

Laying Competition to Waste

The Economics of Resale, Recycling, and Upcycling

Joost Poort

20.1 INTRODUCTION

The reuse of materials that lost their initial function is as old as time – much older than the concept of recycling, let alone upcycling. In prehistoric times, humans and their predecessors used the teeth, bones, and tusks of animals they caught for consumption, to make tools, weapons, musical instruments, and ornaments. Walking along the remnants of Hadrian's Wall, built in the second century AD to separate the Roman Empire from the wild Scots, one can spot many edifices of later date that reused stones from the wall.¹ And the cathedral in Pisa, the Duomo Santa Maria, founded in 1064, contains many stones taken from ruined Roman monuments (see Figure 20.1).

Many more such examples can be encountered around the world. Oftentimes, the reuse of materials was purely inspired by an appreciation of their qualities in terms of durability, shape, or appeal. For instance, tusks may have been used as tools because of their hardness and sharpness. Scarcity of materials with such qualities motivated their reuse, as is also the case for the famous reuse of old velvet curtains as a dress in *Gone with the wind*, described in the Chapter 1 of this *Handbook*.² However, one can wonder why the builders of the Duomo Santa Maria decided to position the stone with the partial inscription in Figure 20.1 in the way they did, if it was just the stone they needed. Given the religious importance of this building, it is hard to believe this was a coincidence or carelessness. According to the official website of the Opera della Primaziale Pisana, which is in charge of the preservation of the Duomo, the 'massive use of reused materials from Roman monuments ... emphasized the greatness of the city of Pisa, "altera Roma"'.³

This notion turns the reuse of these stones into something which is close to upcycling, *avant la lettre*: the reused stones not just serve as building materials, but also as a cultural reference and a tribute to their old function. Recognizability is key to making this reference and tribute. Fast forward to modern times, one can see similarities with the 'ready-made' art from the early twentieth century, with its most famous example, Marcel Duchamp's *Fountain*,⁴ and even with Maurizio Cattelan's *Comedian*, a banana affixed to a wall with a piece of grey duct tape.⁵

¹ See, for example, https://en.wikipedia.org/wiki/Hadrian%27s_Wall (accessed 11 May 2025).

² Péter Mezei and Heidi Härkönen, 'A Primer to Intellectual Property Law and Upcycling' in Péter Mezei and Heidi Härkönen (eds.), *The Cambridge Handbook of Intellectual Property and Upcycling* (Cambridge University Press, 2026) 9–10.

³ See www.opapisa.it/en/square-of-miracles/cathedral/ (accessed on 11 May 2025).

⁴ See Figure 1.2 in Mezei and Härkönen (n. 2).

⁵ See [https://en.wikipedia.org/wiki/Comedian_\(artwork\)](https://en.wikipedia.org/wiki/Comedian_(artwork)) (accessed 11 May 2025).

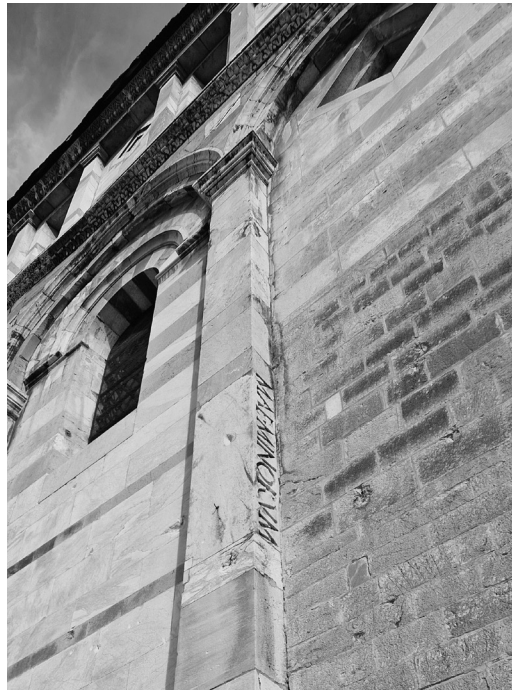


FIGURE 20.1 Reused ancient Roman stone with partial inscription in the Duomo Santa Maria in Pisa. Photo by Joost Poort.

Presently, the upcycling movement is to a large extent inspired by concerns over the depletion of natural resources, pollution, and global warming,⁶ which is in a way akin to the aforementioned scarcity-motivated reuse of materials. At the same time, referencing the old life or purpose of the material is another key feature of upcycling, and it is this feature that has sparked legal disputes in various countries.⁷ In these disputes, several intellectual property (IP) rights are invoked: first and foremost, copyright, but also trademarks and design, to prevent upcycling from reusing materials or items into something new.

