavior 316. The same considerations apply for in-kind exchanges.
- 65 JB Schor and others, 'Paradoxes of Openness and Distinction in the Sharing Economy' (2016) 54 Poetics 66; M-P Wilhelms, S Henkel and T Falk, 'To Earn Is Not Enough: A Means-End Analysis to Uncover Peer-Providers' Participation Motives in Peer-to-Peer Carsharing' (2017) 125 Technological Forecasting & Social Change 38.
- 66 CP Lamberton and RL Rose, 'When Is Ours Better Than Mine? A Framework for Understanding and Altering Participation in Commercial Sharing Systems' (2012) 76 Journal of Marketing 109; Ostrom, *Governing the Commons* (n 16) 42–45.
- 67 Vallas and Schor, 'What Do Platforms Do?' (n 8).
- 68 Sally Zhu, 'Risk Management in Peer-to-Peer Sharing', unpublished, on file with author.
- 69 This corresponds to the dual-level of cooperation, namely transactional and commons, which I refer to in section 3.3 above.

- 70 T Teubner, F Hawlitschek and D Dann, 'Price Determinants on Airbnb: How Reputation Pays Off in the Sharing Economy' (2017) 5 Journal of Self-Governance and Management Economics 53; G Abrate and G Viglia, 'Personal or Product Reputation? Optimizing Revenues in the Sharing Economy' (2019) 58 Journal of Travel Research 136; AG Mauri and others, 'Humanize Your Business. The Role of Personal Reputation in the Sharing Economy' (2018) 73 International Journal of Hospitality Management 36.
- 71 J Bridges and C Vásquez, 'If Nearly All Airbnb Reviews Are Positive, Does That Make Them Meaningless?' (2018) 21 Current Issues in Tourism 2057.
- 72 R Dyal-Chand, 'Sharing Whiteness' (unpublished); McCloskey, 'Discriminatorybnb' (n 58).
- 73 Airbnb, 'Verifying Your Identity' <www.airbnb.co.uk/help/topic/1389/id-and-verification> accessed 7 September 2022.
- 74 Uber has a policy that drivers are downgraded if they refuse more than a certain amount of requests per day; AJ Ravenelle, 'Sharing Economy Workers: Selling, Not Sharing' (2017) 10 Cambridge Journal of Regions Economy and Society 281.
- 75 Benkler, 'Coase's Penguin' (n 31).
- 76 Ostrom, *Governing the Commons* (n 16).
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