This chapter aims to answer the naive question why IP rights holders would care at all about upcycling. It takes an economic perspective in addressing this question and proceeds with a normative welfare-economic perspective to address the question whether IP rights holders should have their way. Before doing so, it presents a rudimentary economically oriented taxonomy of resale, recycling, and upcycling.

20.2 AN ECONOMIC TAXONOMY OF RESALE, RECYCLING, AND UPCYCLING

It is argued in this chapter that resale, refurbishment, and up-cycling share similarities that trigger producers to respond to them in a similar way. So how can these concepts be distinguished from an economic point of view and how do they differ from recycling?

⁶ See, for example, Dana Beldiman, Stina Teilmann-Lock, and Anna Tischner, 'Upcycling as a Design Strategy in Light of European Design Protection' in Mezei and Härkönen (n. 2) 65–87; Neethu Rajam and Daniel Acquah, 'Upcycling and Patents: Finding the Contours for Social Innovation and Sustainability' in *ibid.*, 101–117; and Eeva Aro, 'Foreword: The Importance of Upcycling in Creative Work' in *ibid.*, xiii–xiv.

⁷ For a discussion of several such cases, see Péter Mezei and Heidi Härkönen, 'Monopolising Trash: A Critical Analysis of Upcycling under Finnish and EU Copyright Law' 18(5) *Journal of Intellectual Property Law and Practice* 1 (2023) 360–366.

Allegedly, the first (written) use of the word ‘upcycling’ dates back to 1994, attributed to Reiner Pilz in an article by Thornton Kay,⁸ where it is used to criticize an unnecessary loss of value in common recycling processes. The latter is coined ‘downcycling’ by Pilz. He argues that what is needed is ‘upcycling, where old products are given more value, not less’.⁹ Although this plea for more attention to preserving or maximizing the value of reusable materials is very valid, a definition along these lines is not helpful to understand the economic incentives producers have vis-à-vis upcycling. Nor does it help to understand the controversies that surround upcycling against the backdrop of IP rights, which is the core topic of this volume.

In Chapter 1 of this *Handbook*, Péter Mezei and Heidi Härkönen provide an entirely different and legally inspired definition, as they write: upcycling ‘might be defined as *transformative – recontextualized or repurposed – recycling and redistribution of tangible copies of works or goods that are protected by IP law.*’¹⁰ Through an economic lens, and in order to understand producer behaviour, it is helpful to focus on the markets where products and materials are offered. From this perspective, recycling concerns reuse of tangible objects as more or less raw materials, stripped of their initial use, function, or recognizability. This concerns the recycling of old newspapers via paper pulp into new paper for printing new newspapers as well as for toilet paper, smashing empty bottles in the bottle bank as raw material for making new glass, and collecting old smartphones and computers as ‘ore’ for harvesting precious and rare-earth metals. What these examples have in common is that the recycled materials are offered in *upstream markets*, more or less as raw materials that the producer of the initially recycled products, as well as competitors and producers in entirely different markets can use as an input. The plea by Pilz to upcycle instead of downcycle can be understood as a call to recycle in the most efficient and value-preserving way possible. Rather than making glass from smashed bottles in the bottle bank, which requires a lot of energy and yields glass of an inferior quality, one should reuse bottles. From an economic perspective, this is not a game changer, however, as reused bottles still function as inputs in the upstream market.

In case of resale and refurbishment, on the other hand, products retain their original functionality and are offered in the same market as the original product. While recycling has no competitive consequences for producers in their primary market, it will be discussed in Section 20.3 that resale and refurbishment can have substantial competitive effects.

Upcycling, as defined in this volume, differs from both recycling and resale. Whether or not upcycling conflicts with IP rights, its transformative nature entails that it does not directly compete in the same product market as the original, but it also implies that it is not merely serving as an upstream input factor. In a concrete example: a recycled Coca-Cola bottle may be cleaned and refilled, or smashed, melted down, and made into a new bottle. Both are only relevant to the Coca-Cola Company as (potential) upstream input factors. A Coca-Cola bottle upcycled into a pendant light as in Figure 20.2, serves an entirely different – downstream or derivative – market.

A schematic presentation of the taxonomy in this section is provided in Figure 20.3. The first question for this taxonomy is whether the product is brought to the market while retaining its original function. If so, this concerns a case of resale, or refurbishment if any repairs or improvements have been made before resale. This resold or refurbished product competes with originals in the primary market.

⁸ Thornton Kay, ‘Reiner Pilz’ 23 *Salvo Monthly*, 11 October 1994, 14, referenced in: <https://en.wikipedia.org/wiki/Upcycling> (accessed 11 May 2025).

⁹ Ibid.

¹⁰ Mezei and Härkönen (n. 2) 3, original emphasis.



FIGURE 20.2 Upcycled Coca-Cola bottle by ZALcreations.

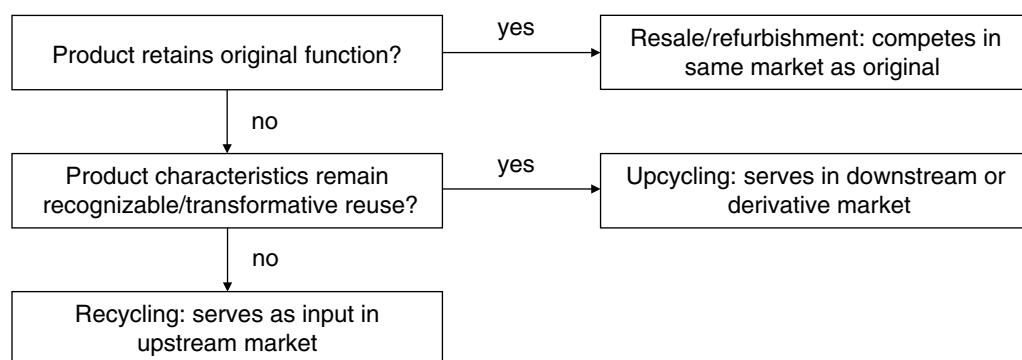


FIGURE 20.3 Economic taxonomy of resale, recycling, and upcycling. Created by Joost Poort.

If the answer to the first question is negative, the next question is whether the product characteristics remain recognizable. If this is the case, then it can be considered upcycling and the product will be offered in downstream, derivative, or completely different markets. If not, it can be seen as a case of recycling, serving upstream markets.

It is appropriate to add that, as in almost any taxonomy, there can be examples which are less clear-cut. One example would be the ‘recycling’ of printer cartridges. If this is done by the producer of the original cartridge, it is no different from recycling a Coca-Cola bottle by cleaning and refilling it. If it is done by a third party, however, it competes in the same market as the original and rather qualifies as refurbishment. In particular, if the trademark remains on the refurbished cartridge, this practice may lead to confusion with brand new original cartridges and may be contested as an infringement of IP rights.¹¹ A second example concerns using materials from

¹¹ By consequence, such examples have led to (alleged) IP infringement cases. See, for example, Scott M Tobias, ‘No Refills: The Intellectual Property High Court Decision in *Cannon v. Recycle Assist* Will Negatively Impact the Printer Ink Cartridge Recycling Industry in Japan’ 16 *Pacific Rim Law & Policy Journal* (2007) 775. A comparable

designer clothes and turning them in a recognizable way into new ‘upcycled’ garments,¹² where one could argue that the upcycled product is offered in the same market as the original product. Such examples will be analyzed in more detail in Section 20.4.

20.3 CONTROLLING RESALE

‘When do secondary markets harm firms?’ This is the title of an article by Jiawei Chen, Susanna Esteban, and Matthew Shum, in which they build a dynamic model of durable goods oligopoly with transaction costs in the secondary market.¹³ These transaction costs in the secondary market are the key parameter in their model: high transaction costs imply large frictions for supply and demand in the secondary market to meet, and raising them in the model effectively shuts down the secondary market while lowering them opens up secondary markets.

Chen et al. discern three relevant effects of opening up a secondary market for durable goods. The first is a *substitution effect*: by selling a product on the market, a firm simultaneously places a future used product on the market. Assuming resale is possible and allowed, used products can substitute demand for new products. The smaller the transaction costs in the secondary market, the larger this potential cannibalization effect which in isolation reduces a firm’s profits.¹⁴

Second, there is what Chen et al. call an *allocative effect*: consumers who buy a product simultaneously buy the option to resell the product. Secondary markets can improve the allocation of the vintage products, and a firm can indirectly benefit from this in the initial sale. Consumers will take the option to resell into account in their initial purchase.¹⁵ One may add to this that a well-functioning secondary market may speed up the renewal pace of high-value customers; think of the market for smartphones for instance, where some consumers buy the latest model of their preferred brand each year, while reselling the previous one.

The third effect is a *time consistency effect*: a firm can increase consumers’ valuation of a product by committing to keeping prices high by restricting output, but has incentives not to commit and to increase output once initial profits have been made. Secondary markets exacerbate the impact of this.¹⁶

Chen et al. calibrate their model using data from the US automobile industry and find that opening up the secondary market from closed to frictionless decreases new car manufacturers’ profits by 35 percent. They conclude: ‘The important takeaway from our findings, however, is that secondary markets have multiple countervailing implications for firms’ profitability. As the magnitude of these effects depends on the underlying parameter values and thus the

case at the Court of Justice of the EU (CJEU) concerns refilling SodaStream cylinders. See Case C-197/21, *Soda-Club (CO₂) SA and Others v MySoda Oy*, CJEU, ECLI:EU:C:2022:834. See, for instance, Michele Giannino, ‘SodaStream: The Court of Justice Clarifies the Application of the Principle of Exhaustion to Trademarked Recyclable Products’ (2023), available at: <https://papers.ssrn.com/abstract=4336563> (accessed 30 June 2025).

¹² Famous examples of this have been created by Duran Lantink, who ‘Frankensteined’ discarded Louis Vuitton and Givenchy coats into new garments. See <https://tinyurl.com/36zwb2c2> (accessed 28 May 2025).

¹³ Jiawei Chen, Susanna Esteban, and Matthew Shum, ‘When Do Secondary Markets Harm Firms?’ 103(7) *American Economic Review* (2013) 2911–2934.

¹⁴ *Ibid.*, 2912–2913.

¹⁵ *Ibid.*, 2913. The argument is related to one made by Liebowitz in a seminal article on the effect of photocopying on demand for journals. He finds that the value of copies (secondary market) can be priced into the initial sale: ‘The evidence indicates that publishers can indirectly appropriate revenues from users who do not directly purchase journals and that photocopying has not harmed journal publishers.’ See Stan J. Liebowitz, ‘Copying and Indirect Appropriability: Photocopying of Journals’ 93(5) *Journal of Political Economy* (1985) 945.

¹⁶ Chen, Esteban, and Shum (n. 13) 2913.

particulars of the industry and market considered, the overall effect cannot be generally signed and remains an empirical question.¹⁷ The answer to this empirical question depends on the market structure, product characteristics and consumer preferences.

Although theoretical articles using different modelling assumptions sometimes lead to different outcomes,¹⁸ Zhao et al. and Chen et al. refer to the ‘conventional wisdom’ that resale of used durable goods generally cannibalizes profits in the primary market.¹⁹ Note also that preventing resale is a condition for successful price discrimination.²⁰

All this explains why firms typically try to control or shut down secondary markets whenever they have the chance. A controversial example is the Trade-Up programme Sonos launched in 2019. Users could choose to replace specific older components of this audio system, by having them disabled in exchange for a discount on renewals. In the process, Sonos would remotely flip a kill-switch in the old component to prevent it from being resold. The component would become useless. Pressured by consumer backlash for the environmentally unfriendly nature of this programme,²¹ Sonos changed it in 2020. Users could still receive a discount code for replacing an eligible component, but it was not ‘bricked’ and could still be resold.²² Bearing in mind the notion in Chen et al. that transaction costs in the secondary market may effectively shut it down, strategic litigation against resellers also emerges as a plausible strategy, even if the chances of winning such cases are slim.

20.4 CONTROLLING UPCYCLING

While it may come natural for firms to strive to control or shut down secondary markets if they have the chance, and by extension to take the same position vis-à-vis upcycling, it was pointed out in Section 20.2 that upcycled products do not compete with originals in the primary market. Instead, they are offered in downstream or derivative markets.

In the language of competition law and competition economics: soft drinks and pendant lights are not part of the same relevant market, nor are curtains and dresses, or teacups and jewellery.²³ In occasional instances, upcycled products may technically be on sale in the same broadly defined market, for instance clothing, but catering for such different consumer groups, that they would fail to be part of the same relevant market in terms of competition law/economics: consumers would not at any scale switch from originals to upcycled products in case of a price increase. Moreover, given the artisan nature that upcycling typically has, the primary market has no meaningful substitution to fear from the upcycled products also in terms of production volume.

¹⁷ Ibid., 2932.

¹⁸ For example, see Pu-yan Nie, Chan Wang, Hong-xing Wen, and Ting Cui, ‘Durable Goods with Secondary Markets’ 24(1) *Journal of Applied Economics* (2021) 577–591; Mengnan Wang, Juliang Zhang, and T. C. E. Cheng, ‘Sharing or Reselling? How Does Manufacturer Handle Used Products?’ 71(5) *Naval Research Logistics (NRL)* (2024) 645–659; You Zhao, Rui Hou, and Zhonghui Ding, ‘The Value of Secondary Markets When Consumers Are Socially Conscious’ 24(1) *Operational Research* (2024) 7; Guoming Lai, Yunjie Wang, and Yuanyuan Yang, ‘The Impact of Secondary Marketplace on Retail Platform and Supply Chain’ (2024), doi.org/10.2139/ssrn.4738114.

¹⁹ Zhao, Hou, and Ding (n. 18); Hongqiao Chen, Ying-Ju Chen, Yang Li, Xiaoquan (Michael) Zhang, and Sean X. Zhou, ‘Digital Goods Reselling: Implications on Cannibalization and Price Discrimination’ *X Production and Operations Management* (2024) 1–18.

²⁰ See, for example, Frederik Zuiderveen Borgesius and Joost Poort, ‘Online Price Discrimination and EU Data Privacy Law’ 40 *Journal of Consumer Policy* (2017) 347–366.

²¹ See, for example, <https://en.community.sonos.com/speakers-228992/trade-up-scheme-6831609> (accessed 23 May 2025).

²² See, for example, <https://tinyurl.com/2v4d594b> (accessed 11 May 2025).

²³ See these examples in Mezei and Härkönen (n. 2) 12–15.

So, how can the often hostile attitude of IP rights holders towards upcycling be explained or even justified, if not by fear of cannibalization of the primary market? Below, various possible motivations are presented. A critical and welfare-economic analysis is given in Section 20.5.

First, IP rights holders may be afraid of *reputational damage* in the primary market. A cause of such reputational damage may stem from *confusion*, the avoidance of which is a cornerstone of trademark law. Consumers might be led to believe that the upcycled product is produced or franchised by the original IP rights holder. If the upcycled product turns out to be faulty or controversial, the original product may suffer reputational damage as a consequence of this confusion. Another cause of reputational damage may result from *criticism* of the original product which the upcycled product may convey. Here the upcycled Louis Vuitton garments by Duran Lantink may be mentioned again as an example. A related example of this, although strictly not an instance of upcycling, is Louis Vuitton's (eventually unsuccessful) legal action against the use of its trademark in Nadia Plesner's artwork *Darfurnica*.²⁴

A second reason why IP rights holders may take a hostile attitude towards upcycling may be *foregone option value* in derivative markets. Although the upcycled product does not compete or substitute in the primary market, an IP rights holder may consider all derivative markets as a portfolio of marketing options that may or may not be exercised at some future moment. For instance, the Coca-Cola Company *could* decide at some stage to issue limited edition pendant lights as collectors' items, just like the previously mentioned Finnish tableware company *could* decide to start producing jewellery. Once the upcycled product gains traction in the market, this option will be spoiled.

A third and related explanation for a hostile attitude towards upcycling is the argument that it is not fair that a third party benefits somehow from the referential aspect of the upcycled product. This argument is reflected in Anthony M. Keats' critical analysis of upcycling practices as *free-riding* and 'lesser efforts' compared to those of the original IP rights holders.²⁵

20.5 WELFARE-ECONOMIC ANALYSIS

In the previous Section, it was argued that a fear of profit-reducing substitution in the primary market does not provide adequate economic justification for a firm to object to or take legal action against upcycling. However, it was pointed out that such objections or legal action may result from fear of reputational damage from confusion or criticism; from forgone option value of engaging in the same derivative market as the upcycling firm or individual; or from discontent about free-riding.

It is hard to weigh the *confusion* argument from a welfare economic perspective. On the one hand, reputational damage as a result of a faulty upcycled product can be construed as a *negative* externality of the upcycled product on the original and as such as a valid concern. On the other hand, a cool or functional upcycled product can similarly generate *positive* reputational externalities. In practice, any misunderstanding that the upcycled product is produced or franchised by the original IP rights holder seems unlikely to occur and can easily be avoided by proper notification.²⁶ For those reasons, allowing IP rights holders to forbid

²⁴ See, for example, https://en.wikipedia.org/wiki/Nadia_Plesner#cite_note-2 (accessed 11 May 2025).

²⁵ Anthony M. Keats, 'Trendy Product Upcycling: Permissible Recycling or Impermissible Commercial Hitchhiking?' 110 *Trademark Reporter* (2020) 712.

²⁶ This is also argued in Heidi Härkönen, 'Copyright Moral Rights Protection and Environmental Sustainability: The Case of Upcycling' in Elena Izyumenko (ed.), *Intellectual Property and the Human Right to a Healthy Environment* (Verfassungsbooks, 2025) 111–122. See also Katarzyna Stasiuk, Anna Tischner, Stina Teilmann-Lock, and Dana Beldiman, 'Empirical Perspective: Upcycling with Branded Material through the Eyes of Consumers' in Mezei and Härkönen (n. 2) 361–379.

upcycling on the basis of this argument seems not only farfetched, but also likely to have negative welfare effects, by destroying the welfare generated by the upcycled products, as well as by the negative externalities of additional waste production and resource extraction this will entail.²⁷

Negative reputational effects as a result of *criticism* implicitly expressed by upcycled products seems more likely than such effects as a result of confusion. From a non-economic point of view, it is in general ill-advised to allow firms to silence criticism, which is a manifestation of the fundamental right of freedom of expression.²⁸ Through a more economic lens, criticism can reduce information asymmetries in the primary product market by pointing at, for instance, environmental malpractices or child labour associated with the product. Raising awareness about this will lead to better informed transactions in the primary market and by doing so, increase welfare. Thus, one can also make the case from welfare economic reasoning that criticism should not be silenced.

The potential harm of the *forgone option value* of engaging in the same derivative market as the upcycling firm or individual is a purely economic argument. In principle, it cannot be ruled out that such effects may occasionally occur. However, it is hard to reconcile this potential harm with the original economic motivation for IP rights, to create investment incentives.²⁹ It is dubious at best to consider a portfolio of unforeseen or unspecified derivative upcycled products part of the required investment incentive. Moreover, it is important not to forget that upcycling reuses products that have legally been acquired in the primary market. Therefore, the value created in the upcycling market could in principle have been priced into the purchase and there is no market failure to justify granting the IP rights holders in the primary market additional rights in the derivative market. To the contrary, granting the IP rights holder in the primary market the right to forbid or extract the rents of any downstream creative reuse provides downstream markets with a disincentive for creative investment.³⁰

The final argument touched upon in Section 20.5 was possible discontent for IP rights holders about the alleged free-riding of upcycling practices. This argument – to the extent that it is not implied in the previous point about the option value of potential derivative markets – boils down to jealousy. It is distributional in nature and lacks an incentive rationale or any other economic justification.

20.6 CONCLUSIONS

This chapter analyzed upcycling through an economic lens. It discussed the similarities and differences between resale, recycling, and upcycling from a markets perspective and analyzed the incentives for producers in the primary market to engage with these markets further down the life cycle of a product. Firms often have incentives to try to control such aftermarket, particularly in the case of resale or refurbishment, in order to reduce cannibalization of and increase options for price discrimination in the primary market.

²⁷ For the market failures associated with resource extraction and disposal, see Don Fullerton, ‘The Circular Economy’, *NBER Working Paper Series*, No. w32419 (National Bureau of Economic Research, Inc., 2024).

²⁸ See also Sabine Jacques, ‘Just My Reimagination, Just Your Intellectual Property’ in Mezei and Härkönen (n. 2) 293–309.

²⁹ For a critical analysis of this rationale in the context of copyright, see Joost Poort, ‘Borderlines of Copyright Protection: An Economic Analysis’ in P. Bernt Hugenholtz (ed.), *Copyright Reconstructed: Rethinking Copyright’s Economic Rights in a Time of Highly Dynamic Technological and Economic Change* (Kluwer, 2018) 283–338.

³⁰ The argument made here is the economic counterpart of the exhaustion doctrine which is central to IP law and discussed in the context of upcycling in Mezei and Härkönen (n. 7) 364–366.

However, in the case of upcycling, these economic motivations to strive to control downstream markets lose their validity. Fear of reputational damage from confusion or criticism, forgone option value of engaging in the same derivative market as the upcycler, or plain discontent about free-riding provide insufficient welfare economic justification to allow IP rights holders to block upcycling. While firms have a natural desire to control resale and by extension to control downstream markets in order to lay any competition to waste, there is no convincing economic justification to allow them to abuse IP rights to discourage upcycling.